

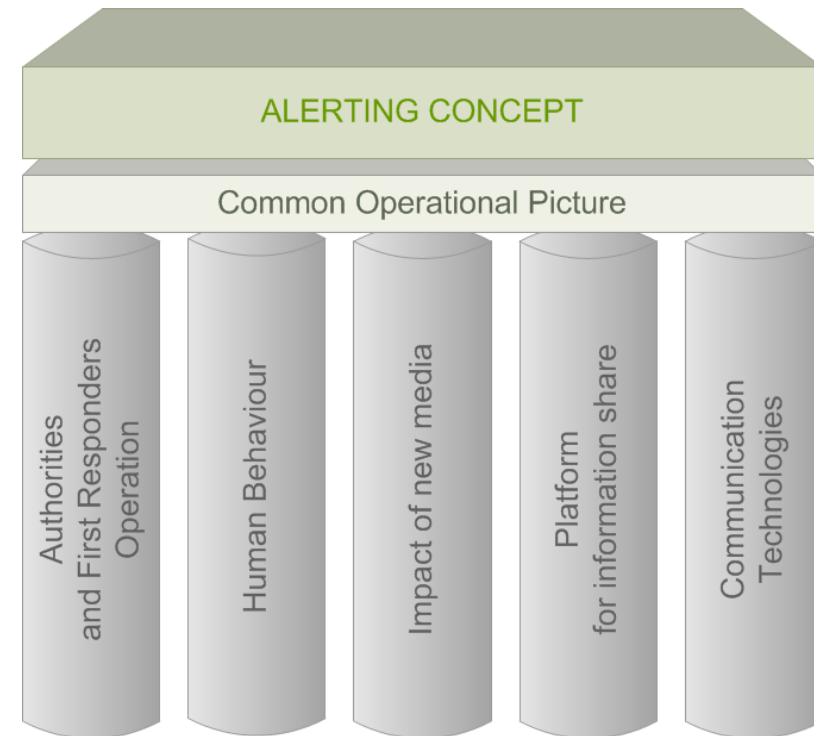


Dissemination of warning messages - An agent based simulation

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TIEMS Conference 2013

Alert4All- Project

- Alert4All
 - EU-Project to research effective alerting and warning mechanisms
 - More info: www.alert4all.eu



Alerting Simulation Module (ASM)

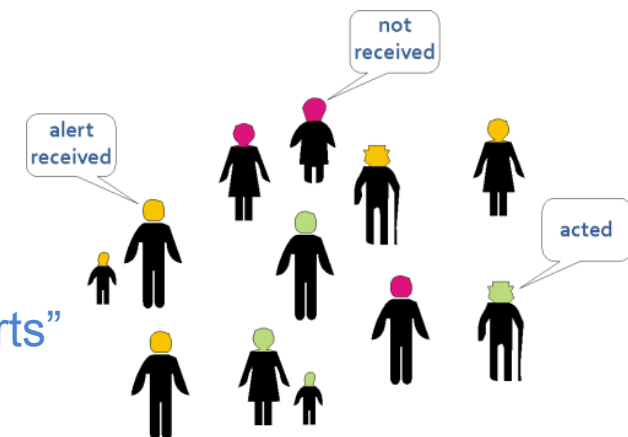
➤ Aim of the ASM:

To simulate the dissemination of warning and alerting messages throughout the population.



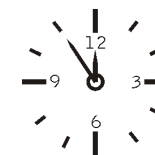
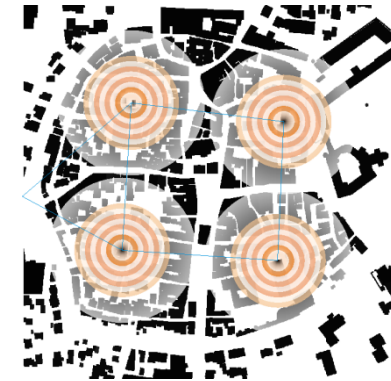
➤ Applied Method:

Agent based simulation using a newly developed model, considering human behaviour theories and own research on “Impacting Factors on Human Reaction to Alerts”



Use Cases for Alerting Simulation

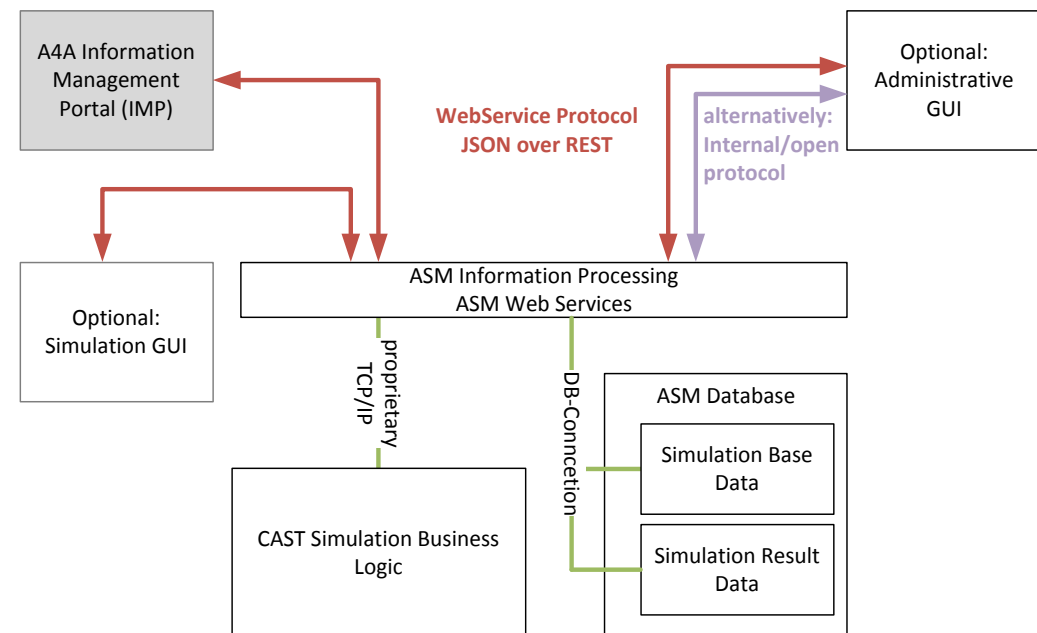
- **Planning use case**
Planning and preparation of alerting plans
- **Investment decision use case**
Support of investment decisions (new channel vs. population training)
- **Time critical warning use case**
Selection of an efficient warning channel mix in a time critical warning situation
- **Training use case**
Preparation and conduction of exercises



Architecture of the Alerting Simulation Module

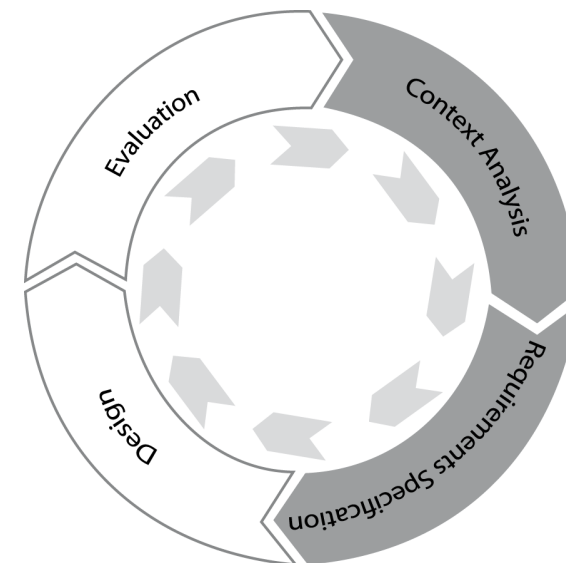
Modular approach, including:

- ASM Web Services as main switch for the simulation environment
- CAST as the “simulation-model” tool
- ASM Database as store unit
- GUI as Web interface placed in the IMP
- Architecture enables the implementation of additional GUIs



ASM-Tool: GUI design process

- Method: Iterative User Centered Design Approach
- Realised steps:
 1. Context Analysis of the end- user environment
 2. Use case and requirements specification
 3. Evaluation of the GUI with end users, performing usability tests and pluralistic walkthroughs



ASM-Tool: Design and Functionalities

- Start Tab:
 - General incident information
 - Loading of base data
 - Loading of previously saved runs

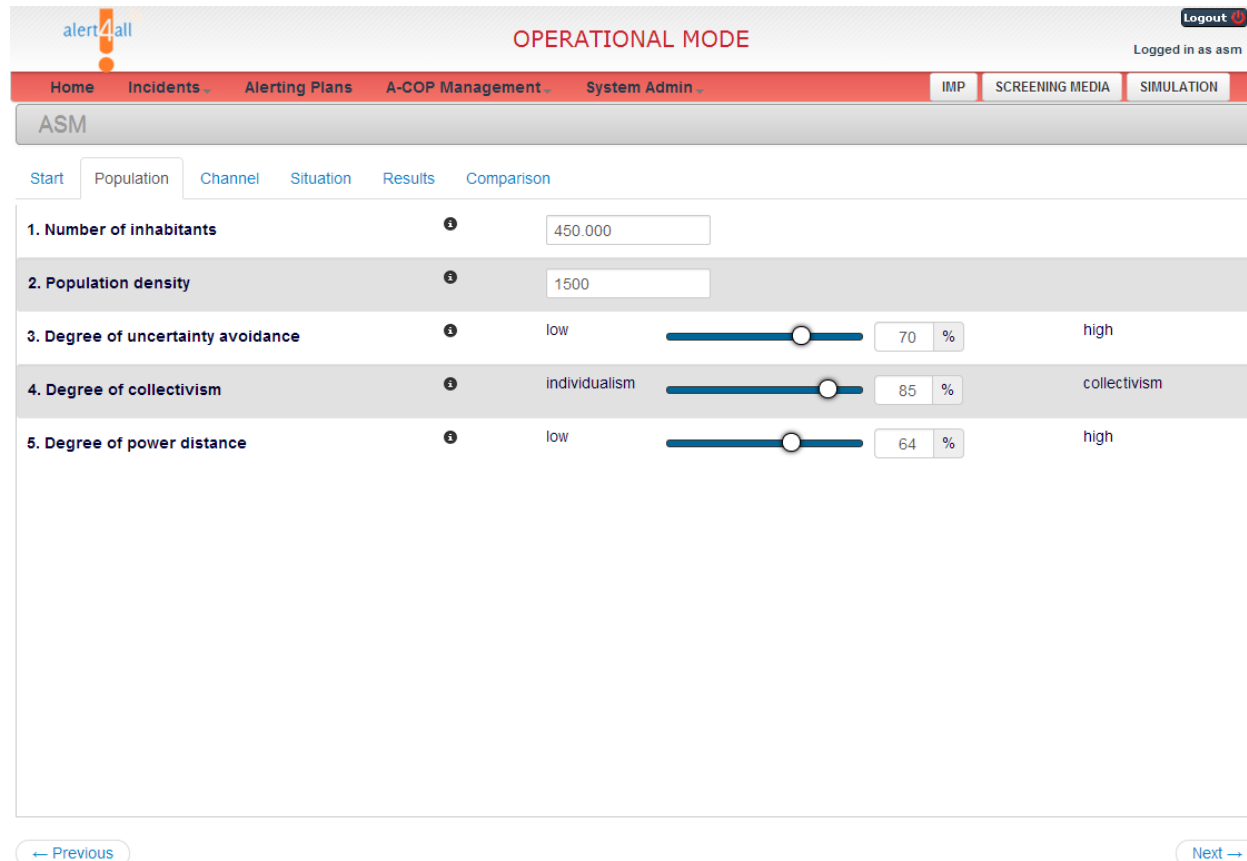
The screenshot shows the 'Start' tab of the ASM-Tool interface. At the top, there is a navigation bar with 'Home', 'Incidents', 'Alerting Plans', 'A-COP Management', and 'System Admin'. Below this is a sub-menu with 'IMP', 'SCREENING MEDIA', and 'SIMULATION'. The main content area is titled 'ASM' and contains several sections:

- Meta data for new simulation run(optional):** This section includes dropdown menus for 'Day' (set to MONDAY) and 'Time of day' (set to 00.00 a.m.), text input fields for 'Incident:' and 'Description:', and a text area for 'Notes:'.
- Chose the geographic area and load the basis data for the population and the channels used:** This section features dropdown menus for 'Country', 'States', 'Regions', and 'Districts', followed by a 'Load basis data for this area' button.
- Load saved simulation run:** This section contains a 'Load simulation run' button.
- Compare saved simulation runs:** This section contains a 'Load simulation runs' button.

A 'Next →' button is located at the bottom right of the main content area.

ASM-Tool: Design and Functionalities

- Population Tab:
 - General information regarding the population
 - Already filled if base data is available



The screenshot shows the ASM-Tool interface in OPERATIONAL MODE. The user is logged in as 'asm'. The main navigation bar includes Home, Incidents, Alerting Plans, A-COP Management, System Admin, IMP, SCREENING MEDIA, and SIMULATION. The current view is the ASM configuration page, specifically the Population Tab. The configuration includes the following parameters:

Parameter	Value	Unit/Range	Target/Scale
1. Number of inhabitants	450.000		
2. Population density	1500		
3. Degree of uncertainty avoidance	70 %	low to high	high
4. Degree of collectivism	85 %	individualism to collectivism	collectivism
5. Degree of power distance	64 %	low to high	high

Navigation buttons for 'Previous' and 'Next' are located at the bottom of the configuration area.

ASM-Tool: Design and Functionalities

- Channel Tab:
 - Data regarding all existing warning or alerting channels
 - Already filled if base data is available

The screenshot shows the 'Channel' configuration tab in the 'alert4all' application. The interface is in 'OPERATIONAL MODE' and the user is logged in as 'asm'. The navigation menu includes Home, Incidents, Alerting Plans, A-COP Management, System Admin, IMP, SCREENING MEDIA, and SIMULATION. The main content area is titled 'ASM' and has tabs for Start, Population, Channel, Situation, Results, and Comparison. The 'Channel' tab is active, showing a list of channels on the left and configuration parameters on the right.

Channel	1. Percentage of subscribers	2. Percentage of individuals able to understand the message	3. Percentage of individuals able to follow the recommendations	4. Trust in channel	5. Trust in sender
<input checked="" type="checkbox"/> Radio WARNING	not severe (35%)	not familiar (75%)	not severe (80%)	not experienced (95%)	not sudden (80%)
<input checked="" type="checkbox"/> Siren ALERT					

Buttons at the bottom right: Define new channel, Delete existing channel. Navigation buttons: Previous, Next.

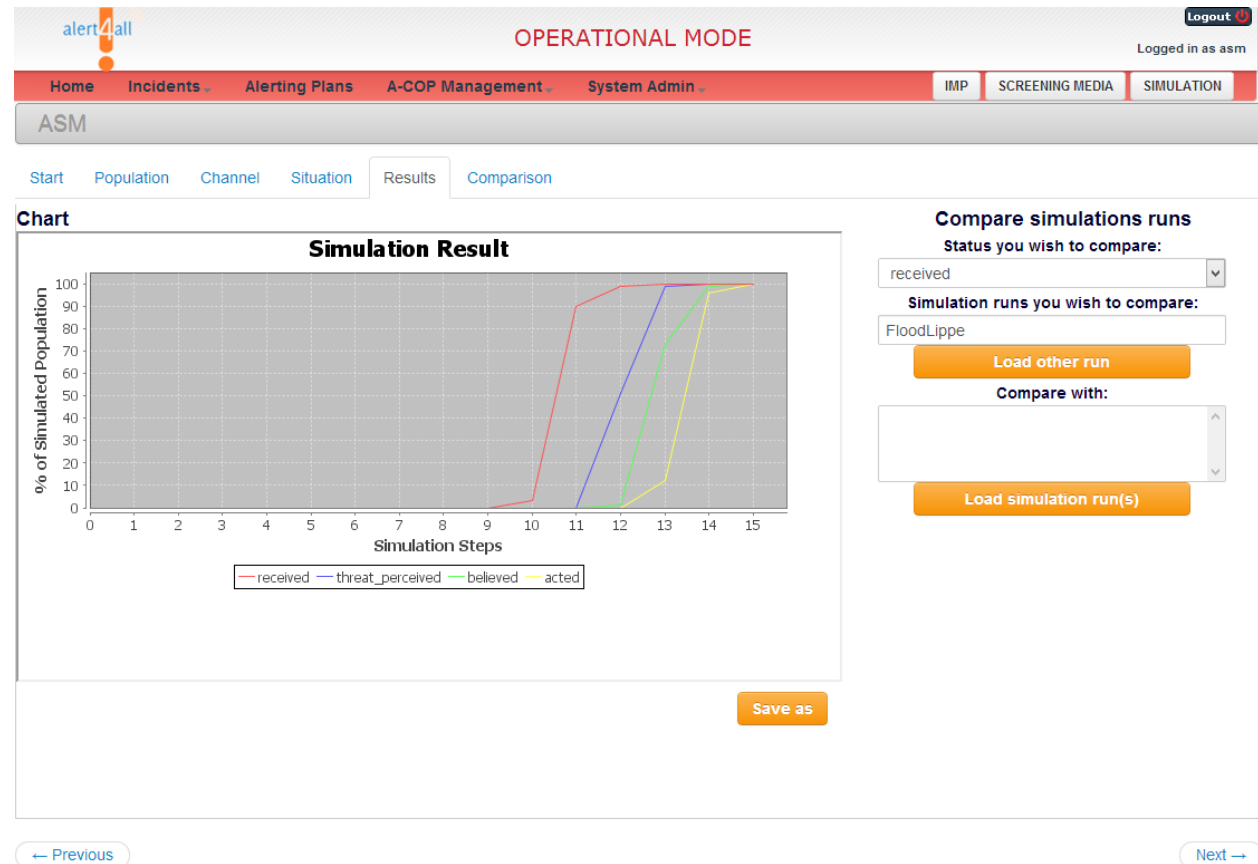
ASM-Tool: Design and Functionalities

- SituationTab:
 - Data regarding the specific circumstances of an incident
 - Not included in the base data
 - Simulation starting point

Parameter	Current Value	Target Value
1. Severity of the incident for the population	70 %	very severe
2. Experience with the incident	70 %	very familiar
3. Negative consequences	80 %	very severe
4. Experience with negative consequences	80 %	very experienced
5. Suddenness of incident	60 %	very sudden
6. Obviousness of incident	50 %	very obvious
7. Time to search for alternative actions	25 %	a lot of time

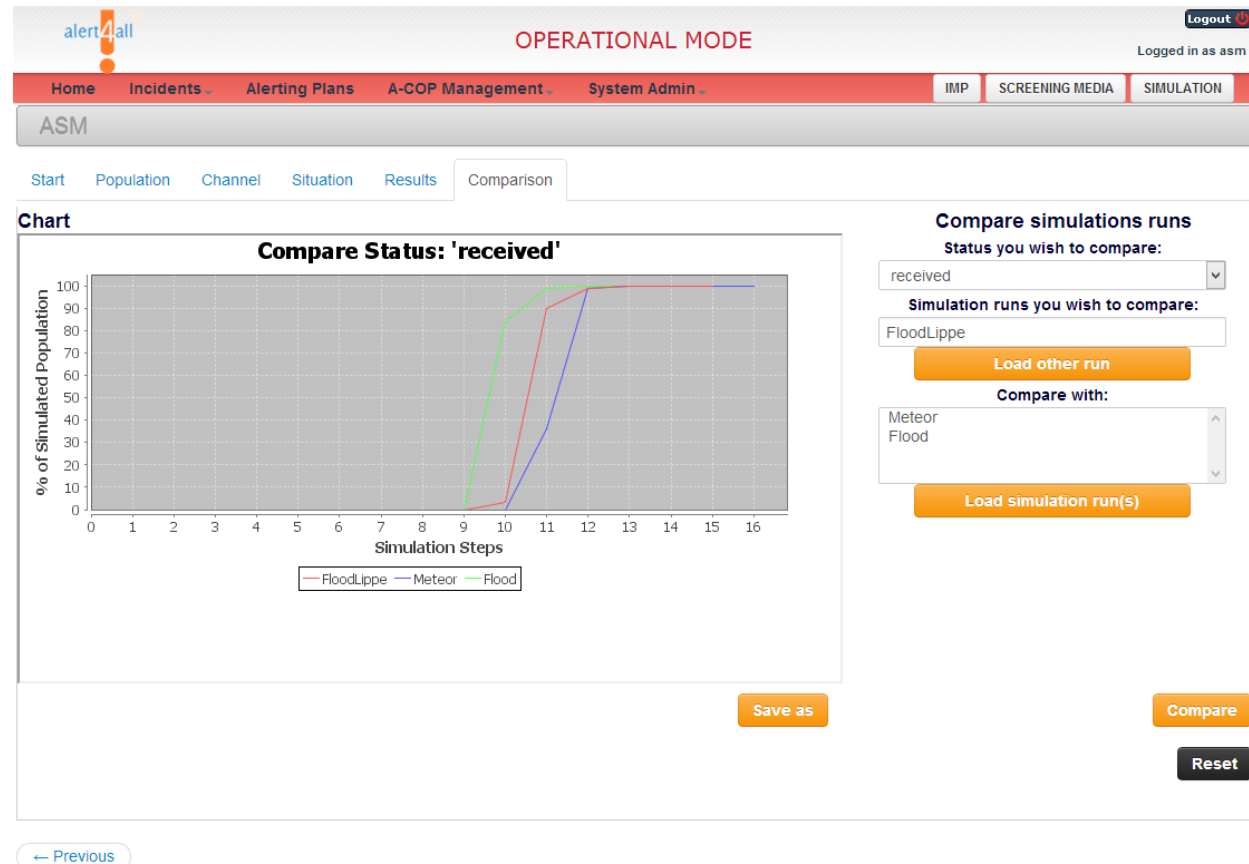
ASM-Tool: Design and Functionalities

- Result Tab:
 - Visualisation of simulation results
 - Percentage of the population that reached a specific state over time
 - 4 types of states:
 1. Message Received
 2. Threat Perceived
 3. Believed
 4. Acted



ASM-Tool: Design and Functionalities

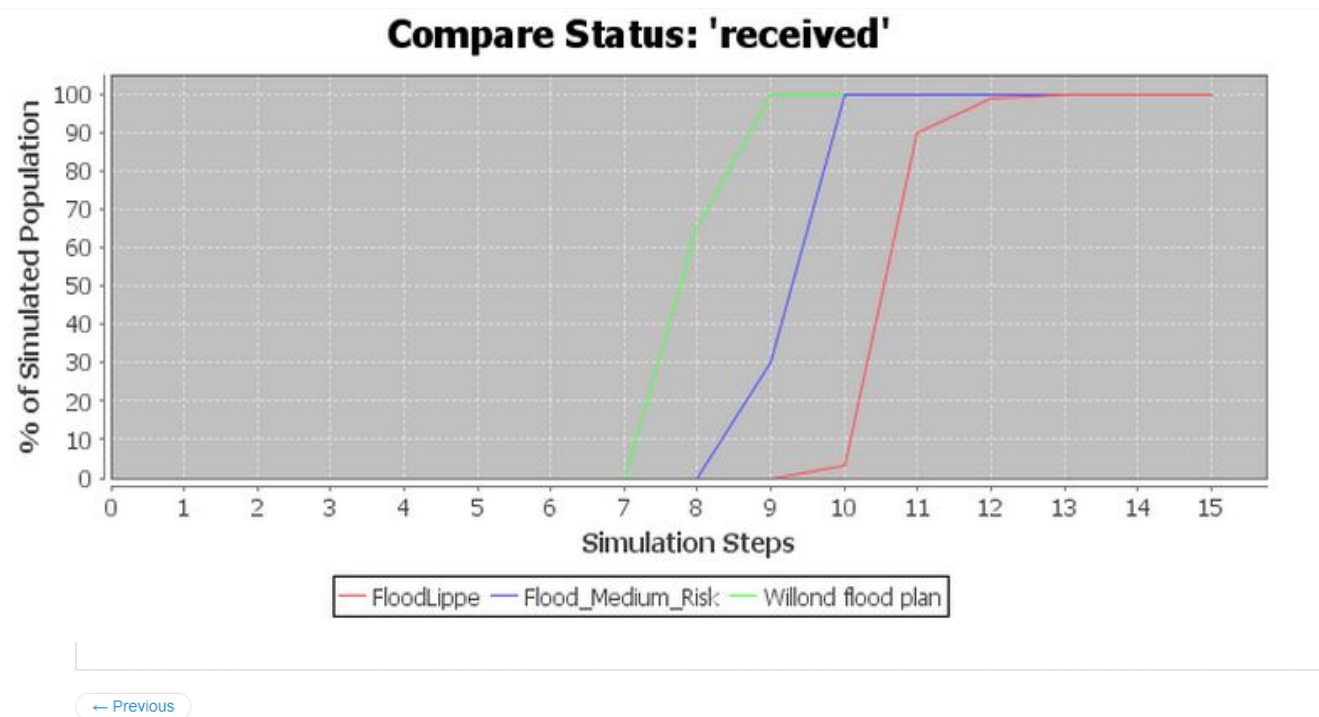
- Compare Tab:
 - Visualisation of different simulation results
 - Based on one specific state
 - Aim: Identify the most efficient warning strategy



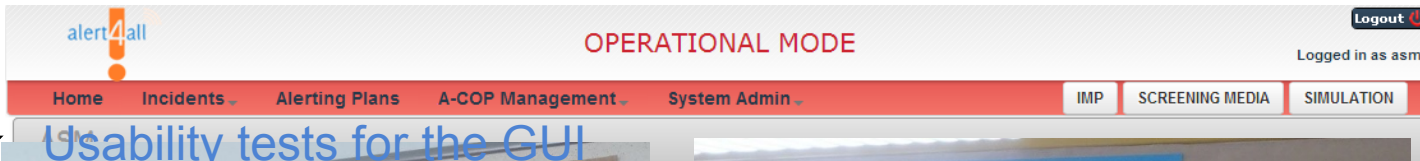
Results and exemplary use cases

Use case question 2:

What measures are the most effective in order to improve the dissemination of warning messages?



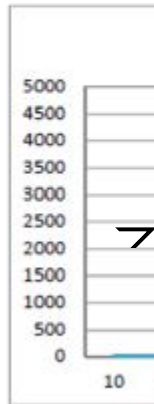
Validation of simulation model and tool



Usability tests for the GUI

Param

- The GUI is intuitive, but still needs some cosmetic adjustments
- Meaning and importance of specific parameters has to be ascertained.



Simulation model testing to validate the impact of the parameters

Manual testing realised

Automated testing approach for the simulation model in progress
(Testing conditions are clarified, testing environment is functioning)

Expert workshops

- Development of realistic scenarios

← Previous

Validation of parameter impact

Next →

Thank you!

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