MitMesh

Konzeptpapier: Projekt „MitMesh“

Title: MitMesh – Your Personal Resilience Coach & Emergency Network
Purpose: Concept for grant applications and presentation to cooperation partners.

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1. Management Summary

Project "MitMesh" is an innovative mobile application that closes a critical gap in Germany's civil protection system. It is the first solution to combine proactive, gamified emergency preparedness for daily life with a resilient, decentralized communication network for acute crisis situations. Commitments from leading scientific partners have already been secured.

MitMesh addresses the two core problems of modern disasters: the lack of public preparedness and the total collapse of communication during an infrastructure failure (blackout).

- As a "Resilience Coach", the app motivates citizens to prepare themselves and their families for crises. It creates targeted action plans tailored to individual life situations and uses gamified elements to actively promote personal preparedness.
- As an "Emergency Network", the app transforms into a vital tool in a crisis, enabling communication, SOS signals, and orientation via ad-hoc mesh technology (Bluetooth/WLAN), even without a cellular network or internet.

The project's goal is to develop a Minimum Viable Product (MVP) and validate it in a controlled pilot project to prove its effectiveness and lay the groundwork for a nationwide rollout. MitMesh has the potential to significantly increase society's self-reliance and sustainably relieve the burden on emergency services during a disaster.

2. Problem Statement: The Dual Gap in Civil Protection

Recent crises, such as the 2021 Ahrtal flood or the growing threat of prolonged power outages, have exposed two fundamental weaknesses:

1. The Preparedness Gap: A large portion of the population is inadequately prepared for crisis situations. Knowledge of necessary supplies, emergency plans, and correct procedures is low. Existing information sources (e.g., websites of the BBK - Federal Office of Civil Protection) are passive and do not reach people in their daily lives.
2. The Communication Gap: During an outage of central infrastructure (power, cellular, internet), all established warning and communication systems fail, including official warning apps (NINA, KATWARN). Citizens are cut off from information, cannot call for help, and cannot coordinate with neighbors or family. This is the moment of greatest vulnerability.

MitMesh was developed to close exactly this dual gap with a single, user-friendly tool.

3. Our Solution: The Two-Pillar Principle of MitMesh

MitMesh is based on two pillars that seamlessly integrate and mutually reinforce each other.

Pillar 1: Proactive Resilience Coach (For Daily Life)
This pillar solves the motivation problem of preparedness. Instead of working with fear, the app uses positive reinforcement and gamification elements to encourage users to prepare.

- Interactive Resilience Planner: Guided modules on topics like "Water Supply," "First Aid," "Emergency Kit," or "Document Safety."
- Personalized Action Plans: Instead of generic advice, the app creates concrete and relevant action plans based on simple, non-sensitive questions about the user's life situation (e.g., mobility, housing, pets). This ensures that the preparedness measures are actually applicable and useful for the user in an emergency.
- Gamification: Users receive rewards and badges (e.g., "Blackout Pro," "First Aid Hero") for completed preparedness tasks. A visible "Resilience Score" encourages them to complete their personal preparations.

Pillar 2: Reactive Emergency Network (For a Crisis)
When a crisis occurs, the coach transforms into a decentralized safety net. The user base built up in Pillar 1 now becomes the decisive factor.

- Official Warnings: Integration of the Modular Warning System (MoWaS) as an initial crisis indicator.
- Ad-hoc Mesh Network: During a network outage, MitMesh automatically establishes a decentralized communication network via Bluetooth & WLAN. Every smartphone becomes a node that relays encrypted messages.
- Intelligent SOS Signal: A SOS signal with coordinates (GPS or Bluetooth Proximity) is broadcast over the mesh network until it reaches helpers nearby or a device with internet access (gateway).
- Offline Maps & Navigation: Important locations (emergency shelters, hospitals) are marked on offline-available maps, enabling orientation.

4. Unique Selling Proposition (USP)

In contrast to existing solutions, MitMesh offers a unique combination:

Feature	NINA / KATWARN	Standard Messenger	Project MitMesh
Official Warnings	✅ Yes	❌ No	✅ Yes
Offline Communication	❌ No	❌ No	✅ Yes
Proactive Preparedness	❌ No (passive info only)	❌ No	✅ Yes
Gamification/Motivation	❌ No	❌ No	✅ Yes

MitMesh is the first app to cover the entire disaster management cycle for the citizen: Preparation → Warning → Reaction → Communication.

5. Target Audience and Market Entry Strategy

The primary target audience includes all security-conscious citizens in Germany, especially families, people in high-risk areas, and individuals with responsibility for others.

To solve the chicken-and-egg problem (network effect), we are pursuing a targeted pilot strategy:

- Option A: Geographic Pilot: Cooperation with a selected county. Joint public relations with local authorities (fire department, THW) to achieve high user density in a limited area for a real-world stress test.
- Option B: Event Pilot: Use at a large-scale event (e.g., a music festival). Overloaded networks are the norm here, providing a perfect testbed for offline functions with guaranteed user density.

6. Technical Feasibility

The MVP will be developed with a focus on stability and security.

- Platform: Native development for iOS and Android for maximum performance and hardware access.
- Mesh Technology: Use of established protocols for peer-to-peer communication. The challenge of iOS background activity is pragmatically solved by a user-activated "Emergency Mode" design.
- Backend: A lean and scalable cloud infrastructure serves exclusively for online functions (warnings, account synchronization).
- Data Privacy: The "Privacy by Design" principle is guiding. Data minimization, end-to-end encryption in the mesh network, and full transparency for the user are core to the concept.

7. Societal Value and Funding Potential

Project MitMesh creates significant societal value:

- Strengthening Societal Resilience: The population is empowered to help themselves and others in the critical first hours of a disaster.
- Relieving Professional Emergency Services: Better prepared and interconnected citizens reduce the number of avoidable emergency calls, enable information exchange, and allow for effective prioritization and guidance of assistance, especially in the most critical time window.
- Promoting Civic Engagement: The app creates a foundation for digital neighborhood assistance in times of crisis.

The project is excellently suited for public funding (e.g., from programs for civil security, digitalization, or volunteer work), as it directly contributes to the strategic goals of national civil protection.

8. Outlook and Future Development

The primary goal of the project is the development of a Minimum Viable Product (MVP). To unfold the full potential of MitMesh, we are pursuing a clear, multi-phase development roadmap.

Phase 1: MVP & Validation

- Objective: To lay the technological foundation, validate the core hypotheses under real-world conditions, and create a basis for scaling.
- Key Activities:
    - Development of the decentralized Emergency Network.
    - Implementation of the foundational Resilience Coach functions.
    - Execution of a controlled pilot project with a strategic partner.
    - Building a sufficient user base for the mesh functionality.
    - Collection of empirical data and user feedback for iterative development.

Phase 2: The Helper Platform (Follow-up Project)

- Objective: To activate the community and channel spontaneous willingness to help.
- Key Features:
    - Introduction of helper profiles with status and skill information.
    - Implementation of a decentralized "bulletin board" for offers of and requests for help.
    - Creation of interfaces for coordinated collaboration with professional emergency services (BOS).

Phase 3: The Resilience Ecosystem (Long-term Vision)

- Objective: To establish MitMesh as an integral component of the digital security architecture and ensure its long-term sustainability through commercialization.
- Key Features:
    - Development of B2B solutions for companies and event organizers.
    - Integration into professional command and control systems and utilization of hyperlocal user and IoT data.
    - Creation of open APIs to foster innovation by third parties.

Each phase logically builds on the previous one. With the successful implementation of the MVP, we are creating the indispensable foundation for a significant strengthening of societal resilience.

9. Conclusion

MitMesh is more than just an app – it is an ecosystem for security and self-reliance. Through its unique combination of motivating preparedness and resilient emergency communication, it has the potential to fundamentally improve the way our society deals with crises.

The next step is to finalize the consortium with application and scientific partners to start the development of the MVP in a funded pilot project and to validate our core hypotheses. We are convinced that with MitMesh, we are creating a sustainable and urgently needed solution for one of the greatest challenges of our time.

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