Seventh Framework Programme

Call FP7-ICT-2009-6

Project: 247708 – SUDPLAN

Project full title:

Sustainable Urban Development Planner for Climate Change Adaptation

Deliverable D7.3.1

Linz Pilot:
Product Validation Report V1

Due date of deliverable: 28/02/2011

Actual submission date: 28/02/2011

Title	D7.3.1 Linz Product Validation Report (Specs and Mockups based part)
Creator	Peter Kutschera
Editor	Guenter Gruber
Description	Validation of the SUDPLAN product from the pilots point of view
Publisher	SUDPLAN Consortium
Contributors	Peter Kutschera (AIT), Denis Havlik (AIT), David Camhy (TU GRAZ), Valentin Gamerith (TU GRAZ)
Type	Text
Format	application/msword
Language	EN-GB
Creation date	01/10/2010
Version number	0.5
Version date	2011-02-28
Last modified by	Guenter Gruber
Rights	Copyright "SUDPLAN Consortium". During the drafting process, access is generally limited to the SUDPLAN Partners.
Audience	☐ internal ☒ public ☐ restricted, access granted to: EU Commission
Review status	☐ Draft ☒ WP Manager accepted ☐ PMC quality controlled ☒ Co-ordinator accepted
Action requested	☐ to be revised by Partners involved in the preparation of the deliverable ☐ to be revised by all SUDPLAN Partners ☐ for approval of the WP Manager ☐ for approval of the Quality Manager ☐ for approval of the Project Co-ordinator ☐ for approval of the PMC
Requested deadline	2011-02-28

Version	Date	Modified by	Comments
0.1	2011-02-10	Peter Kutschera	First proposals
0.2	2011-02-22	Guenter Gruber	WP7 validation included, ready for approval of the Quality Manager
0.3	2011-02-23	Peter Kutschera	QA
0.4	2011-02-23	Guenter Gruber	Revised QA I
0.5	2011-02-24	Guenter Gruber	Revised QA II, minor modifications in respect to Version 0.4, ready for approval of the Project Co-ordinator
0.5	2011-02-28	Lars Gidhagen	Revision and co-ordinator approval

Table of Contents

Table of Tables

Glossary

Model	A *model* is a simplified representation of a system, usually intended to facilitate analysis of the system through manipulation of the model. In the SUDPLAN context the term can be used to refer to mathematical models of processes or spatial models of geographical entities.
Scenario	A *scenario* is a set of parameters, variables and other conditions which represent a hypothetical situation, and which can be analysed through the use of models in order to produce hypothetical outcomes.
SUDPLAN application	A *SUDPLAN application* is a decision support system crafted by using the SUDPLAN platform and integrating models, data, sensors, and other services to meet the requirements of the particular application.
SUDPLAN platform	The *SUDPLAN platform* is an ensemble of software components which support the development of SUDPLAN applications.
SUDPLAN system	*SUDPLAN system* is synonymous with SUDPLAN application
User	The term *user* refers to people who have a more or less direct involvement with a system. Primary users are directly and frequently involved, while secondary users may interact with the system only occasionally or through an intermediary. Tertiary users may not interact with the system but have a direct interest in the performance of the system.
Web-based	Computer applications are said to be *web-based* if they rely on or take advantage of data and/or services which are accessible via the World Wide Web using the Internet.

1. Management Summary

This document "D7.3.1 Linz Product Validation Report" validates the usability of the SUDPLAN product from the Linz pilot's point of view.

Validation against technical detail requirements is not in the scope of the validation process; this is done as part of the state-of-the-art software development.

2. Methodology

The common methodology for all twelve "Product Validation Reports" is described in detail in "D2.1 Product Validation Plan".

2.1. Documents involved

"D2.1 Validation plan" describes the methodology used for the twelve instances of the deliverable "D[5-8].3.x Product Validation Report" and the three versions of deliverable "D2.2.x Validation and Evaluation Report".

The "D[5-8].3.x Product Validation Report" objective is to validate the usability of the SUDPLAN product from the Pilots point of view. There are three versions of the "D[5-8].3.x Product Validation Report" for each of the four pilots. These are used as the main input for the three versions of the "D2.2.x Validation and Evaluation Report".

Each of the three versions of the "D2.2.x Validation and Evaluation Report" summarizes the input from the four instances of "D[5-8].3.x Product Validation Report" from the pilots. Here a main focus is the potential usability of the SUDPLAN product beyond the project and for an arbitrary city in Europe. Furthermore the SUDPLAN product is assessed against the impacts expected by the call which are defined as SUDPLAN objectives in the DoW.

A table of all documents used or referenced in this document is given in the Section 4 at the end of this document.

2.2. Validation aspects

2.2.1 Fulfilment of the pilot goals

Validating the level of fulfilment of the pilot goals as defined in "D[5-8].1.x Pilot Definition Plan" is out of the scope of this document.

2.2.2 Interaction between WP3 and WP4 and usability of the SUDPLAN Product

This deliverable assesses and documents the usability of the main results of WP3 "Scenario Management System" and WP4 "Common Services" for the SUDPLAN pilot applications.

The summary and generalization of the pilot validations is compiled as a part of the WP2 work, and reported in "D2.2.x Validation and Evaluation report". This document also draws conclusions on the pilot validations to provide feedback to WP3 and WP4. It is essential for them to know whether they are on track and where improvement or even changes have to be implemented. Furthermore, this document also assesses the independence of the implementation of the SUDPLAN product from the specific pilots and the usability for an arbitrary European city.

In order to allow overall project evaluation, all four "Product Validation Reports" have to be based on the document template provided by WP2.

2.2.3 Technical requirements of WP3 and WP4

The fulfilment of the technical requirements of WP3 (Scenario Management System) and WP4 (Common Services) is validated by unit- and integration tests done during the product development. This purely technical validation is out of the scope of this document.

2.3. Rating

SUDPLAN product validation contains questions of the following types:

1. Rating starting with 0 for lowest (not fulfilled at all) to 10 for highest rating (fulfilled beyond expectations, which should be awarded only in exceptional cases and explained in the text), or NA (not applicable). Please answer the question with NA rather than leaving it open in the case you are for any reason unable to answer the question correctly. *Example:*

	0	1	2	3	4	5	6	7	8	9	10	NA
Define scenario:					x							
Execute Scenario:								x				

2. Rating from 0 to 10 indicating the comparison with e.g. state of the art solution, with 5=on pair with the state of art, 0=way below state of the art, and 10=way above the state of the art. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge. *Example:*

	0	1	2	3	4	5	6	7	8	9	10	NA
Compared to state of the art solutions?								x				
Compared to SUDPLAN objectives?				x								

3. Yes|No|NA type of questions. *Example:*

Dynamic workflow composition supported by	Y	N	NA
Pilot application:		x	
SUDPLAN product:	x		

4. Multiple choice questions, where a single question can have only a limited number of answers. (with or without NA). For example, in Q 2.2.1 the users are asked to list the SUDPLAN service interfaces and indicate their type (OS = Existing Service Interfaces with open standard specifications, re-used in the SUDPLAN; P = Existing proprietary Services with no open specifications, re-used in the SUDPLAN (if any); (N) New service Interfaces defined in the SUDPLAN (if any):

Service interface	OS	P	N
Dummy 1:			x
Dummy 2:		x	
Dummy 3:	x		
Dummy 4:		x	

5. Free text fields are used to collect overall impressions and comments beyond the simple yes/no or rating level. Quite often, the users are given the opportunity to explain the way a requirement has been fulfilled. In case of partial fulfilment or failure to fulfil the requirement, the description should also explain e.g.:

-   Which part of the requirement was not fulfilled?

-   Why the requirement was dropped/not fulfilled?

-   What are the consequences of not-fulfilling the requirement?

-   Will the requirement be fulfilled later (e.g. "planned for 2-nd development cycle")

Note1: in some cases the number of answers may be larger than the number of free fields in the table. Feel free to add new table rows if needed.

Note2: In the first phase, the questionnaire has to be filled in before the release of the SUDPLAN tool. Consequently, the questions should be answered based on the software already made available, the mockups and specifications.

Note3: For each requirement update the lines
        Validated by:
        Validated in project phase: V1, V2, V3
If you validate a requirement put yourself in the "Validated by" header, else leave the line empty and tick "NA" everywhere.
You may reference to the mock-ups and the WP3 and WP4 specifications, so you may put e.g. "WP3, WP4 (Specifications)" in here.
 If you cannot validate the requirement NOW remove the actual version (e.g. "V1") from the "Validated in project phase" header.

3. SUDPLAN product validation

3.1. Summary from the pilot point of view

Since easy-of-use is one of the main objectives of the SUDPLAN product it will make complex scientific tasks available for users with limited technical background. Compared to state of the art solutions, which often consist of several unconnected components, it greatly facilitates the decision-making workflow. With the integration of a decision support system it will be even possible for the users to assemble their own workflows. The product also simplifies the discovery of sources relevant for the decision maker since it will provide an integrated view on all components and services involved in the process. Because every piece of data within the internal repositories of the SUDPLAN product will be assessed with descriptions about the origin and processing of these data the decision making process is traceable and so important data leading to a decision is not lost.

The possibility to publish results and data on the web will make information of the public much easier and will give people insight of the decision making process.

Through the use of open standards the SUDPLAN product will offer the possibility to integrate many different data sources. So it was possible to use a ready-made Sensor Observation Service (SOS) implementation for the netCDF data format, which is used internally at TU Graz University of Technology from http://www.oostethys.org.

Because the product does not try to alter data in existing third-party repositories the internal data management strategies at the provider level do not have to be changed and only the connection to the SUDPLAN product has to be assured. So it will be possible for us to use our own data management strategy and connect to the other components of the SUDPLAN product by providing services. The security system allows to be sure that the data is unaltered and that users can trust the output of the calculations.

The SUDPLAN application will offer automated model runs, analysis and reporting which currently no state-of-the-art system offers in the field of urban drainage. The integration of the SWMM 5 (Storm Water Management Model) from U.S. EPA in such an automated workflow will greatly facilitate the use of the model execution and provides deep insights in the results.

Since the release of the first version of the integrated SUDPLAN application (Integrated Scenario Management System) is planned for M16 (April 2011) there are no fully implemented use cases using the results of WP3 (Scenario Management System) and WP4 (Common Services) available.

3.2. Summary from the pilots steward point of view

Looking at specifications and mock-ups it seems that all requirements of the pilot version one (V1) will be fulfilled.

Since this report is due on month 14 and the integrated software is planned for month 16 no real experience with the integrated system can be used as input to this report.

But there are already some results from e.g. the rainfall downscaling which could be used as input

3.3. Summary from SUDPLAN-external pilot users

Since the release of the first version of the integrated SUDPLAN application (Integrated Scenario Management System) is planned for M16 (April 2011) there are no fully implemented use cases using the results of WP3 (Scenario Management System) and WP4 (Common Services) available.

3.4. Questionnaire

Following questions shall be answered by each of the pilot applications and used as input into "D2.2.x Validation and Evaluation Report".

Some of the requirements cannot be validated by the pilots (in which case the WP2 leader shall find out who can actually validate this part of the requirements and assure all questions are validated) and some requirements are not relevant for each of the pilots. In case of doubt, please answer with NA.

The following table gives a quick overview of requirements versus product version that needs to be reached to evaluate the fulfilment of the requirement.

Please state what has been used to assess the requirements (I: Integrated SUDPLAN product implementation, S: Specification, M: Mockup, C: common service result, L: local model result, R: Report from WP3 or WP4). If all questions of a requirement are answered "NA", for example if the pilot does not use that particular feature, don't mark it here.

Requirement	V1	V2	V3
REQ-DOW-1.1: Build an easy-to-use system			
REQ-DOW-1.2: Asses risk for river flooding and inundations			
REQ-DOW-1.3: Asses maximum rain intensity	S		
REQ-DOW-1.4: Asses risk from air pollution and extreme temperature			
REQ-DOW-2.1: Use open standards	S		
REQ-DOW-2.2: Publish interfaces	S		
REQ-DOW-2.3: Use and provide open source	S		
REQ-DOW-2.4: Allow discovery of relevant sources	M		
REQ-DOW-2.5: Allow integration of standards-based services	S		
REQ-DOW-2.6: Provide tools for the management of scenarios	S		
REQ-DOW-2.7: Provide quality controlled repositories			
REQ-DOW-2.8: Provide a security system			
REQ-DOW-2.9: Publish results to the WWW			
REQ-DOW-2.10: Offer user-friendly interfaces	S		
REQ-DOW-3.1: Provide dynamic composition of work flows	S		
REQ-DOW-3.2: Provide highly integrated and interactive 3D / 4D			
REQ-DOW-3.3: Provide automation of model runs, analysis and reporting			
REQ-DOW-3.4: Provide integration with SOA-based infrastructures	S		
REQ-DOW-4.1: Support city management	S		
REQ-DOW-5.1: Provide IDF curves			
REQ-DOW-5.2: Improved simulation results			
REQ-DOW-5.3: Identify extreme precipitation events			
REQ-DOW-5.4: Provide input for local models			
REQ-DOW-5.5: Provide tools to compare scenarios	S		
REQ-DOW-6.1: Simulate directly from SUDPLAN interface			
REQ-DOW-6.2: Provide better downscaling results by using local data			
REQ-DOW-6.3: Assess future land use scenarios			
REQ-DOW-6.4: Provide future runoff time series			

REQ-DOW-7.1: Provide long term air quality simulation			
REQ-DOW-7.2: Assess local influence to air quality			
REQ-DOW-7.3: Connect local emission models			
REQ-DOW-7.4: Assess future health risks			
REQ-DOW-7.5: Assess future fulfilment of air quality standards			
REQ-DOW-8.1: Provide models using SOA			
REQ-DOW-8.2: Provide models for the end user			
REQ-DOW-8.3: Foster SOA development in the area of model integration			
REQ-DOW-8.4: Validate existing standards			
REQ-DOW-9.1: Improve existing SOA-based developments			
REQ-DOW-9.2: Spread SOA-type service networks	S		
REQ-DOW-9.3: Provide new SOA service specifications			
REQ-DOW-9.4: Provide new SOA modelling services			
REQ-DOW-10.1: Provide 3D / 4D visualisation framework	M		
REQ-DOW-10.2: Provide interaction framework			
REQ-DOW-10.3: Provide tools to create customizable presentation material			
REQ-DOW-10.4: Provide support of different output devices			

REQ-DOW-1:   Sudplan objectives

The DOW-1 set of requirements are based on overall project objectives, and therefore indirectly also on the ICT-2009.6.4 call expectations.

REQ-DOW-1.1: Build an easy-to-use system

SUDPLAN shall provide easy-to-use planning, prediction, decision-support and training tool.

Rationale: The main idea of the SUDPLAN project is to develop an easy-to-use web-based planning, prediction, decision support and training tool, for the use in an urban context, based on a what-if scenario execution environment, which will help to assure population's health, comfort, safety and life quality as well as sustainability of investments in utilities and infrastructures within a changing climate.

Source: *DoW 1.1.1 SUDPLAN objectives, Page 12*

Validated by: WP7

Validated in project phase: V2, V3

Q1.1.1:   *Please assess the **ease of use** of the pilot application for the **EXPERT USERS** (0-10 or NA) for following tasks (just write an x in the appropriate box):*

	0	1	2	3	4	5	6	7	8	9	10	NA
Define a scenario:												x
Execute existing scenario "as is":												x
Execute existing scenario with changed parameters:												x
Save results:												x
Share results with other users:												x
Visualize results:												x
Visualize uncertainties:												x
Compare the results of various scenarios:												x
Export results in different formats (if that is supposed to be possible; e.g. to a word document, MS Excel or ArcView):												x

Q1.1.2: *Please assess the **ease of use** of the pilot application for the **OCCASIONAL USERS** (0-10 or NA) for following tasks:*

	0	1	2	3	4	5	6	7	8	9	10	NA
Define a scenario:												x
Execute existing scenario "as is":												x
Execute existing scenario with changed parameters:												x
Save results:												x
Share results with other users:												x
Visualize results:												x
Visualize uncertainties:												x
Compare the results of various scenarios:												x
Export results in different formats (if that is supposed to be possible; e g to a word document, MS Excel or ArcView):												x

Q1.1.3: Where appropriate, please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

According to the specs most of the required operations will be usable from the GUI, so the usability should not be a problem, even for occasional users. Depending of what the *occasional* user is going to do it will be no problem. However, dealing with models etc. using advanced features will need training to understand the background.

The visualization of uncertainties is not available in V1 as most of the available data don't provide this information.

Comparing of different scenarios in V1 can only be done by visualising them side by side.

No data export in V1

Usability is one of the questions that can only be answered by an end user after doing his daily work with the system over some time period, which was not yet possible.

REQ-DOW-1.2: **Asses risk for river flooding and inundations**

SUDPLAN shall provide the possibility to assess river flooding scenarios

Rationale: Risk for river flooding and inundations of built-up areas and other developed areas have to be assessed based on future climate scenarios

Source: *DoW 1.1.1 SUDPLAN objectives, Page 12*

Validated by: WP4 (Specification; annual SUDPLAN reports)

Validated in project phase: V2, V3

Note: *This was originally planned in the SUDPLAN DoW, but apparently not used by any of the pilots in version 1 of the SUDPLAN application.*

Q1.2.1:   *Please assess the capability of the pilot application to assess the river-flooding scenarios (0 to 10 or NA, with 5=on pair, 0=way below, and 10=way above. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge – indicate which of these is true in Q1.2.3 below)*

	0	1	2	3	4	5	6	7	8	9	10	NA
Compared to state of the art solutions?												x
Compared to SUDPLAN objectives?												x

Q1.2.2:   *Please assess the usability of the SUDPLAN tool as the basis for river-flooding assessment applications*

	0	1	2	3	4	5	6	7	8	9	10	NA
Overall:												x
Scenario Management System:												x
Common Services:												x

Q1.2.3:   Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

REQ-DOW-1.3: Asses maximum rain intensity

SUDPLAN shall provide the possibility to assess maximum rain intensity

Rationale: Maximum rain intensity to be expected over sealed surfaces is needed to know how water run-off systems must be dimensioned.

Source: *DoW 1.1.1 SUDPLAN objectives, Page 12*

Validated by: WP7

Validated in project phase: V1, V2, V3

Note: Used in the Pilots Wuppertal (WP6) and Linz (WP7)

Q1.3.1:   *Please assess the capability of the pilot application to assess the maximum rain intensity (0 to 10 or NA, with 5=on pair, 0=way below, and 10=way above. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge – indicate which of these is true in Q1.3.3):*

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
Compared to state of the art solutions?								x				
Compared to SUDPLAN objectives?						x						

Q1.3.2:   *Please assess the usability of the SUDPLAN tool as the basis for rain intensity assessment (0-10 or NA):*

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
Overall:												x
Scenario Management System:												x
Common Services:												x

Q1.3.3:   Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

Much better than state of the art since in the moment no comparable system is available.

However the correctness and usability of the results has not yet been proofed by using them in the pilot.

REQ-DOW-1.4: **Asses risk from air pollution and extreme temperature**

SUDPLAN shall provide possibility to assess the risk from air pollution and extreme temperature

Rationale: Spatial distribution of air pollution, risk for extreme events and high ambient temperature in built-up residential and work areas.

Source: *DoW 1.1.1 SUDPLAN objectives, Page 12*

Validated by: WP5, WP8 (Product Validation Questionnaire)

Validated in project phase: V2, V3

Note: Used in the Pilots Stockholm (WP5) and Czech Regional Pilot (WP8).

Q1.4.1: *Please assess the capability of the pilot application to assess the risk of pollution and extreme temperature (0 to 10 or NA, with 5=on pair, 0=way below, and 10=way above. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge – indicate which of these is true in Q1.4.3):*

	0	1	2	3	4	5	6	7	8	9	10	NA
Compared to state of the art solutions?												x
Compared to SUDPLAN objectives?												x

Q1.4.2: *Please assess the usability of the SUDPLAN tool as the basis for assessment of the air pollution and extreme temperature risks:*

	0	1	2	3	4	5	6	7	8	9	10	NA
Overall:												x
Scenario Management System:												x
Common Services:												x

Q1.4.3: please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

REQ-DOW-2:   Open approach: technical requirements of SISE

REQ-DOW-2.1: Use open standards

The SUDPLAN product service interfaces, data and meta-information models shall be entirely based on open standards

Rationale: The usage of open standards is needed to enable connections to other (existing and future) systems. For example, we need to access already existing city-local data and services which are not based on open standards. This should be done by providing standard based interfaces to this data storages and services.

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 16*

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 16*

Validated by: WP3, WP4 (Specifications)

Validated in project phase: V1, V2, V3

Q2.1.1:   Please list the open standards used in SUDPLAN:

	Relevant Standards
Service interfaces:	OGC SOS, SPS, WMS, WFS
Data encoding:	OGC O&M, WFS Simple Feature
Other:	

Q2.1.2:   Please indicate the proprietary solutions used in this pilot (if any) and explain why no open standard has been used (e.g. "existing system, replacing too costly", "no open standard exists")

Solution	**Reason**

Q2.1.3:   Please give a short textual explanation for the above marks, and suggestions for improvement.

The existing systems providing proprietary interfaces are hidden behind services providing open standard interfaces where applicable.

REQ-DOW-2.2: Publish interfaces

SUDPLAN shall define and publish interfaces to access SUDPLAN (in order to access results or to invoke services), which are based on open standards

Rationale: This will allow other systems to use data and services provided by SUDPLAN.

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 16*

Validated by: WP3, WP4 (Specifications)

Validated in project phase: V1, V2, V3

Q2.2.1:   Please list the SUDPLAN service interfaces and indicate their type (OS = Existing Service Interfaces with open standard specifications, re-used in SUDPLAN; P = Existing proprietary Services with no open specifications, re-used in SUDPLAN (if any); (N) New service Interfaces defined in the SUDPLAN (if any):

Service interface	OS	P	N
OGC SOS	x		
OGC SPS	x		
OGC WMS	x		
OGC WFS	x		

Q2.2.2:   Please list the service instances and data sets used in the Pilot and indicate the possibility of re-using them outside the pilot (Y= Can be used outside of SUDPLAN free of charge, C= commercial/can be used outside of SUDPLAN subject to payment, N = Cannot be used outside SUDPLAN):

Service instance, data set	Y	C	N
Common Services rainfall downscaling		x	
Common Services hydrological downscaling	x		
Common Services air quality downscaling		x	
SWMM for Linz			x

Q2.2.3:   For each **new** service defined in SUDPLAN, please indicate the level of completion of the service (N=no specifications, F=functional description, C= complete formal specifications, BP= considered "best practice" by relevant community, IS=de-facto industry standard, S= de-facto standard (e.g. OGC/ISO/CEN standard) as well as the availability of the specifications (P=publicly available) and give an URI to the specification document.

Name + URI	N	F	C	BP	IS	S	P

Q2.2.4:   Please give a short textual explanation on the use of standardized and not-standardized services in SUDPLAN, and suggestions for improvement.

The instance of SWMM contains Linz-specific data and can only be used for the city of Linz. But the Software is all open source and an can easily adopted for other cities.

REQ-DOW-2.3: Use and provide open source

SUDPLAN shall be based on open source products, and will itself be an open source product

Rationale: Should enable simple extensibility, reuse and make the product easily available to all interested parties at minimal cost

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 16*

Validated by: WP3, WP4 (Specifications, annual report)

Validated in project phase: V1, V2, V3

Q2.3.1:   Please give a list of software elements used in the pilot, and indicate whether the software is already existing and used as is by SUDPLAN (E), has been extended by SUDPLAN team (X), has been written from scratch by SUDPLAN team (N=new). Please also indicate if the software is available as Open Source (OS) yet. If possible, please add an URI indicating where to obtain the software..

Name + URI	E	X	N	OS
TS-Toolbox http://ts-toolbox.ait.ac.at		X		
Cids Geointegration Platform http://www.cismet.de/en/products.html	X			
Cids SUDPLAN extensions http://sudplanwp3.cismet.de/sms/		X		
MATCH		X		
E-HYPE		X		
Rainfall downscaling		X		

Q2.3.2:   Please give a short textual explanation on the use of Open Source in SUDPLAN, and suggestions for improvement.
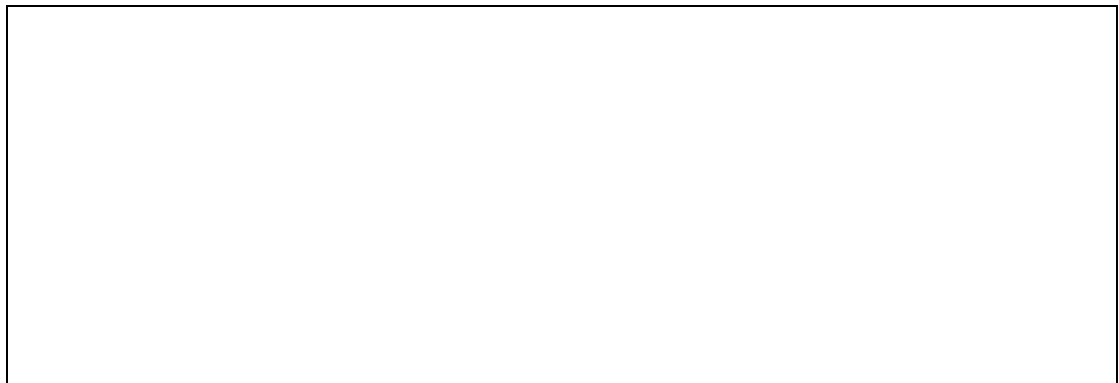
REQ-DOW-2.4: Allow discovery of relevant sources

SUDPLAN shall provide applications and tools for the discovery of relevant sources

Rationale: A decision maker needs to find the relevant facts for his decision

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 17*

Validated by: WP7

Validated in project phase: V1, V2, V3

Q2.4.1:   Please assess the ease of service- and resource discovery for:

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
Pilot user:											x	
SUDPLAN application developers:											x	
Users outside the project:												x

Q2.4.2:   Please give a short textual explanation on the (dis)advantages of "discovery" in SUDPLAN, and suggestions for improvement.

Pilot user can easily find sources already catalogued within the SMS.

SUDPLAN developers and even users can easily extend this catalogue.

In the moment there are no plans to provide a SUDPLAN catalogue to the outside world.

REQ-DOW-2.5: **Allow integration of standards-based services**

SUDPLAN applications and tools shall ease the integration of existing data stores and legacy systems, and assure seamless access to data sources over open standard based infrastructure (as in e.g. SANY or ORCHESTRA)

Rationale: There are already a lot of relevant data sources available. It is therefore required to access them in a standardised way.

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 17*

Validated by: WP3 (Specifications)

Validated in project phase: V1, V2, V3

Q2.5.1:   Please assess the ease of service integration (for newly discovered services) for:

	0	1	2	3	4	5	6	7	8	9	10	NA
Pilot user:											x	
Administrator:											x	
SUDPLAN application developers												x

Q2.5.3:   Please give a short textual explanation on the (dis)advantages of "service integration" in SUDPLAN, and suggestions for improvement.

Integration of external systems using known open standard based interfaces (e.g. OGC WMS holding local map data in high resolution) can be done in a simple way.

Depending on the type of service there might be a problem to understand the meaning of the data since most existing systems lacks an appropriate data description. The reason for this is the lack of data provided by the services.

REQ-DOW-2.6: Provide tools for the management of scenarios

SUDPLAN scenario management related applications and tools shall not require the permission to alter the data sources at the provider level.

Rationale: SUDPLAN applications rely on external data sources, and need to assure that all information used in defining and running the scenario is stored and available for later reference. However, changing and storing data in third party repositories is often either impossible, or at least discouraged.

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 17*

Validated by: WP3 (Specification)

Validated in project phase: V1, V2, V3

Q2.6.1: Please assess the usability of scenario management (0-10, NA) for:

	0	1	2	3	4	5	6	7	8	9	10	NA
Pilot user:					x							
Administrator:					x							
SUDPLAN application developers:												x

Q2.6.2:   Please give a short textual explanation on the (dis)advantages of "scenario management" in SUDPLAN, and suggestions for improvement.

When changing some data or model parameters to create a new scenario they can be stored by the SMS.

Changing of data is only possible if there is an editor for the data format available. In V1 this means only basic formats (Text, XML).

REQ-DOW-2.7: **Provide quality controlled repositories**

SUDPLAN shall provide applications and tools for the availability of repositories (e.g. databases, caches, inventories) for quality controlled and securely managed scenarios and their results

Rationale: Decisions based on the SUDPLAN applications may have great impact (e.g. financial impact on city planning). It is therefore important to adequately store all the facts and results leading to the decision, e.g. to allow a-posterior reconstruction of the decision making process and audits. Every piece of data within the internal repositories therefore has to be assessed with descriptions about the origin and processing of these data.

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 17*

Validated by: WP7

Validated in project phase: V2, V3

Q2.7.1: Please indicate which aspects of the repository QA are covered in the pilot (U=uncertainties of input/output data known and visualized; D= Data snapshot (input data, model results) used for decision making saved with scenario instance; R= Decision & reasoning/comments saved with scenario instance)

Repository name + URI	U	D	R

Q2.7.2: Please give a short textual explanation on the (dis)advantages of "quality controlled repositories" in SUDPLAN, and suggestions for improvement.

Not a V1 target

REQ-DOW-2.8: Provide a security system

SUDPLAN shall provide applications and tools to implement security and access control as an integral part of the system

Rationale: Beside the obvious reasons for security this comes also from the need for quality controlled repositories.

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 17*

Validated by: WP7

Validated in project phase: V2, V3

Q2.8.1:   Please describe at least one "worst case" scenario illustrating the need for "security" in the pilot application:

Q2.8.2:   Please indicate the worst case scenario consequences, in terms of the human or monetary losses, legal liabilities, etc. (example: 100M€ on productivity loss in case of false alert)

Q2.8.3:   Please give a short textual explanation on the (dis)advantages of "security" in SUDPLAN, and suggestions for improvement.

Not a V1 target

REQ-DOW-2.9: Publish results to the WWW

SUDPLAN shall provide applications and tools to publish results to the public on the World Wide Web

Rationale: Web publishing is becoming a main information source for large parts of the population. SUDPLAN does not intend to implement a full Content Management System functionality, but it should allow the export of results in proper formats to publish them in the WWW to inform the public.

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 17*

Validated by: WP7

Validated in project phase: V2, V3

Q2.9.1:   Please assess the usability of the "result publication" (0-10, NA) on the web as offered by the pilot for:

	0	1	2	3	4	5	6	7	8	9	10	NA
Occasional users:												x
Expert users:												x
Administrator:												x
SUDPLAN application developers:												x

Q2.9.2:   Please give a short textual explanation on the (dis)advantages of "web publication" in SUDPLAN, and suggestions for improvement.

Not in V1

REQ-DOW-2.10: Offer user-friendly interfaces

SUDPLAN shall provide user-friendliness of services and interfaces, in particular ergonomics of the graphical user interface (GUI) and the visualization components

Rationale: Enable usage by untrained users, not only "SUDPLAN" experts.

Source: *DoW 1.1.3 Open Approach: technical requirements of SISE, Page 17*

Validated by: WP3 (Specification)

Validated in project phase: V1, V2, V3

Q2.10.1:   Please indicate the key concepts used in the pilot to assure the GUI ergonomics (Y= concept used, N = concept not used, NA= concept not applicable):

Concept	Y	N	NA
Task-oriented Menu structure:		x	
Multi-lingual user interface:		x	
Smart scaling for small screens:		x	
Workflows for common tasks:	x		
Colour-coding schemas for colour-blind:		x	
Contextual help system:		x	
Alerts user when processing finished (e.g. per SMS, e-mail):		x	
Panning/browsing through results (in space):	X		
Panning/browsing through results (in time):	X		
Highlighting recently changed data:		X	
Comparing two result sets:	x		

Q2.10.2:   Please indicate the key concepts used in the SUDPLAN to assure the usability of the service interfaces:

Concept	Y	N	NA
Self-describing service interface:	x		
Self-describing data models:	x		
Service ontology:		x	
Data ontology:		x	
Response time estimate:		x	
Response size estimate:		x	
User-requested limits for response size:		x	
User-requested limits for response time:		x	
Subscribe/alert mechanism:			
Panning/browsing through results (in space):	x		
Panning/browsing through results (in time):	x		
Fetching the recently changed data only:		x	

Q2.10.3:   Please give a short textual explanation on the user friendliness of the pilot application and SUDPLAN service interfaces and suggestions for improvement.

Alerting not in V1

Estimation and limits for response time and size might be implemented in V2 or V3 if needed.

REQ-DOW-3:   Integrated decision support systems

REQ-DOW-3.1: Provide dynamic composition of work flows

SUDPLAN shall extend the state-of-the-art in the field of environmental decision support systems by offering to users the dynamic composition of scientific work flows

Rationale: Allow users to define their own workflows as needed

Source: *DoW 1.2.1 Integrated decision support systems, Page 20*

Validated by: WP3 (Specification)

Validated in project phase: V1, V2, V3

Q3.1.1:   *Please indicate if the dynamic workflow composition is supported by the pilot application, and by the SUDPLAN product. Use NA if you are unsure, or if this is of no interest for the application.*

Dynamic workflow composition supported by	Y	N	NA
Pilot application:		x	
SUDPLAN product:		x	

Q3.1.2:   *Please indicate the level of usability of the "dynamic workflow composition" offered by SUDPLAN as compared to the state of the art workflow solutions (0 to 10 or NA, with 5=on pair with the state of art, 0=way below state of the art, and 10=way above the state of the art. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge – indicate which of these is true in Q3.1.1):*

	0	1	2	3	4	5	6	7	8	9	10	NA
Pilot user:												x
Administrator:												x
SUDPLAN application developers												x

Q3.1.3: *Please indicate the "state of the art" applications used to compare SUDPLAN results:*

Application Name	URL (where to find more/download the application)

Q3.1.4: Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

There will be no possibility to define a workflow for the end user. However – all the information needed in a workflow can be "grouped" to support an arbitrary workflow

REQ-DOW-3.2: Provide highly integrated and interactive 3D / 4D

SUDPLAN shall extend the state-of-the-art in the field of environmental decision support systems by offering to users highly integrated and interactive 3D / 4D

Rationale: Proper visualization is needed to understand large data sets, especially if they are georeferenced. The visualization will not only be used by experts for themselves but also to inform other persons.

Source: *DoW 1.2.1 Integrated decision support systems, Page 20*

Validated by: WP7

Validated in project phase: V2, V3

Q3.2.1: *Please indicate the usability of the SUDPLAN 3D/4D visualization as compared to state of the art applications (0 to 10 or NA, with 5=on pair with the state of art, 0=way below state of the art, and 10=way above the state of the art. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge – indicate which of these is true in Q3.2.1):*

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
Large data sets:												x
Geo-referenced data:												x
3-D data:												x
3-D data (geo-referenced, on the map):												x
1-D Time-series:												x
2-D Time-series:												x
3-D Time-series:												x
Multi-dimensional data:												x
Expert users:												x
Occasional users:												x

Q3.2.2: *Please indicate the "state of the art" applications used in this comparison:*

Application Name	*URL (where to find more/download the application)*

Q3.2.3:   Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

The focus is on integration, so the usability cannot be assessed in V1.

REQ-DOW-3.3: Provide automation of model runs, analysis and reporting

SUDPLAN shall extend the state-of-the-art in the field of environmental decision support systems by offering automation of model runs, analysis and reporting

Rationale: Simplify the use of modelling, analysis and reporting tools for end users

Source: *DoW 1.2.1 Integrated decision support systems, Page 20*

Validated by: WP7

Validated in project phase: V2, V3

Q3.3.1:   Please indicate the level of support for following functionality offered by SUDPLAN product (0-10, NA):

	0	1	2	3	4	5	6	7	8	9	10	NA
Automated model runs:												x
Automated analysis:												x
Automated reporting:												x

Q3.3.2:   Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

In V1 there is no requirement for automation.

REQ-DOW-3.4: Provide integration with SOA-based infrastructures

SUDPLAN shall extend the state-of-the-art in the field of environmental decision support systems by offering ubiquitous integration with information sources and services in SOA-based infrastructures

Rationale: Needed for easy integration of existing and future services.

Source: *DoW 1.2.1 Integrated decision support systems, Page 20*

Validated by: WP3 (Specification)

Validated in project phase: V1, V2, V3

Q3.4.1:   *Please indicate the level of support for following functionality offered by SUDPLAN product (0-10, NA):*

	0	1	2	3	4	5	6	7	8	9	10	NA
Access standardized SOA services:									x			
Interpret underlying data model:						x						
Transform data to different models:												x
Data interpolation/extrapolation:												x
Fusion of data from heterogeneous sources:												x

Q3.4.2:   Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

Access to a limited set of standardized SOA service interfaces and data models is implemented, Interpolation and fusion can be done in external models

REQ-DOW-4: Use of models for urban planning

Q4.0.1: *Does this pilot provide models for urban planning? (Y/N or NA if this question is irrelevant):*

Y

(If not, please skip to section 5)

REQ-DOW-4.1: Support city management

SUDPLAN shall offer a powerful tool for assessing environmental factors and their interaction with urban subsystems such as infrastructure, waste water and transport systems, in a climate change perspective to be used for city management.

Rationale: Model based decision support applications are used to better understand the effects of city management decisions in a complex system.

Source: *DoW 1.2.2 Use of models for urban planning, Page 20*
Validated by: WP7
Validated in project phase: V1, V2, V3

Q4.1.1: *Please assess the **usability of the pilot application** in the city management scenario (0 to 10 or NA, with 5=on pair, 0=way below, and 10=way above. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge – indicate which of these is true in Q4.1.1):):*

	0	1	2	3	4	5	6	7	8	9	10	NA
Compared to state of the art solutions?											x	
Compared to SUDPLAN objectives?						x						

Q4.1.2: *Please assess the **usability of the SUDPLAN tool** as the basis for city management applications (0-10 or NA):*

	0	1	2	3	4	5	6	7	8	9	10	NA
Overall:												x
Scenario Management System:												x
Common Services:												x

Q4.1.3: Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

The key advantages of SUDPLAN will be the availability and integration of regional downscaled rain time series from CS, providing them automatically for SWMM Linz model runs and compare and visualize the results with actual or other future scenarios.

REQ-DOW-5: Extreme precipitation events with potential of causing storm water flooding in urbanized areas

Q5.0.1:   Does this pilot need the extreme precipitation prediction? (Y/N or NA):

Y

(If not, please skip to section 6)

REQ-DOW-5.1: Provide IDF curves

SUDPLAN shall extend the state-of-the-art in the field of extreme precipitation by providing statistical measures (IDF curves) for future intense rainfalls, based on climate model results

Rationale: This data is needed (at least in WP7) to plan efficient strategies to prevent damage, as input to a local model of the waste water infrastructure caused by future storm water events

Source: *DoW 1.2.2.2 Extreme precipitation..., Page 23*
Validated by: WP7
Validated in project phase: V2, V3

Q5.1.1:   Does this pilot use IDF curves for extreme precipitation predictions? (Y/N/NA):

Y

Q5.1.2:   Please give a short textual explanation on your experience with IDF curves in SUDPLAN, and suggestions for improvement.

IDF curves will be validated in project year 2 and 3

REQ-DOW-5.2: Improved simulation results

SUDPLAN shall extend the state-of-the-art in the field of extreme precipitation by enabling the user to improve the quality of the simulated precipitation results by adding local historical precipitation data

Rationale: Local historical data can be used to calibrate the results according the local conditions

Source: *DoW 1.2.2.2 Extreme precipitation…, Page 23*

Validated by: WP7

Validated in project phase: V2, V3

Q5.2.1:   *Does this pilot add historical precipitation data to improve IDF curves for extreme precipitation predictions? (Y/N/NA):*

Y

Q5.2.2:   *Please indicate the quality of SUDPLAN's local prediction solution, compared to existing predictions (0 to 10 or NA, with 5=on pair with the state of art, 0=way below state of the art, and 10=way above the state of the art. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge – indicate which of these is true in Q5.2.3):*

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
Ease of use (adding local data, using the model):												x
Prediction quality:												x

Q5.2.3:   Please give a short textual explanation on your experience with prediction of extreme precipitation in SUDPLAN, and suggestions for improvement.

Not in V1

REQ-DOW-5.3: Identify extreme precipitation events

SUDPLAN shall extend the state-of-the-art in the field of extreme precipitation by identifying future periods – typically 1-2 months – with extreme precipitation events, for which SUDPLAN provides precipitation grids with high temporal (30 min) resolution

Rationale: This data is needed to plan efficient strategies to prevent damage caused by future accumulations of heavy rain events.

Source: *DoW 1.2.2.2 Extreme precipitation..., Page 23*

Validated by: WP7

Validated in project phase: V2, V3

Q5.3.1:   *Does this pilot provide 1-2 months advanced predictions of extreme precipitation events with 30 min resolution (Y/N/NA):*

Y

Q5.3.2:   *Please indicate the quality of SUDPLAN's prediction with high temporal resolution, compared to existing predictions (0 to 10 or NA, with 5=on pair with the state of art, 0=way below state of the art, and 10=way above the state of the art. NA can be used to indicate that the comparison is impossible, useless or beyond your knowledge – indicate which of these is true in Q5.3.2):*

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
SUDPLAN prediction quality:												*x*

Q5.3.3:   Please give a short textual explanation on your experience with prediction of extreme precipitation in SUDPLAN, and suggestions for improvement.

Not assessed in V1

REQ-DOW-5.4: Provide input for local models

SUDPLAN shall extend the state-of-the-art in the field of extreme precipitation by allowing planners to use such results as input into waste water models, models computing pipe network capacity and storm water flooding

Rationale: Beside the models with European scope there is a need of local, city-specific models which need the result of the European wide models as input.

Source: *DoW 1.2.2.2 Extreme precipitation..., Page 23*

Validated by: WP7

Validated in project phase: V2, V3

Q5.4.1:   *Does this pilot provide an option for using the extreme precipitation predictions as input to other models? (Y/N/NA):*

Y

Q5.4.2:   *Please assess the SUDPLAN product support for service chaining (0-10, NA) by:*

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
Pilot user:												x
Administrator:												x
SUDPLAN application developer:												x

Q5.4.3:   Please give a short textual explanation on your experience with service chaining in "extreme precipitation" scenarios (in SUDPLAN), and suggestions for improvement.

Not in V1

REQ-DOW-5.5: Provide tools to compare scenarios

SUDPLAN shall extend the state-of-the-art in the field of extreme precipitation by allowing planners to show how different designs of the waste water pipe network systems handle future's extreme rainfalls

Rationale: To get an optimal decision the decision maker needs to compare the results of different scenarios.

Source: *DoW 1.2.2.2 Extreme precipitation..., Page 23*

Validated by: WP7

Validated in project phase: V1, V2, V3

Q5.5.1:   Does this pilot provide an option for comparing several "extreme precipitation" scenarios? (Y/N/NA):

Y

Q5.5.2:   Please assess the SUDPLAN product support for comparing scenarios (0-10, NA) by:

	0	1	2	3	4	5	6	7	8	9	10	NA
Pilot user:						x						
Administrator:												x
SUDPLAN application developer:												x

Q5.5.3:   Please give a short textual explanation on your experience with comparison of scenarios in "extreme precipitation" scenarios (in SUDPLAN), and suggestions for improvement.

The SMS provides the possibility to store, execute and visualise different scenarios. A side by side comparison is possible in V1.

More advanced comparison features a subject to V2 work.

REQ-DOW-6:   Local flood and drought assessment using Pan-European, multi-basin, hydrological models

Q6.0.1:   Does this pilot use the local flood and drought assessment? (Y/N/NA):

N

(If not, please skip to section 7)

REQ-DOW-6.1: Simulate directly from SUDPLAN interface

SUDPLAN shall extend the state-of-the-art in the field of flood and draughts by allowing end users to simulate trends and extreme values of river runoff, draughts and ground water levels for whatever city in Europe, directly from the SUDPLAN web interfaces

Rationale: For a better usability of SUDPLAN there should be no need to run models from outside the SUDPLAN product.

Source: *DoW 1.2.2.3 Local flood and drought assessment..., Page 27*

Validated by: WP7

Validated in project phase: V2, V3

Q6.1.1:   Does this pilot allow end users to simulate trends and extreme values of river runoff, draughts and ground water levels for arbitrary cities in Europe? (Y/N/NA):

NA

Q6.1.2:   Please give a short textual explanation on your experience with river runoff, draughts and ground water levels trend simulation in SUDPLAN, and suggestions for improvement.

REQ-DOW-6.2: Provide better downscaling results by using local data

SUDPLAN shall extend the state-of-the-art in the field of flood and draughts by leaving local end users the possibility to improve SUDPLAN model results by adding local precipitation, river runoff and land use data

Rationale: To get more accurate results some fine grain local data can be used by the downscaling services.

Source: *DoW 1.2.2.3 Local flood and drought assessment..., Page 27*

Validated by: WP7

Validated in project phase: V2, V3

Q6.2.1: Does this pilot allow end users to improve the model results by adding local precipitation, river runoff and land use data*? (Y/N/NA):*

NA

Q6.2.2:   Please give a short textual explanation on your experience with the use of the local data to improve the simulations in SUDPLAN, and suggestions for improvement.

REQ-DOW-6.3: **Assess future land use scenarios**

SUDPLAN shall extend the state-of-the-art in the field of flood and draughts by forming a tool which evaluates how different local land use and urbanization scenarios respond hydrologically to climate changes

Rationale: Land use, and to a somewhat lesser extent the urbanisation (e.g. building architecture, requirements on infrastructure, sustainable population density) are very sensitive to climate changes.

Source: *DoW 1.2.2.3 Local flood and drought assessment..., Page 27*

Validated by: WP7

Validated in project phase: V2, V3

Q6.3.1:   *Can the end user evaluate the impact of climate change for different land use and urbanisation scenarios? (Y/N/NA):*

NA

Q6.3.2:   Please give a short textual explanation on your experience with *evaluating the impact of climate change for different land use and urbanisation scenarios* (in SUDPLAN), and suggestions for improvement.

REQ-DOW-6.4: Provide future runoff time series

SUDPLAN shall extend the state-of-the-art in the field of flood and draughts by delivering time series output of future river runoff suitable to feed local hydraulic flooding models

Rationale: To protect existing and plan future infrastructures the risk of flooding has to be assessed.

Source: *DoW 1.2.2.3 Local flood and drought assessment..., Page 27*

Validated by: WP7

Validated in project phase: V2, V3

Q6.4.1:   *Does the pilot deliver* time series output of future river runoff suitable to feed local hydraulic flooding models*? (Y/N/NA):*

NA

Q6.4.2:   Please give a short textual explanation on your experience with using the SUDPLAN time series output of future river runoff as input to local hydraulic flooding models, and suggestions for improvement.

REQ-DOW-7: Dispersion model systems used to assess air quality in European cities

Q7.0.1: *Does this pilot use the dispersion models to assess air quality in European cities? (Y/N/NA):*

N

(If not, please skip to section 8)

REQ-DOW-7.1: Provide long term air quality simulation

SUDPLAN shall extend the state-of-the-art in the field of air pollution by delivering long term (10 year) air quality and temperature simulations over the entire Europe, for different climate scenario windows (e.g. 2006-2015, 2026-2035, 2046-2055 etc), enabling the end user to identify trends in poor air quality and heat wave incidents.

Rationale: Future air quality is needed to map out strategies for future infrastructure and land use.

Source: *DoW 1.2.2.4 Dispersion model systems..., Page 29*

Validated by: WP7

Validated in project phase: V2, V3

Q7.1.1: *Please indicate the level of support for following functionality offered by the pilot (0-10, NA):*

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
Long term (10 year) air quality and temperature simulations over the entire Europe:												*x*
Choice of climate scenario windows (e.g. 2006-2015, 2026-2035, 2046-2055 etc):												*x*
Identify trends in poor air quality:												*x*
Identify trends in heat wave incidents:												*x*

Q7.1.2: Please give a short textual explanation on your experience with the long term air quality and temperature simulations in SUDPLAN, and suggestions for improvement.

REQ-DOW-7.2: Assess local influence to air quality

SUDPLAN shall extend the state-of-the-art in the field of air pollution by performing year long downscaling air quality and temperature simulations that allow the assessment of how local sources, activities and land use impact future air quality in particular European cities

Rationale: This is needed to understand the implications of emission sources like factories or highways.

Source: *DoW 1.2.2.4 Dispersion model systems..., Page 29*

Validated by: WP7

Validated in project phase: V2, V3

Q7.2.1:   Please indicate the level of support for following functionality offered by the pilot (0-10, NA):

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
Perform year long downscaling air quality and temperature simulations:												x
Assess how local sources, activities and land use impact future air quality in particular European cities:												x

Q7.2.2:   Please give a short textual explanation on your experience with assessing the impact of local sources, activities and land use on future air quality in European cities (in SUDPLAN), and suggestions for improvement.

Not in V1

REQ-DOW-7.3: Connect local emission models

SUDPLAN shall extend the state-of-the-art in the field of air pollution by allowing local emission scenarios and dispersion models to be nested to the downscaled air quality grids, demonstrating the relative importance of local sources within individual industrial, urban and residential environments

Rationale: This can be used for simpler assessment of different scenarios concerning local emission sources

Source: *DoW 1.2.2.4 Dispersion model systems..., Page 29*

Validated by: WP7

Validated in project phase: V2, V3

Q7.3.1:   Please indicate the level of support for following functionality offered by the pilot (0-10, NA):

	0	1	2	3	4	5	6	7	8	9	10	NA
Nesting of local emission scenarios and dispersion models to the downscaled air quality grids:												x
Allow users to estimate the relative importance of local sources within individual industrial, urban and residential environments:												x

Q7.3.2:   Please give a short textual explanation on your experience with assessing the importance of local sources to future air quality (in SUDPLAN), and suggestions for improvement.

Not in V1

REQ-DOW-7.4: Assess future health risks

SUDPLAN shall extend the state-of-the-art in the field of air pollution by offering the possibility for countries or groups of countries to assess future exposure and health risks caused by air pollutants and high ambient temperature

Rationale: Air quality has a huge impact on human health, so assessing the air quality means also to assess human health risks. For example a visualization of air quality together with population density will help to make proper decisions.

Source: *DoW 1.2.2.4 Dispersion model systems..., Page 29*

Validated by: WP7

Validated in project phase: V2, V3

Q7.4.1:   Please indicate the usability of following pilot aspects:

	0	1	2	3	4	5	6	7	8	9	10	NA
Assess future exposure and health risks caused by air pollutants:												x
Assess future exposure and health risks caused by high ambient temperature:												x

Q7.4.2:   Please give a short textual explanation on your experience with assessing the future exposure and health risks caused by air pollutants and high ambient temperature (in SUDPLAN), and suggestions for improvement.

REQ-DOW-7.5: **Assess future fulfilment of air quality standards**

SUDPLAN shall extend the state-of-the-art in the field of air pollution by offering the possibility for countries or groups of countries to assess their possibilities to fulfil national air quality standards and environmental objectives, also in a climate change perspective

Rationale: Assess the implications of decisions met now to the fulfilment of actual and future air quality standards (Strictly spoken this would also require a model of future air quality standards).

Source: *DoW 1.2.2.4 Dispersion model systems..., Page 29*

Validated by: WP7

Validated in project phase: V2, V3

Q7.5.1:   Please indicate the ability of the pilot to assess the feasibility of fulfilling national air quality standards and environmental objectives, in a climate change perspective:

	0	1	2	3	4	5	6	7	8	9	10	NA
Pilot usability:												x

Q7.5.2:   Please give a short textual explanation on your experience with assessing the feasibility of fulfilling national air quality standards and environmental objectives in a climate change perspective (in SUDPLAN), and suggestions for improvement.

REQ-DOW-8: Model integration in the daily work environment

Q8.0.1:   Does this pilot allow users to make use of third party models through SUDPLAN tool? (Y/N/NA):

Y

(If not, please skip to section 9)

REQ-DOW-8.1: Provide models using SOA

SUDPLAN shall contribute to the extension of the state-of-the-art in the area of model integration and expose the models used in SUDPLAN applications as services in loosely coupled SOA

Rationale: The models used within SUDPLAN shall be offered as services to allow re-using them in multiple contexts without repeated model development efforts.

Source: *DoW 1.2.3 Model integration in the daily work environment…, Page 30*

Validated by: WP7

Validated in project phase: V2, V3

Q8.1.1:   Please assess the ease of use of "models as services" (0-10, NA) for:

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
End users, using the "well known services" from within the pilot application:												*x*
End users, trying to integrate a new service in the pilot application:												*x*
Pilot developers/integrators, trying to integrate a new service in the pilot application:												*x*
Service developers, trying to integrate a new model in the SUDPLAN tool:												*x*

Q8.1.2:   Please give a short textual explanation on your experience with integrating and using the models as services (in SUDPLAN), and suggestions for improvement.

Not in V1

REQ-DOW-8.2: Provide models for the end user

SUDPLAN shall contribute to the extension of the state-of-the-art in the area of model integration as models become more available to administrative end users

Rationale: Models available as services (other than the Common Services) should be offered to SUDPLAN users.

Source: *DoW 1.2.3 Model integration in the daily work environment..., Page 30*

Validated by: WP7

Validated in project phase: V2, V3

Q8.2.1: Please assess the capability of SUDPLAN "model as a service" concept for (0-10, NA):

	0	1	2	3	4	5	6	7	8	9	10	NA
Dynamic linking the models with data sources:												x
Configuration of the models:												x
Running of the models continuously:												x
Running of the models on request:												x
Informing the users about the model run progress:												x
Propagation of the data and model uncertainties:												x
Providing rich self-describing data models for model results:												x
Handling large data sets:												x

Q8.2.2: Please give a short textual explanation on your experience with the SUDPLAN's "model as a service" concept, and suggestions for improvement.

Not in V1.

REQ-DOW-8.3: Foster SOA development in the area of model integration

SUDPLAN shall contribute to the extension of the state-of-the-art in the area of model integration as emerging SOA development is fostered

Rationale: Techniques and tools used for model integration in SUDPLAN shall also be available outside of SUDPLAN.

Source: *DoW 1.2.3 Model integration in the daily work environment..., Page 30*

Validated by: WP7

Validated in project phase: V2, V3

Q8.3.1: Please name the extensions of the state of the art in the area of "model as a service" achieved by SUDPLAN (if any):

Not available outside SUDPLAN in V1

Q8.3.2: Please give a short textual explanation on your experience with the models used in this pilot, and suggestions for improvement.

Models are integrated on the basis of OGC Services and Tools are provided to support this task.

A SMS is provided that can deal with this kind of models. Independent of the actual model.

REQ-DOW-8.4: Validate existing standards

SUDPLAN shall contribute to the extension of the state-of-the-art in the area of model integration as existing standards (e.g. OGC Web Processing Service) are tested and validated in terms of their usability

Rationale: SUDPLAN will collect experience in using existing SOA standards.

Source: *DoW 1.2.3 Model integration in the daily work environment..., Page 30*

Validated by: WP7

Validated in project phase: V2, V3

Q8.4.1:   Please name the standards that were tested/validated for their usability in the "model as a service" context by SUDPLAN, and assess their usability:

	0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*
OGC SPS:												x
OGC SOS:												x
OGC WPS:												x

Q8.4.2:   Please describe the key shortcomings of the above mentioned standards that were discovered in the pilot, and give suggestions for improvement.

REQ-DOW-9:   Service-oriented infrastructures for environmental management

Q9.0.1:   Does this pilot make use of the Service-oriented infrastructures for environmental management? For example, does it deploy SensorWeb and ModelWeb services? (Y/N/NA):

Y

(If not, please skip to section 10)

REQ-DOW-9.1: Improve existing SOA-based developments

SUDPLAN shall extend the state-of-the-art in the field of service-oriented infrastructures by taking up existing developments, validating and improving them

Rationale: SUDPLAN will use and where necessary improve existing standards

Source: *DoW 1.2.4 Service-oriented infrastructures for environmental management..., Page 31*

Validated by: WP3, WP4

Validated in project phase: V2, V3

Note: This can probably only be fully validated through community, e.g. through feedback received on related SUDPLAN publications.

Q9.1.1:   Please name the existing SOA-relevant developments and standards that were used by SUDPLAN and assess the level of their usability from the SUDPLAN point of view (e.g. SANY SensorSA, OGC SOS, ...):

Relevant SOA developments	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*NA*

Q9.1.2:   Please name the extensions of the state of the art in the SOA area achieved by SUDPLAN (if any):

Q9.1.3:   Please give a short textual report on your experience with the above listed developments and standards in this pilot, and suggestions for improvement.

REQ-DOW-9.2: Spread SOA-type service networks

SUDPLAN shall extend the state-of-the-art in the field of service-oriented infrastructures by supporting the spreading of SOA-type service networks

Rationale: Since SUDPLAN will allow the access to and from SOA based service networks users will have an interest to use SOA networks

Source: *DoW 1.2.4 Service-oriented infrastructures for environmental management..., Page 31*

Validated by: WP4 (Specification)

Validated in project phase: V1, V2, V3

Q9.2.1:   Please list the projects and products using (parts of) the SUDPLAN service infrastructure (if any):

Project/Product name	*URL (where to find more/download the application)*

Q9.2.2:   Please give a short textual report on the achievements wrt. spreading of the SOA infrastructures by SUDPLAN, and suggestions for improvement.

Common Services delivering downscaling services for all over Europe are deployed implementing SOS, SPS and WMS functionality.

In V1 it is not planned to have users (in the sense of projects and products) outside SUDPLAN.

REQ-DOW-9.3: **Provide new SOA service specifications**

SUDPLAN shall extend the state-of-the-art in the field of service-oriented infrastructures by adding to SOAs new types of services (both specifications and implementations)

Rationale: If there are no proper service specifications SUDPLAN will provide new specifications and implementations.

Source: *DoW 1.2.4 Service-oriented infrastructures for environmental management..., Page 31*

Validated by: WP4 (D4.1.x)

Validated in project phase: V1, V2, V3

Q9.3.1:   Please name new open service specifications (if any) developed in the SUDPLAN project, and state the level of reference implementation (C= proof of concept, E= early prototype, P=prototype, S=stable, Q=qualified), and indicate if the result is available under an open source license (OS). If possible, please also indicate the URL where the software can be downloaded:

Name + URI	C	E	P	S	Q	OS

Q9.3.2:   Please give a short textual report on the new services developed by SUDPLAN, and suggestions for improvement.

Not applicable yet: No need for new service types in the moment

REQ-DOW-9.4: **Provide new SOA modelling services**

SUDPLAN shall extend the state-of-the-art in the field of service-oriented infrastructures by complementing SOAs in the field of modelling services

Rationale: The models used within SUDPLAN will be provided as services

Source: *DoW 1.2.4 Service-oriented infrastructures for environmental management..., Page 31*

Validated by: WP7 (based on WP4 Specification: D4.2.x, D4.3.x, D4.4.x)

Validated in project phase: V2, V3

Q9.4.1:   Please list the modelling services developed in SUDPLAN and used in this pilot (Name, type, URL of a service instance)

Name	Type (e.g. SOS, SPS)	URL
Climate Scenario data	SOS, SPS, WMS, WFS	
Rain timeseries downscaling	SOS and SPS	
Model of waste water network in Linz	SOS and SPS	

Q9.4.2:   Please give a short textual explanation on your experience with the modelling services used in this pilot, and suggestions for improvement.

The service aspect of the models could not be validated in V1 since this needs the integrated SUDPLAN product not available yet (Planned for month 16, this report was written in month 14).

REQ-DOW-10:   Visualisation and interaction

Q10.0.1: Does this pilot use the SMS GUI? (Y/N/NA):

Y

(If not, please skip to the end)

REQ-DOW-10.1: Provide 3D / 4D visualisation framework

SUDPLAN shall enhance the current state of the art in interactive visualization by a highly interactive, extendable 3D / 4D visualization framework combining geometric, volumetric and information visualization algorithms as well as interaction techniques for analyzing, comparing and presenting of simulated what-if scenarios (in the area of sustainable urban development).

Rationale: A proper visualization is required to understand and compare complex or large data sets. This is needed to understand the implications of different scenarios.

Source: *DoW 1.2.5 Visualisation and interaction, Page 36*

Validated by: WP3 (D3.3.x), WP7

Validated in project phase: V2, V3

Q10.1.1:   Please assess the capabilities of the SUDPLAN 3D/4D visualization framework (0 to 10 or NA if unsure):

	0	1	2	3	4	5	6	7	8	9	10	NA
Overall impression:											x	
Interactive applications:											x	
Geometric visualization algorithms:												x
Volumetric visualization algorithms:												x
Other information visualization algorithms:												x
Presenting of simulated what-if scenarios:												x
Comparing of simulated what-if scenarios:												x
Analyzing of simulated what-if scenarios:												x

Q10.1.2:   Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

A 3D Map component is provided that can be used in various contexts to visualise model results and data in 3 and 4d.

In the moment the visualization is only available as mockup, so most questions can't be answered.

REQ-DOW-10.2: Provide interaction framework

SUDPLAN shall enhance the current state of the art in interactive visualization by an extendable framework; regarding visualization as well as interaction metaphors (the system can be adapted to a wide variety of data)

Rationale: The 3D/4D visualization shall also be usable for direct interaction with the SUDPLAN system to allow an intuitive use.

Source: *DoW 1.2.5 Visualisation and interaction, Page 36*

Validated by: WP3 (D3.3.x), WP7

Validated in project phase: V2, V3

Q10.2.1:   Please list the key enhancements of the "state of the art" in interactive visualization developed by SUDPLAN:

Q10.2.2:   Please give a short textual explanation for the above advantages of SUDPLAN wrt. to the state of the art and suggestions for improvement.

Not in V1

REQ-DOW-10.3: Provide tools to create customizable presentation material

SUDPLAN shall enhance the current state of the art in interactive visualization by allowing easy customization of the visualization and interaction by the user/planer, which can produce presentations tailored for different recipient groups

Rationale: This is needed to present facts and document the reasons of decisions outside the interactive SUDPLAN environment.

Source: *DoW 1.2.5 Visualisation and interaction, Page 36*

Validated by: WP3 (D3.3.x), WP7

Validated in project phase: V2, V3

Q10.3.1:   Please assess the level of SUDPLAN's achievement in the following categories (0-10, NA):

	0	1	2	3	4	5	6	7	8	9	10	NA
Interactive visualization:												x
Customization for different recipient groups:												x
Exporting the results for further dissemination:												x

Q10.3.2: Please give a short textual explanation for the above marks, key advantages of SUDPLAN wrt. to the state of the art (if any), and suggestions for improvement.

Not in V1.

See export and publishing earlier in the document (REQ-DOW-1.1, REQ-DOW-2.9)

REQ-DOW-10.4: **Provide support of different output devices**

SUDPLAN shall enhance the current state of the art in interactive visualization by the support of different types of output devices (the system can be adapted to a wide variety of hardware from single-user desktop to immersive multi-user environments)

Rationale: Depending on the systems available to the user proper visualization techniques have to be used.

Source: *DoW 1.2.5 Visualisation and interaction, Page 36*

Validated by: WP3 (D3.3.x), WP7

Validated in project phase: V2, V3

Q10.4.1:   *Please assess the usability of the pilot application with various output devices used in this pilot (name, characteristics):*

	0	1	2	3	4	5	6	7	8	9	10	NA
Overall:												x
Smartphone's (2-4Iinch, resolution 320x240 to 360 x 640 pixels):												x
High resolution PC monitor **(22-26 Inch, 1080p):**												x
Laptop (15-17 Inch, 1280x800 pixel):												x
Small 3D Displays (Desktop monitors):												x
Large 3D displays (for presentation to a large audience):												x
												x
												x

Note: *It is up to you to decide which devices make sense, test, and report the results here. Devices listed above are just for orientation.*

Q10.4.2:   Please give a short textual explanation of the special features allowing the use of the SUDPLAN's GUI elements across the large range of screen sizes, key advantages of SUDPLAN wrt. to state of the art (if any), and suggestions for improvement.

Not in V1.

3.5.   Comments

Space for everything the editor of the "Product Validation Report" wants to add but does not fit in the previous sections

4. References

This is the list of documents and software deliverables that have been be used as input for this document.

Document	Version
DoW	2009-12-01
D2.1 Validation Plan	V1.3, 2010-08-03
Template for D[5-8].3.x	V0.95, 2011-01-21
D3.2.1 SMS Product Implementation	V1, 2011-01-21
D3.3.1 Integrated Scenario Management System	Not available for V1 validation
D4.1.1 Common Services Concerted Approach	V1
D4.2.1 Rainfall Downscaling Service	V1

Table 1: List of documents and software deliverables that has been referenced or used for this document

Acronyms used

CA   Consortium Agreement

concall   conference (phone) call

DoW   Description of Work

PMC   Project Management Committee

PM   Person Month

QA   Quality Assurance

SOA   Service Oriented Architecture

WP   Workpackage

tbd   to be determined

wrt   with respect to

SOA   Service Oriented Architecture

NA   Not applicable

URI   Universal Resource Identifier