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## **Tender for Feasability Study Mold-Alert**

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# 1 Introduction

For more than two decades, mecom has been developing and operating the Modular Warning System (MoWaS) on behalf of the Federal Republic of Germany (Federal Office for Civil Protection and Disaster Assistance). This state-of-the-art Public Warning System (PWS) enables the police, fire brigade and other authorities with a warning mandate (BfS, flood portals, DWD, Federal Ministry of Health, Federal Ministry of the Environment, civil protection liaison offices...) to disseminate warnings via satellite or terrestrial networks (network redundancy). People in Germany receive alerts and warnings via various alert channels such as TV, radio, alert and warning apps, passenger information systems, public displays or directly on their mobile phones as cell broadcast messages. Approximately 3,000 to 4,000 warning messages are generated, processed and disseminated via MoWaS each year.

The German warning system is one of the most advanced and developed warning systems in the world and has unique USPs:

## **One alert message for all distribution channels**

- Competent authorities can act immediately and simultaneously on all warning systems available in their geographical area.

## **Different needs - one warning system**

- Combines civil protection and emergency management requirements
- Civil protection is the responsibility of the federal government.
- Emergency management is the responsibility of the federal states.

## **Safe and secure**

- The transmission of communications and the delivery of alerts to various warning disseminators (television, public transport, etc.) are implemented in a fail-safe and secure manner for times of crisis.

## **All levels of government combined**

- Includes federal, state, district, local and foreign partners.

## **National & international networking**

- Interface to other public warning systems of neighbouring European countries (NL, BE, DK). Satellite communication platform for MoWaS participants.

After Germany was hit by a devastating natural disaster in the summer of 2021, it was decided to introduce Cell Broadcast as a nationwide alerting technology with a wake-up function.

As the operator of the German Public Warning System, mecom was commissioned to advise and support all partners involved, such as the client Federal Office for Civil Protection and Disaster Assistance (BBK), the regulatory authority Federal Network Agency (BNetzA) and the four mobile network operators (MNOs) operating in Germany, from day one in the conception, planning, development and introduction of Cell Broadcast in Germany.

In the implementation phase, mecom also realised the interface to the PWS and the complete CBE infrastructure connected via satellite, and supported all project partners involved in the introduction phase with tests. In addition, mecom was commissioned to secure the communication between CBE and CBC by collaborating in the implementation of a Public Key Infrastructure (PKI) and administrating it.

Due to its long experience in the development and operation of MoWaS, mecom has not only a complete technical knowledge of the system and all related interfaces, but also a deep understanding of warning processes, the development of warning situations and the associated requirements of both users and connected transmission systems.

Based on this extensive experience, mecom advises governmental organisations and companies in the field of (public) warning, warning systems and safety-critical communication. mecom provided consulting support for the specification of the Galileo message format, is involved in the Stellar project in an advisory role and has in-depth knowledge of the Galileo Emergency Warning Service.

As a practical partner in research projects, mecom supports research institutions and universities in collecting relevant data in the field of warning and communication. Through usability studies, surveys, literature research or data analysis, mecom provides the theoretical basis for practical projects. mecom is a member of organisations such as OASIS, EENA and TiSA in order to exchange ideas with other companies on the subject of warning and safety-critical communication and to drive developments forward.

## **2 mecom's offer for the feasibility study**

mecom has reviewed the points listed in the service description and summarised some aspects in the response and partially adjusted the order.

The aim is to structure the tender in such a way that the processing sequence is presented chronologically. The reference points are given in brackets so that the tenderer can understand which topics are dealt with where.

1. mecom will research the most important requirements regarding the scope of functions, security requirements, transport and delivery of messages in publicly available sources, interview experts nominated by the client and review studies and information provided by

the client. The data thus obtained will be analysed. mecom will propose a prioritisation and document these results. (3.1.1.)

Prerequisite: The client provides information and studies on the requirements and nominates experts and obtains their willingness to cooperate.

2. mecom will review up to three international funding programs and identify the criteria that must be met in order to receive funding. These results will be documented and used as the basis for the subsequent evaluations (3.1.2)

Prerequisite: The client and mecom jointly determine which up to three funding programs are to be evaluated.

3. mecom researches the European legislation on warning the population, analyses the mentioned directives, guidelines, recommendations and standards and evaluates the regulations from Moldova provided by the client. mecom identifies which relevant issues are not regulated by law and develops a proposal on which open issues there are that should be regulated to meet the legal requirements and for implementation. (3.2., 3.2.1., 3.2.2., 3.2.3, 3.7., 3.28.)

Prerequisite: The client shall indicate which relevant Moldovan legal regulations must be observed.

Restrictions: No binding legal advice is provided.

4. mecom analyses the infrastructure necessary for the implementation of the warning of the population in Moldova, collects publicly available information on the mobile networks and public networks and evaluates the information provided by the client and the stakeholders involved. Based on the results, mecom assesses the suitability of the available information and communication technology for warning the population and a brief risk profile (3.3.1., 3.13.).

Prerequisites: The client provides information and studies on the public networks and mobile phone networks or obtains that the operators of the networks provide corresponding information in written form within one week upon request.

5. mecom describes two solutions selected by mecom for the implementation of a PWS in European countries. The publicly available information on the topics mentioned in the tender is researched and the information provided by the client and the selected countries is analysed. (3.4.)

Requirements: The client supports the procurement of relevant information on the country-specific solutions to be analysed.

6. mecom develops two proposed solutions on the basis of the functional and legal requirements, taking into account the existing infrastructure in Moldova. (3.1.3, 3.10., 3.19.)

7. mecom will select and describe in detail suitable key performance indicators (KPIs) to evaluate the proposed solutions. The criteria relevant for funding are an important criterion. The KPIs will then be used to create a comparative summary. (3.1.4., 3.5.)
8. mecom will work out the strengths and weaknesses of the proposed solutions based on the previously developed KPIs. (3.6.)
9. Finally, a report based on the analyses, research and evaluations listed above will be prepared in consultation with the client, recommending a solution that will form the basis for the preparation of the technical documents and organisational regulations. (3.13.)  
Prerequisite: The client and mecom jointly determine the preferred solution on the basis of the above comparative summary and the strengths and weaknesses. Feedback must be provided within one week.
10. mecom develops a proposal for standards-based formats and transmission protocols for the transmission to further processing systems and the import of warning messages from external systems. (3.15)
11. mecom analyses which warning channels are available and evaluates their warning effectiveness on the basis of publicly available information provided by the client, taking into account the recommendations of 3 GPP and ETSI-/EU-Alert. mecom draws up proposals on this basis as to which further channels should be connected. ( 3.16., 3.17.)  
Prerequisites: The client shall provide information and studies on the public networks and the mobile radio networks or shall ensure that the operators of the networks provide corresponding information within one week of a request.
12. mecom provides an overview, based on the warning systems realised in Europe, of the types of warning messages that could exist and documents who has corresponding warning orders. (3.18.)
13. mecom develops a proposal based on the available information of the legal framework and the organisation chart of the state authorities as to who could be responsible for issuing the different warning messages. (3.18., 3.19., 3.24.)  
Prerequisites: The client provides information and studies on the state authorities and obtains that experts nominated by him provide relevant information within one week upon request.
14. mecom draws up a rough concept for the involvement of third parties, such as the population, companies and subordinate authorities. A central aspect here will be the authorisations that regulate who may inform whom and when, who receives the information and then creates a binding warning message. The rough concept must analyse the ways in which the information is collected and processed by the above-mentioned parties. mecom also makes suggestions as to how automated risk monitoring

systems and, if applicable, warning systems from neighbouring countries can be integrated. (3.20., 3.22.)

15. mecom prepares an overview with details of possible manufacturers and suppliers of warning systems that have implemented and operate warning systems in Europe (3.3.2)  
Restriction: Offers for warning systems are not obtained.

16. mecom determines for the cost analysis all items that must be used for the estimation of project costs, costs for implementation and hardware, as well as operating and service costs, training costs and reserves. The items for a productive system, the test system and a redundancy system are taken into account. If other countries make their calculations available or if the customer can provide quotations from potential suppliers or manufacturers, mecom will prepare a cost estimate. Otherwise, mecom can provide a rough, non-binding cost estimate. (3.25., 3.3.3.)

Prerequisites: The client obtains offers or other countries disclose their calculation.

Restriction: mecom cannot provide a cost estimate without the submission of offers or calculations from other countries.

17. mecom creates an overview of the most important dangers and military threats that jeopardise public security and that must be taken into account when implementing a PWS. (3.23.1)

18. mecom prepares a proposal for an overview of the entire warning process, listing the parties involved and their functions, focussing on the exchange of information and the necessary interfaces. (3.23.2., 3.23.3.)

19. mecom examines the steps required to implement the PWS in the mobile networks, examines the advantages and disadvantages of centralised and decentralised solutions and evaluates them. mecom analyses the feasibility of the connection. (3.14.)

Prerequisites: The data required for the analysis must be available.

20. mecom prepares technical documentation in which the technical requirements are listed, the system architecture (incl. hardware and software components, security requirements, etc.) is characterised, the user interface is specified and the CBE-CBC infrastructure is described. Scalability and the possibility of integrating new functions are also taken into account, as is the modular structure of the system. (3.8., 3.9., 3.11., 3.12., 3.21., 3.23.3.)

21. mecom will prepare a draft implementation plan based on the information gathered during the analysis. (3.26.)

22. mecom will create a draft test plan and list important test cases (3.27.)

### 3 Risks

The following section lists the risks that mecom has identified for the preparation of the feasibility study.

1. If information is provided late or not at all, the analyses etc. cannot be prepared at all or not within the timeframes provided for them. Countermeasures: The client undertakes to provide the documents and information in a timely manner.
2. If stakeholders cooperate late or not at all, the analyses etc. cannot be prepared at all or not within the timeframes provided.  
Countermeasures: The client contacts relevant experts at an early stage and obliges them to respond promptly.
3. If experts are available late or not at all, the analyses etc. cannot be prepared at all or not within the timeframes provided.  
Countermeasures: The client not only contacts the respective experts, but also contacts a potential replacement.
4. Geopolitical developments can lead to economic instability, security threats and disruptions to energy supplies. They can also cause migration, humanitarian crises and environmental problems, as conflicts hinder international cooperation. These risks are often interlinked and can have far-reaching, unforeseeable consequences. These risks can affect the procurement of information and the coordination between the client and mecom and, in the worst case, lead to the feasibility studies not being submitted or being submitted late.  
Countermeasure: No countermeasures can be taken as part of this tender.
5. Changes to the legal framework may result in the analyses and assessments being out of date when the feasibility study is submitted.  
Countermeasures: The client shall clarify at an early stage whether and when amendments to the legal norms are to be expected.
6. Changes to the funding guidelines may mean that the analyses and evaluations of the funding guidelines are out of date when the feasibility study is submitted.  
Countermeasures: The client shall clarify at an early stage whether and when amendments are to be expected.

mecom draws up a schedule so that the client can fulfil its obligations to cooperate on time. If delays occur due to missing or late fulfilment of cooperation obligations, mecom will check whether an extension can be offered and submit an offer with the additional costs.



## 4 Development of Technical Documentation

The following section describes in detail how mecom will prepare the technical documentation which includes the optimal technological solution identified and proposed in the feasibility study (4.1). The documentation will be compliant, detailed and sufficient for the successful implementation of NPWS "Mold-Alert" in the Republic of Moldova (4.7).

The following aspects are included:

- technical requirements for NPWS "Mold-Alert" (4.2.1)
- technical concept for NPWS "Mold-Alert", developed under the normative acts in force in the Republic of Moldova (4.2.2)
- a structured list of all standards and regulations to be observed (4.3)
- the implementation of additional functions must not impair the system functionality (4.5)

Structure of the technical requirements (4.6): mecom will structure the technical requirements as required.

### 4.1 PWS (Mold-Alert) system architecture (4.4):

mecom will describe the system architecture of "Mold-Alert". This includes the following topics:

#### 4.1.1 General system architecture

The general system architecture comprises the following components:

- the central hardware and software components (form factors, energy consumption, EMC compatibility, redundancies, maintainability, availability of spare parts, operating systems, software components)
- Data flows, data processing, storage and archiving
- Reports generated by the system
- Security and redundancy aspects
- Security and compliance requirements
- Performance, scalability and accessibility

#### 4.1.2 PWS (Mold-Alert) User Interface

Based on the requirements for the PWS system, mecom will provide technical specifications for the following aspects of the PWS user interface:

- User groups and their roles
- The user interface

- The hardware used for the operator stations (form factors, power consumption, EMC compatibility, redundancies, maintainability, availability of spare parts, operating systems, software components)
- Communication networks
- Transmission protocols
- Data formats

## **4.2 CBE - CBC Infrastructure**

Since it is the core of the desired PWS and Cell Broadcast Solution, mecom is going to provide more details regarding the CBE-CBC specifications. Before specific technical specifications for the CBE-CBC infrastructure can be established, the requirements for this infrastructure must first be identified. In particular, if the connection of additional warning channels is to be ensured in principle, their requirements must also be taken into account. Therefore, mecom will proceed as follows:

- Detailed collection of requirements for the technical implementation of the CBE-CBC interface, taking into account the future use of additional warning channels.
- Develop a comprehensive concept for the CBE-CBC infrastructure based on the collected requirements.
- Detailed planning of the technical implementation.
- Coordinate the implementation with all stakeholders.

## **4.3 Key aspects of the technical specification of the CBC functions**

- Required geolocation capabilities
- Interface functions (redundancies, heartbeat, etc.)
- Multilingualism of Cell Broadcast alerts, use of CB channels, warnings, updates, all-clear, etc.

## **4.4 Key aspects of the description of the communication network requirements (communication paths, components involved)**

- The technical specification of the CBE infrastructure
- The technical specification of the CBC infrastructure
- The technical specification of the interface and communication protocol between CBE & CBC
- The technical specification of the additional alert channel infrastructure (where possible)

Network security and privacy based on the security guidelines, a requirement specification for the network architecture will be developed.

## 4.5 Key aspects of the network architecture requirements

- Physical separation from untrusted networks and handover points
- Encrypted and integrity-protected communication of network connections according to the cryptographic concept
- Sizing and redundancy of network and security components, transmission paths and external connections
- Protocols to be used and their basic configuration and addressing
- Management and monitoring
- Integration of the network into a central logging instance to record unauthorised access and access attempts, network performance and availability variations, faults and limitations in the accessibility of network components.
- Development of possible cyber-attack scenarios and their solutions
- Perform penetration tests to ensure requirements are met
- Avoiding unintentional interference with other devices

To evaluate whether and if so, what effects on devices can arise from sending warnings via Cell Broadcast and how to prevent these, mecom proposes the following approach:

- Collection and evaluation of possibilities and necessities to influence the reception of Cell Broadcast messages on unintended devices.
- If necessary, identification and contact of the affected hardware manufacturers of devices that should not receive Cell Broadcast messages to develop solutions in collaboration with them.
- If necessary, documentation of the requirements for the necessary changes to the affected devices and creation of implementation proposals for the client.
- Evaluation of possibilities for selective addressing of SIM cards within an MNO network

## 4.6 Security Requirements

In a requirements specification to be created, functional and non-functional requirements are distinguished. Functional requirements refer to the purpose of the product. Non-functional requirements include requirements such as time behaviour, resource consumption, robustness, and IT security. In the area of IT security, security tests corresponding to the protection goals of availability, integrity, confidentiality, authenticity, etc., for the warning system are defined and recorded in a test catalogue. In addition to creating the test catalogue and requirements specification, a process for secure testing and approval of software and hardware components will be created.

## **5 Requirements for Tender Documentation for procurement of the National Public Warning System “Mold-Alert”**

With the feasibility study and the technical documentation, mecom provides key documents that can be used to prepare a tender.

mecom is familiar with the World Bank's specifications for the preparation of tenders and will prepare an offer on request in order to provide further support in the preparation of a tender after completion of a feasibility study with technical documentation.

## **6 Timetable and deadlines**

The timetable and deadlines for the preparation of the Feasibility Study and the documentation referred to in these Specifications, also including the Workshops and consultation sessions, progress report, as well as Final acceptance and submission to the Beneficiary of the Feasibility Study and the documentation drawn up according to these Specifications, including key documents that can be used to prepare a PWS tender (see point 5) by the beneficiary, going to be completed within the deadline of 150 calendar days.

## 7 Project Price

Fixed Project Price		
Workstream	Deliverable	Cost (Ex VAT)
0. Project Initiation	Agree scope, timelines, approach, protocols etc.	15.450,00 EUR
1. Analysis of Requirements	See Part 3 <ul style="list-style-type: none"> <li>• Funding Programs</li> <li>• Legislative Requirements</li> <li>• Analysis of Infrastructure</li> </ul>	166.875,00 EUR
2. Solutions and Evaluation	See Part 3 <ul style="list-style-type: none"> <li>• Development of solutions</li> <li>• Comparison</li> <li>• Discussion</li> <li>• Documentation and Evaluation</li> </ul>	58.715,00 EUR
3. Evaluation of Implementation	See Part 3 <ul style="list-style-type: none"> <li>• Implementation Plan</li> <li>• Definition Testing Use Cases</li> </ul>	24.725,00 EUR
4. Cost Analysis	See Part 3	30.900,00 EUR
5. Other Considerations	See Part 3 <ul style="list-style-type: none"> <li>• Warning Process</li> <li>• Warning Channels</li> <li>• Types of Warnings</li> <li>• Responsibilities</li> <li>• Warning through Third Parties</li> </ul>	71.080,00 EUR

6. Technical Documentation	See Part 4 <ul style="list-style-type: none"> <li>• System Architecture</li> <li>• User Interface</li> <li>• CBE-CBC Infrastructure</li> <li>• CBC Functions</li> <li>• Network</li> <li>• Network Security</li> </ul>	108.160,00 EUR
Total Fixed Project Fee excluding VAT:		475.905,00 EUR
German VAT Rate %:		19 %

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