



Annex 1

Local Verification results – Berlin



Table of Contents

	Page
Indicator 1: Accuracy of DOAS equipment compared with traditional equipment.....	3
Indicator 2: Accuracy of roadside description, Air models	3
Indicator 3: Accuracy of roadside description, Noise models.....	5
Indicator 4: Testing processes of DSS interfaces	5
Indicator 5: Testing DSS modelling and forecasting processes.....	8
Indicator 6: Testing DSS operator interface and scenario processes.....	10
Indicator 7: Testing the functioning of the main system components and their interaction	11
Indicator 8: User acceptance by professional users	12
Indicator 9: User acceptance by the general public	14

LOCAL VERIFICATION RESULTS - BERLIN

Indicator 1: Accuracy of DOAS equipment compared with traditional equipment

This indicator is not applicable for Berlin.

Indicator 2: Accuracy of roadside description, Air models

Measurements were completed for one roadtype only:

Roadtype x	Beusselstrasse, an inner urban road
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Location X: Beusselstrasse

Which organization(s) did the testing?	SenStadt were responsible for the air pollution measurements, IVU Traffic Technologies completed the modelling and the comparison of the modelled and measured data
When did the testing take place?	Measurements were taken between 1 st November - 15 th December in the northern part of the Beusselstrasse. Additional measurements will be collected in February in the southern part of the Beusselstrasse. Modelling has been made for the period Nov 1 - Nov 7
How many values have been collected and evaluated?	Comparisons have been made over a one week period (168 values per pollutant)
Which pollutants have been measured and calculated?	Measured: PM ₁₀ , CO, NO ₂ , NO _x , Benzene Calculated: PM ₁₀ , CO, NO ₂ , NO _x , Benzene

$$\Delta C = \frac{\sum (C_m - C_{calc})}{n} \quad \Delta C_{abs} = \frac{\sum |C_m - C_{calc}|}{n}$$

CRITERION	R ²	Value C	Success criterion	OK / NOK	If not OK, why not and how to improve this?
NO ₂ (1 hour)	0.54	51%	ΔC < 60 %	OK	Better results are expected from an improved method which will be used to calculate the NO ₂ contribution from NO _x during the demonstration period
NO _x (1 hour)	0.64	44%	ΔC < 60%	OK	
PM ₁₀ (1 hour)	0.6	27%			
PM ₁₀ (24 hour)		27%	ΔC < 50%	OK	Additional improvements are expected from the results of a parallel study concerning improved knowledge of PM ₁₀ modelling
CO (1 hour)	0.73	42%			

CO (8 hour)		42%	$\Delta C < 50\%$	OK	
Benzene (1 hour)	0.52	56%			
Benzene (24 hour)		38%	$\Delta C < 50\%$	OK	

In general, improvements are expected when the improved traffic data, which will be available for the whole network, can be used. This data should be available by the end of February.

Indicator 3: Accuracy of roadside description, Noise models

To be completed.

Indicator 4: Testing processes of DSS interfaces

Indicator 4a: Test Interface to Traffic Monitoring Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	3 weeks	0		OK
Operational time	3 weeks	100%	> 95%	OK
Correct data in and out, referred to data in monitoring station	3 weeks	YES	Data in DSS equals data in monitoring station	OK
Speed	3 weeks	2 – 3 minutes	Fast enough to allow the entire system to reach an hourly update	OK

To which process(es) does the above table refer?	P 2.1: Data import from detection data of the Traffic Management Centre???
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	22 nd October – 16 th November 2001
Any other remarks concerning this sub-indicator?	Currently the data is captured on an hourly basis but is only transferred to the HEAVEN System once a day

Indicator 4b: Test Interface to Meteorological Monitoring Process

CRITERION	Testperiod / frequency	Value	Success Criterion	OK / NOT OK or N/A
Number of system failures	3 weeks	0		OK
Operational time	3 weeks	100%	> 95%	OK
Correct data in and out, referred to data in monitoring station	3 weeks	YES	Data in DSS equals data in monitoring station	OK
Speed	3 weeks	2 – 3 minutes	Fast enough to allow the entire system to reach an hourly update	OK

To which process(es) does the above table refer?	P2.2: Data import from meteorological data providers
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	22 nd October – 16 th November 2001
Any other remarks concerning this sub-indicator?	The values are not always updated on an hourly basis, in case the current hourly level is unavailable, the most recent value is used.

Indicator 4c: Test Interface to Environmental Monitoring Network Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	3 weeks	10		OK
Operational time	3 weeks	100%	> 95%	OK
Correct data in and out, referred to data in monitoring station	3 weeks	YES	Data in DSS equals data in monitoring station	OK
Speed	3 weeks	2 – 3 minutes	Fast enough to allow the entire system to reach an hourly update	OK

To which process(es) does the above table refer?	P2.3: Data import from 4 background pollution monitoring stations in the suburbs of Berlin
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	22 nd October – 16 th November 2001
Any other remarks concerning this sub-indicator?	The values are not always updated on an hourly basis, in case the current hourly level is unavailable the most recent value is used.

Indicator 4d: Test Interface to Static & Infrequently Updated Information Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	N/A only one data import	0		OK
Operational time	N/A	Running since data import which took place in September 2001	> 95%	OK
Correct data in and out, referred to data in	September 2001	YES	Data in DSS equals data in source	OK

source				
Speed	N/A	N/A	Hourly update	N/A

To which process(es) does the above table refer?	P 3.1: Import of necessary static data in the database
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	Only one import
Any other remarks concerning this sub-indicator?	Data has been installed on the database only once

Indicator 4e: Test Interface to Information Flow Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	4 days	0		OK
Operational time	4 days	100%	> 95%	OK
Correct data in and out, referred to data in DSS database	4 days	YES	Data information presentation equals data in DSS	OK
Speed	4 days	A few seconds	Hourly update	OK

To which process(es) does the above table refer?	P4, P3: Data export from result table in the DSS database for presentation on the information platform
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	19 th – 22 nd November 2001
Any other remarks concerning this sub-indicator?	Only static offline tests were carried out

Indicator 5: Testing DSS modelling and forecasting processes

Indicator 5a: Test Air Quality Emission Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	3 weeks	0		OK
Operational time	3 weeks	100%	> 95%	OK
Speed	3 weeks	2 – 3 minutes	Hourly update	OK

To which process(es) does the above table refer?	P2.4: Modelling of emissions as a first step in the IMMIS model chain, mostly offline modelling was carried out
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	22 nd October – 16 th November 2001
Any other remarks concerning this sub-indicator?	

Indicator 5b: Test Air Quality Concentration Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	3 weeks	0		OK
Operational time	3 weeks	100%	> 95%	OK
Speed	3 weeks	2 – 3 minutes	Hourly update	OK

To which process(es) does the above table refer?	P2.4: Modelling of emissions as a first step in the IMMIS model chain, mostly offline modelling was carried out
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	22 nd October – 16 th November 2001
Any other remarks concerning this sub-indicator?	

Indicator 5c: Test Noise Modelling Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	3 weeks	0		OK
Operational time	3 weeks	100%	> 95%	OK
Speed	3 weeks	2 – 3 minutes	Hourly update	OK

To which process(es) does the above table refer?	P2.5: Modelling of pollution concentrations, mostly offline modelling was carried out
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	22 nd October – 16 th November 2001
Any other remarks concerning this sub-indicator?	

Indicator 5d: Test Traffic Modelling and Forecast Process

This indicator is not applicable for Berlin.

Indicator 5e: Test Result Processing Process

This indicator is not applicable for Berlin.

Indicator 6: Testing DSS operator interface and scenario processes

Indicator 6a: Test DSS Operator interface presentation process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures				
Operational time			> 95%	
Correct data in and out, referred to data in monitoring station			Data information presentation equals data in DSS	
Speed		< 1 hour	Hourly update	

To which process(es) does the above table refer?	P5
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	
Any other remarks concerning this sub-indicator?	The operator has direct access to all incoming and outgoing data. The indicator was difficult to evaluate during offline testing

Indicator 6b: Test DSS Operator Interface Intervention Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures				
Operational time		% of total time	> 95%	
Correct data in and out, referred to data in monitoring station			Stored data in DSS equals introduced data	
Speed			Hourly update	

To which process(es) does the above table refer?	P5
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	
Any other remarks concerning this sub-indicator?	The operator has direct access to all incoming and outgoing data. The indicator was difficult to evaluate during offline testing

Indicator 6c: Test DSS Scenario Process

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	5 offline tests	0		OK
Operational time	5 offline tests	100%	> 95%	OK
Correct data in and out, referred to data in monitoring station	5 offline tests	YES	Data stored in DSS equals scenario data	OK
Speed	5 offline tests	2 – 3 minutes	Hourly	OK

To which process(es) does the above table refer?	P5: Running of scenario analysis with changed data input sets
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	
Any other remarks concerning this sub-indicator?	5 offline tests took place in November 2001

Indicator 7: Testing the functioning of the main system components and their interaction

CRITERION	Testperiod / frequency	Value	Success criterion	OK / NOT OK or N/A
Number of system failures	3 weeks	0		OK
Operational time	3 weeks	100%	> 90%	OK
Speed	3 weeks	2 – 3 minutes	Hourly update	OK

To which process(es) does the above table refer?	P5: Running of scenario analysis with changed data input sets
What method(s) were used for testing?	
Which organization(s) did the testing?	IVU Traffic Technologies AG
When did the testing take place?	22 nd October – 16 th November 2001
Any other remarks concerning this sub-indicator?	As long as data was provided on an hourly basis, there were no problems running the system in the offline mode.

Indicator 8: User acceptance by professional users

Indicator 8a: Does the DSS meet the system requirements as described in WP5?

Questions about Functional Requirements "To which extend are the following requirements implemented satisfactory?" Rating 1-5 (1=not at all satisfactory 5=very satisfactory) When the rating is below 4, please ask for an explanation	User 1	User 2	User 3	User 4	User 5
Traffic information management					
Does the system support on-line network traffic monitoring through interface with the traffic control and monitoring systems	4	4	5	3 ¹	X
Does the system support accurate and efficient incident detection?	4	4	5	X	X
Does the system support recording of traffic data and formation of historical series and statistics	5	5	5	4	yes
Does the system support traffic forecasting?	4	4	4	X	X
Does the system support traffic demand modelling?	-	-	-	-	-
Does the system support the optimisation of traffic control?	-	-	-	-	-
Does the system support the evaluation of short-term and long-term traffic measures?	4	3 ²	5	X	X
Does the system support near real-time traffic status representation for the whole demonstration area	5	5	4	X	X
Air quality modelling					
Does the system support emissions modelling based on near real-time traffic measurements?	5	5	5	4	Yes
Does the system support emissions modelling based on modelled traffic data?	5	5	5	2 ³	X
Does the system support pollutants dispersion modelling at the street and area levels?	5	5	5	4	Yes
Does the system support recording of monitored pollutant levels and modelled data?	5	5	5	3 ⁴	X
Does the system support background pollution modelling?	5	5	4	4	Yes ⁵
Does the system support noise modelling at the <i>hotspots</i> ?	5	5	5	3 ⁶	Yes
Does the system support air quality modelling based on current traffic levels and on predefined traffic and demand management scenarios?	5	5	5	X	2 ⁷
The system shall support evaluation of the environmental effect of short and long term transport policies	4	3 ⁸	4	1 ⁹	1 ¹⁰

EXPLANATION IN CASE OF SCORES LOWER THAN 4

(Please give a detailed explanation and if possible an indication of how your site may be able to improve the situation)

-	= this question is not applicable in Berlin
X	= this cannot be assessed at the moment, it maybe possible during evaluation next year
yes	= rating not possible because validated modelled values were not presented
1	= the quality of the support is not obvious at the moment
2	= for short-term planning it is sufficient, but for long-term planning the system is not ideal
3	= the modelling possibilities are insufficient
4	= it is unclear whether monitored and modelled data could be presented together
5	= the system supports the modelling of urban background pollution but not regional background pollution.
6	= noise modelling at hot spots is possible, but the quality of the modelling is not obvious???

- 7 = yes, but insufficient, modelling with different vehicles fleets should be possible
 8 = for short-term planning it is sufficient but for long-term planning the system is not ideal
 9 = yes, but insufficient
 10 = medium-term and long-term scenarios, which demonstrate the traffic shifts as a result of implemented measures

Indicator 8b: Is the information provided by the system easy to understand?

Questions about understandable information Rating 1-5 (1=not at all satisfactory 5=very satisfactory) When the rating is below 4, please ask for an explanation	User 1	User 2	User 3	User 4	User 5
Information presentation					
Does the system support data representation via maps, charts and generic tables	5	5	5	4	3 ¹
Environmental maps					
How do you rate the comprehensibility of the HEAVEN information presentation via <i>maps</i>	5	4	4	X	X
How easy to use is the HEAVEN information presentation via <i>maps</i>	5	5	5	X	4
How usefull is the HEAVEN information presentation via <i>maps</i> to manage urban mobility	-	-	-	-	-
How do you rate the comprehensibility of the colour codes used on the <i>maps</i>	2	4	4	X	X
Is the level of geographical detail presented in maps satisfactory	5	5	5	X	5
Environmental charts and generic tables					
How do you rate the comprehensibility of the HEAVEN information presentation via <i>charts and generic tables</i>	4	4	4	4	4
How easy to use is the HEAVEN information presentation via <i>charts and generic tables</i>	5	5	X	X	X
How usefull is the HEAVEN information presentation via <i>charts and generic tables</i> to manage urban mobility	-	-	-	-	-
Traffic maps					
How do you rate the comprehensibility of the HEAVEN information presentation via <i>maps</i>	-	-	-	-	-
How easy to use is the HEAVEN information presentation via <i>maps</i>	-	-	-	-	-
How useful is the HEAVEN information presentation via <i>maps</i> to manage urban mobility	-	-	-	-	-
How do you rate the comprehensibility of the colour codes used on the <i>maps</i>	-	-	-	-	-
Is the level of geographical detail presented in maps satisfactory	-	-	-	-	-
Traffic charts and generic tables					
How do you rate the comprehensibility of the HEAVEN information presentation via <i>charts and generic tables</i>	-	-	-	-	-
How easy to use is the HEAVEN information presentation via <i>charts and generic tables</i>	-	-	-	-	-
How usefull is the HEAVEN information presentation via <i>charts and generic tables</i> to manage urban mobility	-	-	-	-	-
Health information					
How do you rate the comprehensibility of health information presented	-	-	-	-	-
How easy to use is the health information presented	-	-	-	-	-
Information output					
Does the system deliver reports dealing with model outputs and evaluation of traffic demand management strategies	5	5	5	4	3 ²
Does the system support attention and alarm pollutant levels achievement	5	5	5	4	X

Questions about understandable information Rating 1-5 (1=not at all satisfactory 5=very satisfactory) When the rating is below 4, please ask for an explanation	User 1	User 2	User 3	User 4	User 5
detection and forecast					
Is Information presentation driven through a suitable MMI	5	5	5	X	4
Are you satisfied with the update interval of the information	5	5	5	X	X
Operator interface					
Does the system interface support operator driven scenario definition	5	5	5	1 ³	2 ⁴
Is the system interface for support of operator driven definitions comprehensible?	-	-	-	-	-
Is the system interface for support of operator driven definitions easy to use?	-	-	-	-	-
Is the system interface for support of operator driven definitions useful to manage urban mobility?	-	-	-	-	-
Does the system interface drive the operator through the tasks related to off-line evaluation of the impact of scenarios on the environment	-	-	-	-	-
Are these procedures comprehensible	-	-	-	-	-
Are these procedures easy to use	-	-	-	-	-

EXPLANATION IN CASE OF SCORES LOWER THAN 4

(Please give a detailed explanation and if possible an indication of how your site may be able to improve the situation)

- = this question is not applicable in Berlin
- X = this cannot be assessed (at the moment), it maybe possible during evaluation next year
- 1 = a map of the actual pollutant load is missing
- 2 = maps of monthly or yearly evaluations are missing. Scenarios maps, which present the differences between the reference and scenario case, would be helpful
- 3 = yes, but in sufficient
- 4 = medium-term and long-term scenarios, which demonstrate the traffic shifts as a result of implemented measures

Indicator 9: User acceptance by the general public

Questions on understandable information Rating 1-5 (1=not at all satisfactory 5=very satisfactory) When the rating is below 4, please ask for an explanation	User 1	User 2	User 3	User 4	User 5
Information presentation					
Environmental maps					
How readable is HEAVEN information via <i>maps</i>	4 ¹	4	4	5	3 ⁷
How do you rate the comprehensibility of the HEAVEN information presentation via <i>maps</i>	4	5	4	5	4
How easy to use is the HEAVEN information presentation via <i>maps</i>	X	2 ⁴	4	5	5
How usefull is the HEAVEN information presentation via <i>maps</i>	5	5	5	4	5
How do you rate the comprehensibility of the colour codes used on the <i>maps</i>	X ²	4	4	4	2 ⁶
Is the level of geographical detail presented in maps satisfactory	4	X	4 ¹	X	5
Environmental charts and generic tables					

Questions on understandable information					
Rating 1-5 (1=not at all satisfactory 5=very satisfactory)					
When the rating is below 4, please ask for an explanation	User 1	User 2	User 3	User 4	User 5
How readable is HEAVEN information <i>via charts and generic tables</i>	3 ³	1 ⁵	4	4	3 ⁵
How do you rate the comprehensibility of the HEAVEN information presentation <i>via charts and generic tables</i>	4	1 ⁵	4	4	4
How easy to use is the HEAVEN information presentation <i>via charts and generic tables</i>	5	4	4	5	5
Traffic maps					
How do you rate the comprehensibility of the HEAVEN information presentation <i>via maps</i>	-	-	-	-	-
How easy to use is the HEAVEN information presentation <i>via maps</i>	-	-	-	-	-
How do you rate the comprehensibility of the colour codes used on the <i>maps</i>	-	-	-	-	-
Is the level of geographical detail presented in maps satisfactory	-	-	-	-	-
Traffic charts and generic tables					
How do you rate the comprehensibility of the HEAVEN information presentation <i>via charts and generic tables</i>	-	-	-	-	-
How easy to use is the HEAVEN information presentation <i>via charts and generic tables</i>	-	-	-	-	-
Health information					
How do you rate the comprehensibility of health information presented	-	-	-	-	-
How easy to use is the health information presented	-	-	-	-	-

EXPLANATION IN CASE OF SCORES LOWER THAN 4

(Please give a detailed explanation and if possible an indication of how your site may be able to improve the situation)

- = this question is not applicable in Berlin
- X = this cannot be assessed (at the moment), it maybe possible during evaluation next year
- 1 = the district should be named on the map to support the search of particular areas
- 2 = the colours should be tested by the end user
- 3 = the comparability is missing
- 4 = the context is not comprehensible
- 5 = for non-experts it is difficult to assess the causes and effects as well as the legal basis and consequences
- 6 = it is difficult to discriminate between some colours
- 7 = the presented traffic volumes are not easy to interpret.