2026

Improving Emergency Communication in Greece

Image courtesy of SolidarityNow, 2023

KATIE ADILETTA, MATT DI GIOVANNI, SEAN FOLLIS, ANGELINA POPP
Project Advisors: MELISSA BUTLER and ROBERT KINICKI

Improving Emergency Communication in Greece

An Interactive Qualifying Project Report Submitted to the Faculty of Worcester Polytechnic Institute in partial fulfillment of the requirements for the Degree of Bachelor of Science in cooperation with SolidarityNow.

Submitted by:

Katie Adiletta

Matt Di Giovanni

Sean Follis

Angelina Popp

With the Support of:

Nikolas Rangos and Nikolaos Stavridis

SolidarityNow

Date Submitted:

May 6, 2026

Submitted to:

Professors Melissa Butler and Robert Kinicki

Worcester Polytechnic Institute

WPI

This report represents the work of WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review. For more information about the projects program at WPI, please refer to http://www.wpi.edu/academics/ugradstudies/project-learning.html

Abstract

The goal of this project was to develop a safety communication application that supports real-time coordination during emergencies for SolidarityNow, a non-governmental organization assisting vulnerable populations in Thessaloniki, Greece. To understand safety risks from emergencies such as natural disasters and civil unrest, our team conducted ten interviews and visited four sites, identifying core features for an effective solution. These insights led to the development of Echo, a desktop and mobile app that enables two-way, location-based communication. Scenario-based testing demonstrated improved coordination and faster, clearer staff responses. In high-stress situations, effective communication is critical to ensuring the safety of the vulnerable communities the staff serve.

Executive Summary

Introduction and Backgroud

Natural disasters are becoming more frequent and severe worldwide, leading to major human, social, and economic impacts (EM-DAT CRED/UCLouvain, 2025 & Ma et al., 2023). In Greece, earthquakes, floods, and wildfires are a part of life, and when combined with aging infrastructure and a growing vulnerable population, they make emergency response and evacuation increasingly challenging (Diakakis et al., 2025). During these events, disruptions to transportation, utilities, and communication systems can limit access and slow down coordination, putting both responders and affected communities at greater risk (Diakakis et al., 2016).

Effective evacuation relies on clear, timely, and coordinated communication. However, communication systems often fail during disasters due to technological and organizational challenges, and social factors such as language barriers and differences in past emergency experiences (Manoj and Baker, 2007). Many humanitarian organizations need communication solutions that fit their existing structure and address these challenges.

SolidarityNow is a Greek non-profit humanitarian organization that responds to the needs of vulnerable and marginalized groups without discrimination. The organization relies on general-purpose communication tools, such as WhatsApp and Microsoft Teams Chat to communicate during emergencies, which makes it difficult to send rapid, location-based alerts and maintain real-time coordination between members during evacuations.

Our project addressed this gap by designing and evaluating a safety communication application focused on enabling real-time, two-way communication, and supporting decision-making during evacuations. Overall, the goal was to strengthen communication, improve evacuation effectiveness, and increase safety for both responders and the populations they support.

Methodology

Our team's research focused on the challenges SolidarityNow members face during emergency evacuation scenarios identify and develop an application that addressed the key communication breakdowns they experienced. We carried out this work through a comprehensive methodology that included observations, interviews, qualitative data synthesis, and thematic analysis. A major component of meeting our deliverables involved determining which technical features we could implement on site.

Before arriving on-site, we conducted a literature review of current communication tools to identify existing emergency communication platforms and created a design matrix to compare their features. This review allowed us to identify the features most integrated into safety communication applications and most relevant to our sponsors' needs.

We also interviewed a Human Computer Interaction professor at WPI who specializes in graphic design, UI/UX design, and application development. He

Executive Summary

addressed our questions about rapid decision making features and offered informed suggestions and adjustments we could integrate in our communication solution.

Our team conducted on-site research from March 16 to May 6 at SolidarityNow centers in Thessaloniki and Athens. Through interviews and observations, we developed a comprehensive understanding of members' experiences during emergency evacuations. We visited four central locations: Thessaloniki Helios+ Center, Thessaloniki Premises, Athens Headquarters, and the Athens Solidarity Center (Figure E.1). During each visit, staff explained the centers' functions, services, and internal roles. We observed daily operations, including occupant capacity, work pace, and overall environment.

Figure E.1 Map of Locations Centers Visited by Project Team

We conducted ten interviews across all visited centers except the Athens Headquarters. We interviewed participants with diverse roles and levels of experience to gain a well-rounded perspective. Interviews focused on communication practices, emergency scenarios, and desired application features.

The final component of our methodology involved creating and testing the application. We build the application in PowerApps and implemented every staff-requested feature that was feasible. Once the application reached its final development stage, we conducted usability testing with eight staff members. Participants completed a series of tasks on their mobile device to evaluate core functions. Two project team members monitored the desktop version to send alerts and track expected notifications, while the remaining two project team members observed participant interactions. During testing, we assessed app navigation, communication effectiveness, response time, and overall usability. Afterward, we identified necessary adjustments and incorporated them into the final version of the application.

Findings

To consolidate the findings from observations, the team developed simplified floor-plan diagrams that highlighted elements influencing emergency evacuation: exits, egress paths and features, as well as staff and beneficiary distribution. The diagrams illustrated two categories of concern: fixed physical constraints and high occupant load.

Across the sites, the most significant physical constraint involvedthe limited number of exits. All centers had only one exit except the Athens Solidarity Center. The Athens Headquarters contained one exit as well as multiple enclosed rooms with closely spaced doors, which increased the likelihood of collisions during hurried movement, and its second floor required occupants to descend a flight of stairs to exit. At the Thessaloniki Premises, the

Executive Summary

single exit sat at one end of the building, leaving most occupants with a long egress path.

High occupancy levels further intensified these risks, particularly at the Thessaloniki Premises and the Athens Solidarity Center. The Athens Solidarity Center's waiting accommodates up to 50 beneficiaries, which causes the space to crowd and the path to the exit to congest when occupancy is high. If an evacuation occurred while at capacity, the center would experience delays and potential crowding.

Overall, the combination of limited exits, constrained egress paths, and high occupant loads created a consistent potential for evacuation challenges across all sites. Although the application could not resolve these structural issues, the team integrated features such as adjustable notifications to warn staff about evacuation events related to the building's physical constraints.

We also analyzed the interviews with SolidarityNow staff and found that their communication during evacuation scenarios often lagged, varied widely, and created management challenges. Participants reported challenges receiving timely updates, communicating rapidly changing events in the field, and an inability to confirm colleagues are safe. These issues become amplified by the dynamic, high-pressure nature of emergencies, where communication speed and accuracy are essential.

Several key findings emerged through the interviews. Staff emphasized the importance of receiving clear, concise, and actionable instructions with minimal app navigation required. All participants expressed that the application should specify the type of emergency when sending an alert, to differentiate between various natural disasters and human caused emergencies. Additionally, staff expressed concerns about app complexity. In high-stress environments, intricate interfaces or multi-step processes significantly hinder effective communication. The emergency director, on the other hand, required tools that enable rapid dissemination of information to specific groups, as well as mechanisms to confirm message receipt and personnel safety. All participants highlighted the necessity of two-way communication, allowing members to report conditions in real time and enabling coordinators to adjust evacuation strategies accordingly. Nine of then ten interview participants requested a way to confirm safety status or alert the emergency director they need further assistance.

Our team utilized scenario-based user testing of the completed app to assess the final features and design. The test scenario was a practice evacuation in the event of an earthquake, where staff needed to meet at the designated assembly point and check-in using the app. Participating staff started in the building, where they received a 112 alert instructing them to evacuate. The test group then followed their evacuation procedure out of the offices to designated meeting points, and report their status through the app. From this testing we determined that all features functioned properly, as well as the app being intuitive for users.

Executive Summary

Design

The challenges identified in our findings, particularly delays in communication, lack of targeted messaging, and difficulty maintaining real-time coordination during emergencies, directly guided the design of the proposed communication system. To address these issues, we developed a communication application custom built for SolidarityNow that improves speed, clarity, and coordination during evacuation scenarios.

The system consists of a mobile application (Figure E.2.) for office staff and a desktop dashboard (Figure E.3.) for emergency coordinators. The mobile application enables staff to quickly receive alerts and respond with their status using simple, clearly defined buttons.

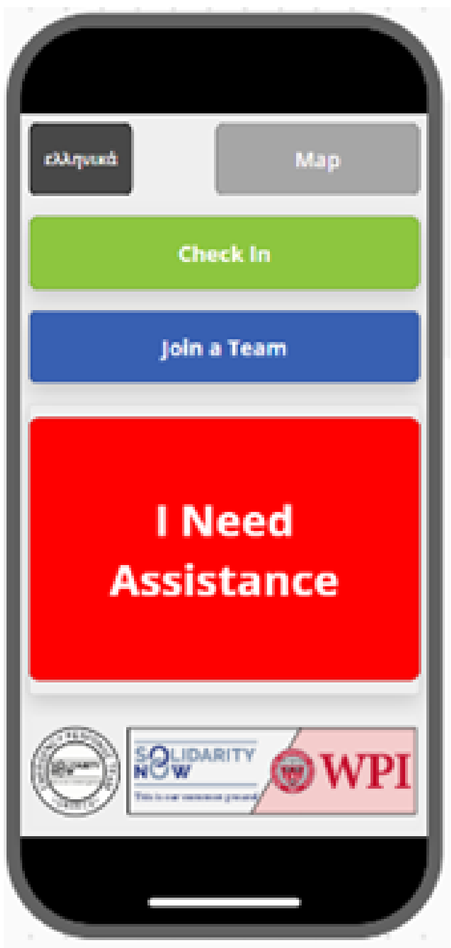


Figure E. 2. Mobile Phone Application

For example, there is an enlarged button for assistance that is easily distinguishable from the other buttons on the screen. Immediate responses allow emergency directors to quickly determine who is safe and who needs assistance, improving situational awareness during critical moments.

Figure E.3. Desktop Application

To reduce confusion and improve efficiency, the design for the “Create Incident” pop-up in Figure E.4 incorporates structured communication through predefined message formats and categorized incident types. It also includes targeted, location-based messaging, ensuring that only relevant teams receive specific alerts. This minimizes unnecessary notifications and allows staff to focus on incidents that directly affect them.

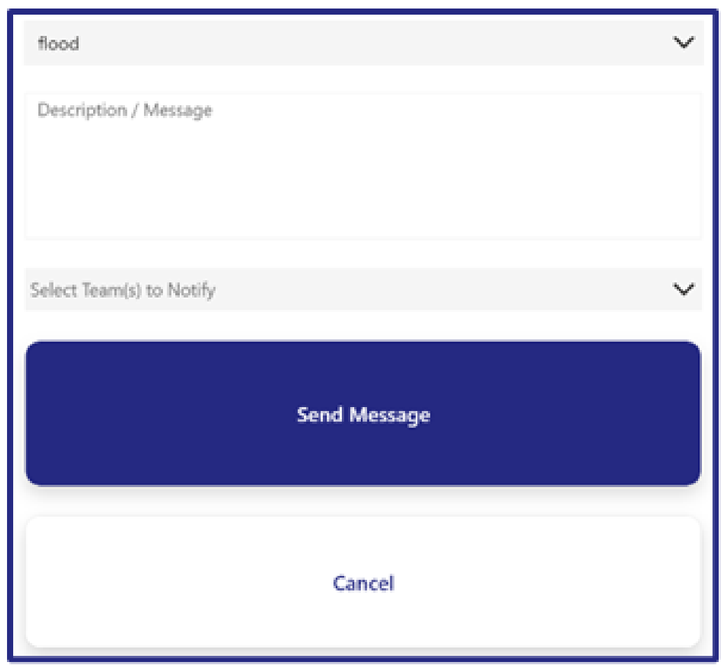


Figure E. 4. “Create Incident” Popup

We developed the application using Microsoft Power Apps, Power Automate, and SharePoint Lists, and integrated it with existing tools such as Microsoft Teams and Outlook. This approach ensures the system

Executive Summary

remains cost-effective, easy to deploy, and practical for long-term use within SolidarityNow. Additionally, communication overlap between Microsoft Teams and Outlook increases the likelihood that critical information reaches all staff during emergencies.

Recommendations

Based on our research, development process and testing, we identified several key steps to support the continued use and improvement of the application.

Assign a dedicated staff member with Power Apps expertise to maintain the system. Ongoing technical support is necessary to ensure effective use during real incidents, as the application relies on SharePoint data, automated workflows, and organization-specific configurations.

Integrate the application into regular emergency training scenarios. Our findings showed that staff have varying levels of experience with emergencies and technology, and high-stress environments can make it difficult to use unfamiliar tools. Practicing with the application in controlled settings will improve confidence and ensure more effective use during incidents.

Focus on enhancing communication features. Improvements such as repeated urgent notifications, additional emergency information sources, and automatic translation between Greek and English would directly address communication gaps identified in our findings. Adding these features would strengthen the system's ability to deliver clear, timely, and accessible information during emergencies.

Conclusion

Through interviews, observations, and prototype testing with SolidarityNow staff, the team discovered that existing communication methods were often inconsistent and relied heavily on manual, interpersonal interactions, which increased pressure on staff and slowed response times.

Our team developed an application designed to improve communication during emergency situations. The proposed solution addressed staff challenges by introducing a structured, real-time communication system that supports both office staff and emergency coordinators. By improving how staff share, track, and act on information, the application enhances situational awareness and enables coordinated responses during critical moments. In emergency situations, clear and real-time communication allows staff to respond more effectively, which helps create a safer and more stable environment for those in their care.

Overall, this project demonstrated how a practical, organization-specific solution can strengthen emergency communication, leading to faster coordination, more informed decision-making, and improve response effectiveness within humanitarian settings. By directly addressing the organization's communication challenges, the project highlights the tangible impact that a safety application can have on saving time and utilmately supporting vulnerable populations.

Bibliography

Diakakis, M., Xanthopoulos, G., & Gregos, L. (2016). Analysis of forest fire fatalities in Greece: 1977–2013. *International Journal of Wildland Fire,* 25(7), 797–809. https://doi.org/10.1071/WF15198'

Diakakis, M., Sarantopoulou, A., Gogou, M., Filis, C., Nastos, P., Kapris, I., Vassilakis, E., Konsolaki, A., & Lekkas, E. (2025). Cascade Effects Induced by Extreme Storms and Floods: The Case of Storm Daniel (2023) in Greece. *Water*, 17(7), 912. https://doi.org/10.3390/w17070912

EM-DAT, & CRED/UCLouvain. (n.d.). *Timeseries of Natural Disasters Statistics* 980-2024 [Dataset]. Retrieved February 6, 2026, from https://climateknowledgeportal.worldbank.org/country/greece/natural-disasters-historical

Manoj, B. S., & Baker, A. H. (2007). Communication Challenges in Emergency Response. *Communications of the ACM, 50*(3), 51–53. https://doi.org/10.1145/1226736.1226765

Ma, C., Qirui, C., & Lv, Y. (2023). "One Community at a Time": Promoting Community Resilience in the face of Natural Hazards and Public Health Challenges. *BMC Public Health*, 23(1), 2510. https://doi.org/10.1186/s12889-023-17458-x

Acknowledgements

Nikolas Rangos

Nikolaos Stavridis

Melissa Butler

Robert Kinicki

We would like to thank our sponsor, SolidarityNow, and in particular our sponsor contacts, Nikolas Rangos and Nikolaos Stavridis, for their support during our time in Thessaloniki, which made it possible for us to complete our research. Their guidance and assistance played a key role in enabling us to design the application.

We would also like to thank SolidarityNow for providing a dedicated workspace, supplying the resources we needed, and welcoming us into the organization throughout our time abroad.

Finally, we thank our advisors, Professor Melissa Butler and Dr. Robert Kinicki, for their continued support and guidance throughout this project.

Authorship

Section	Primary Author(s)	Primary Editor(s)
Abstract	Katie Adiletta	Matt Di Giovanni
Exectutive Summary	All	All
Acknowledgments	All	All
1.0 Introduction	All	Angelina Popp
2.0 Background	Sean Follis	All
2.1 Vulnerable Populations in Greece	Katie Adiletta	Angelina Popp
2.2 Infrastructure Failures During Natural Disasters	Matt Di Giovanni	Sean Follis
2.2.1 Storm Daniel (2023)	Matt Di Giovanni	Katie Adiletta
2.2.2 Other Natural Hazards in Greece	Matt Di Giovanni	Angelina Popp
2.3 Disaster Communication: Framework and Barriers	Katie Adiletta	Matt Di Giovanni
2.3.1 Technological Communication Challenges	Katie Adiletta	Matt Di Giovanni
2.3.2 Sociological Communication Challenges	Katie Adiletta	Angelina Popp
2.3.3 Organizational Communication Challenges	Katie Adiletta	Matt Di Giovanni
2.4 Role of Apps In Supporting Emergency Evacuation	Sean Follis	Katie Adiletta
2.4.1 Communication Features in Emergencies	Sean Follis	Matt Di Giovanni
2.5 SolidarityNow	Angelina Popp	Matt Di Giovanni
2.6 Summary	Sean Follis	Angelina Popp
3.0 Methods	Matt Di Giovanni	Angelina Popp
3.1 Comparing Safety Communication Applications	Sean Follis	All

Authorship

Section	Primary Author(s)	Primary Editor(s)
3.1.1 Review of Safety Communication Apps	Sean Follis	All
3.1.2 Design Matrix to Compare Apps	Sean Follis	All
3.2 Staff and emergency director Challenges During Evacuation Scenarios	Angelina Popp	All
3.2.1 Observations of SolidarityNow Offices	Angelina Popp	Sean Follis
3.2.2 Interviews with SolidarityNow Staff and Volunteers	Angelina Popp	Katie Adiletta
3.3 Develop Prototype Communication Application for Evacuation Messaging	Katie Adiletta	All
3.3.1 Interviewing WPI UI/UX Design Professional	Katie Adiletta	All
3.3.2 Developing PowerPoint Mockup	Katie Adiletta	All
3.4 Testing the App	Matt Di Giovanni	All
3.5 Ethical Considerations	Angelina Popp	Sean Follis
3.6 Summary	Sean Follis	All
4.0 Findings	Sean Follis	Angelina Popp
4.1 Assessment of Emergency Egress and Occupancy	Angelina Popp	Sean Follis
4.2 High Risk Emergency Experiences and Communication Barriers	Angelina Popp	Sean Follis
4.2.1 Emergency Experience	Angelina Popp	Sean Follis
4.2.2 Communication Methods	Matt Di Giovanni	Katie Adiletta
4.2.3 Communication Challenges	Katie Adiletta	Sean Follis
4.2.4 Emergency Features	Sean Follis	Katie Adiletta
5.0 Design Strategy	Matt Di Giovanni	Katie Adiletta

Authorship

Section	Primary Author(s)	Primary Editor(s)
5.1 Design Goals and Framework	Matt Di Giovanni	Katie Adiletta
5.2 Logo Design	Matt Di Giovanni	Angelina Popp
5.3 Mobile Application Design	Katie Adiletta	Sean Follis
5.3.1 ***Home*** Screen	Katie Adiletta	Sean Follis
5.3.2 ***Join a Team*** Screen	Katie Adiletta	Sean Follis
5.3.3 ***Incidents*** Screen	Katie Adiletta	Sean Follis
5.3.4 ***Map of Centers*** Screen	Katie Adiletta	Sean Follis
5.4 Desktop Application Design	Katie Adiletta	Matt Di Giovanni
5.4.1 ***Dashboard*** Screen	Katie Adiletta	Matt Di Giovanni
5.4.2 ***Incidents*** Screen	Katie Adiletta	Matt Di Giovanni
5.4.3 ***SOS Request*** Screen	Katie Adiletta	Matt Di Giovanni
5.4.4 ***Teams*** Screen	Katie Adiletta	Matt Di Giovanni
5.4.5 ***Map of Centers*** Screen	Katie Adiletta	Matt Di Giovanni
5.5 Integrating with Microsoft Workplaces	Matt Di Giovanni	Sean Follis
6.0 Verifying the Application Solution	Matt Di Giovanni	Katie Adiletta
6.1 Testing Methodology	Matt Di Giovanni	Katie Adiletta
6.2 Evaluation Metrics	Matt Di Giovanni	Katie Adiletta
6.3 Evaluation Results and Observations	Matt Di Giovanni	Katie Adiletta
6.4 User Feedback and Feature Requests	Matt Di Giovanni	Katie Adiletta
7.0 Limitations and Recommendations	Angelina Popp	Matt Di Giovanni
7.1 Limitations	Angelina Popp	Matt Di Giovanni

Authorship

Section	Primary Author(s)	Primary Editor(s)
7.1.1 Interviewee Availability	Angelina Popp	Matt Di Giovanni
7.1.2 Cost Considerations	Angelina Popp	Sean Follis
7.1.3 Technical Limitations	Angelina Popp	Sean Follis
7.1.4 Testing Setbacks	Angelina Popp	Sean Follis
7.2 Recommendations	Angelina Popp	Katie Adiletta
7.2.1 Assign a Knowledgeable Staff Member	Matt Di Giovanni	All
7.2.2 Incorporating the Application into Training Scenarios	Matt Di Giovanni	All
7.2.3 Expanding Application Features to Improve Communication	Matt Di Giovanni	All
8.0 Conclusion	Sean Follis	Katie Adiletta

Meet the Team

Katie Adiletta

My name is Katie Adiletta, and I am a junior majoring in Electrical and Computer Engineering and Computer Science, with a focus on machine learning in computer engineering. I applied my UI/UX background, interview insights, and problem-solving skills to design an intuitive emergency safety app by identifying user needs and iterating on solutions to improve communication during emergencies. I also learned about the critical work SolidarityNow does with vulnerable populations.

Matthew Di Giovanni

My name is Matthew Di Giovanni, and I am a junior Aerospace Engineering major at WPI, focusing on astronautics. I have experience in emergency response–related projects, along with team leadership and technical problem-solving. Through this project, I applied my interest in safety and risk communication to develop a communication tool for humanitarian workers, while gaining insight into how systems must be designed for clarity and reliability in high-pressure situations.

Sean Follis

My name is Sean Follis, and I am a junior Aerospace Engineering major at WPI focusing on aeronautics. I have experience working with vulnerable populations, along with team communication and technical problem solving. I looked forward to applying my passion for public safety as well as my past experiences to help support SolidarityNow. I was especially excited to make a lasting difference for the safety and communication of humanitarian workers and the vulnerable populace of Thessaloniki.

Angelina Popp

My name is Angelina Popp, and I am a junior studying Architectural Engineering. I have several years of experience in graphic design and a strong interest in visual communication. My school and volunteer work also gave me meaningful humanitarian experience. For this project, I conducted interviews with staff to collect essential information for the application, and I designed graphics, including the app logo.

Table of Contents

Abstract.....i
Executive Summary.....ii
Bibliography.....vii
Acknowledgments..... viii
Table of Authorship..... ix
Meet the Team..... xiii
List of Figures..... xvii
List of Tables..... xx
1.0 Introduction..... 1
2.0 Background..... 3
2.1 Vulnerable Populations in Greece..... 3
2.2 Infrastructure Failures During Natural Disasters..... 5
2.2.1 Storm Daniel (2023) 5
2.2.2 Other Natural Hazards in Greece..... 6
2.3 Disaster Communication: Framework and Barriers..... 7
2.3.1 Technological Communication Challenges..... 8
2.3.2 Sociological Communication Challenges..... 9
2.3.3 Organizational Communication Challenges..... 10
2.4 The Role of Apps in Supporting Emergency Evacuation..... 10
2.4.1 Communication Features in Emergencies.....10
2.5 SolidarityNow..... 12
2.6 Summary..... 12
3.0 Methods.....13
3.1 Comparing Safety Communication Applications..... 14
3.1.1 Review of Safety Communication Apps.....15
3.1.2 Design Matrix to Compare Apps..... 15
3.2 Staff and emergency director Challenges During Evacuation Scenarios..... 17
3.2.1 Observations of SolidarityNow Offices.....17
3.2.2 Interviews with SolidarityNow Staff and Volunteers.....17
3.3 Develop Prototype Communication Application for Evacuation Messaging..... 19
3.3.1 Interviewing WPI UI/UX Design Professional.....19
3.3.2 Developing PowerPoint Mockup.....19
3.4 Testing the App..... 21
3.5 Ethical Considerations..... 21
3.6 Summary..... 22
4.0 Findings.....23
4.1 Assessment of Emergency Egress and Occupancy..... 23

Table of Contents

4.2 High Risk Emergency Experiences and Communication Barriers..... 28
4.2.1 Emergency Experience.....28
4.2.2 Communication Methods.....31
4.2.3 Communication Challenges.....32
4.2.4 Emergency Features.....33
5.0 Design Strategy..... 36
5.1 Design Goals and Framework.....37
5.2 Logo Design.....38
5.3 Mobile Application Design..... 39
5.3.1 ***Hom***e Screen.....40
5.3.2 ***Join a Team*** Screen..... 41
5.3.3 ***Incidents*** Screen..... 42
5.3.4 ***Map of Centers*** Screen..... 43
5.4 Desktop Application Design..... 44
5.4.1 ***Dashboard*** Screen.....45
5.4.2 ***Incidents*** Screen.....46
5.4.3 ***SOS Request*** Screen..... 48
5.4.4 ***Teams*** Screen..... 49
5.4.5 ***Map of Centers*** Screen..... 51
5.5 Integrating with Microsoft Workspaces..... 53
6.0 Verifying the Application Solution..... 54
6.1 Testing Methodology..... 54
6.2 Evaluation Metrics..... 54
6.3 Evaluation Results and Observations..... 55
6.4 User Feedback and Feature Requests..... 56
7.0 Limitations and Recommendations..... 57
7.1 Limitations..... 57
7.1.1 Interviewee Availability..... 57
7.1.2 Cost Considerations..... 58
7.1.3 Technical Limitations..... 58
7.1.4 Testing Setbacks..... 59
7.2 Recommendations.....60
7.2.1 Assign a Knowledgeable Staff Member.....60
7.2.2 Incorporating the Application into Training Scenarios.....61
7.2.3 Expand Application Features to Improve Communication.....61
8.0 Conclusion..... 63
Bibliography.....64

Table of Contents

Appendix A: Gannt Chart..... 69
Appendix B: Observations..... 70
Appendix C: SolidarityNow Staff Interview Consent Form and Questions..... 73
Appendix D: Interview Questions and Responses– UI/UX and Emergency Communication Design..... 75
Appendix E: App Testing Consent Form..... 78
Appendix F: Scenarios For Application Testing..... 79

List of Figures

Figure Title	Page Number
Figure 2.1 Vulnerable Population in Greece 2016-2026 (UNHCR, 2025b)	3
Figure 2.2 Map of Mainland Refugee Camps (Refugee Support Agean, 2024)	4
Figure 2.3 Athens-Thessaloniki National Road flooded after Storm Daniel (Tsinidis & Koutas, 2025)	5
Figure 2.4 SolidarityNow Search and Rescue Operations in Hatay, Turkey (Tolga, 2023)	6
Figure 2.5 Disaster Communication Framework	8
Figure 2.6 Features of Safety App (Jan et al., 2025)	11
Figure 3.1 Methods Flow Diagram (Jan et al., 2025)	14
Figure 3.2 Design Matrix for Emergency Communication App Feature Selection	16
Figure 3.3 PowerPoint Mockup Interface Examples	20
Figure 3.4 PowerPoint Mockup Mobile Application	20
Figure 4.1 SolidarityNow Locations	23
Figure 4.2 Floor Plan of Thessaloniki Helios+ Center	25
Figure 4.3 Floor Plan of SolidarityNow Athens Headquarters	26
Figure 4.4 Floor Plan of Thessaloniki Premises	26
Figure 4.5 Floor Plan of Athens Solidarity Center	27
Figure 4.6 Emergency Experience Among Interviewees	29

List of Figures

Figure Title	Page Number
Figure 4.7 Communication Methods Used by Office Staff	31
Figure 4.8 Communication Challenges and their Occurences	32
Figure 4.9 Analysis of User-Requested Features from Interview Findings	34
Figure 5.1 Initial (left) and Final Design (right) of the Mobile Application	36
Figure 5.2 Initial (top) and Final (bottom) Design of the Desktop Application	37
Figure 5.3 Final Application Design Logo	39
Figure 5.4 Mobile App Home Screen (left) and Assistance Confirmation Screen (right)	40
Figure 5.5 Join a Team Screen	41
Figure 5.6 Mobile Phone Incident Screen	42
Figure 5.7 Mobile Phone Incident Response Screen	42
Figure 5.8 Map of Center Screen	43
Figure 5.9 Map of Athens Locations with Legend	43
Figure 5.10 Maps Locations Legend of Athens Helios+ Center	44
Figure 5.11 Desktop App Dashboard	45
Figure 5.12 Incidents Screen	46
Figure 5.13 Incident Details	47
Figure 5.14 Create-Incident Pop-up	48

List of Figures

Figure Title	Page Number
Figure 5.15 SOS Request	48
Figure 5.16 SOS Request Details	49
Figure 5.17 Teams	50
Figure 5.18 Modify Teams	50
Figure 5.19 Add or Remove Team Pop-up	51
Figure 5.20 Map of Centers	52
Figure 5.21 Zoomed-In “View Map” Button	52
Figure 6.1 Power Flow Results from Load Test	55
Figure 7.1 Emergency Coordintor Giving Evacuation Training	59
Figure 7.2 Radios, Vest, and Other Safety Gear	60
Figure 7.3 UNHCR First Aid Kit and Ready Kit	60
Figure 7.4 Ready Kit Contents	60
Figure 7.5 UNHCR First Aid Contents	60

List of Tables

Figure Title	Page Number
Table 2.1 Four Properties Present in Natural Disasters	7
Table 2.2 Communication Technologies Assuming No Fixed Infrastructure	9
Table 3.1 Interview Details (Colors Group Locations)	18
Table 4.1 Observation Summary	24
Table 5.1 Design Specification and Solutions	38

1.0 Introduction

Natural disasters are an inescapable reality that occur “more often and with greater severity than ever” (Ma et al., 2023). The number of global natural disasters has increased dramatically, rising from 50 events in 1960 to 450 in 2024 (EM-DAT & CRED/UCLouvain, 2025). These events cause economic disruptions, long-term social and psychological effects, and between 40,000 to 50,000 fatalities every year globally, suggesting the need for proactive strategies to reduce the risk of mortality (Ritchie et al., 2022).

Over the past 40 years, Greece has experienced an increase in both the frequency and severity of floods, earthquakes, and wildfires (EM-DAT CRED/UCLouvain, 2025). These events often disrupt transportation, utilities, and communication networks, making evacuation efforts more difficult and less coordinated. In affected areas, fieldworkers may encounter blocked routes, damaged shelters, and limited access to accurate, real-time updates (Diakakis et al., 2025).

To address these challenges, modern disaster response increasingly relies on mobile-based communication tools designed to improve information sharing during emergencies (Luna & Pennock, 2018). Communication tools often take the form of apps that governments and corporations can easily have built for them, yet humanitarian organizations find it far harder to obtain such tools because they need solutions that remain affordable, adaptable, and easy to integrate into existing workflows.

SolidarityNow is a humanitarian organization that provides essential support to vulnerable populations while facing challenges in maintaining reliable communication during emergency evacuations, where communication must remain stable and without failure (Kapucu, 2006). Rapidly changing conditions and large teams increase the risk of delays when real-time updates and personnel safety confirmations are most critical. Kapucu describes that communication “requires sharing and using information effectively: collecting, collating, analyzing, and then deploying it promptly and in a useful form” (Kapucu, 2006). SolidarityNow currently uses Microsoft Teams as their primary communication tool for daily operations, but the Microsoft Teams platform does not support targeted messaging for region-specific evacuations during emergencies. As a result, delays in reaching the appropriate personnel can reduce coordination when timely communication is essential.

The goal of this project was to develop a safety communication app that would assist SolidarityNow in providing real-time communication between members during evacuations. We accomplished this goal through the following objectives:

1. Evaluate the effectiveness and feasibility of existing safety communication applications.
2. Investigate past experiences and challenges of field workers and emergency directors during evacuation scenarios.
3. Develop a communication solution for evacuation messaging.
4. Validate the effectiveness of the communication solution.

Our research and analysis from site observations and interviews revealed that communication during evacuation scenarios was often delayed, inconsistent, and difficult to manage; particularly when staff needed to confirm safety or share real-time updates across locations. Participants emphasized the need for a simple, reliable system that enables fast, two-way communication under high-stress conditions. In response to these findings, the team developed Echo, a safety communication application designed to provide targeted, location-based alerts, enable rapid status updates, and support real-time coordination between office staff. Scenario-based testing demonstrated that the application improved communication clarity and enhanced overall coordination during simulated evacuations. By delivering rapid, accurate updates, the application strengthens evacuation effectiveness and promotes safety.

2.0 Background

This chapter establishes the contextual foundation for this project by examining the populations, risks, and communication challenges that shape emergency response in Greece. It begins with an overview of vulnerable populations in Greece, then examines infrastructure failures during natural disasters, including Storm Daniel (2023) and other relevant hazards. The chapter next analyzes disaster communication by outlining key frameworks and identifying technological, sociological, and organizational barriers that affect information exchange during emergencies. It then evaluates the role of mobile applications in supporting emergency evacuation, with a focus on critical communication features. Finally, the chapter introduces SolidarityNow, our project sponsor for this study, and concludes with a summary of key insights that inform the project.

2.1 Vulnerable Populations in Greece

This chapter establishes the contextual foundation for this project by examining the populations, risks, and communication challenges that shape emergency response in Greece. It begins with an overview of vulnerable populations in Greece, then examines infrastructure failures during natural disasters, including Storm Daniel (2023) and other relevant hazards. The chapter next analyzes disaster communication by outlining key frameworks and identifying technological, sociological, and organizational barriers that affect information exchange during emergencies. It then evaluates the role of mobile applications in supporting emergency evacuation, with a focus on critical communication features. Finally, the chapter introduces SolidarityNow, our project sponsor for this study, and concludes with a summary of key insights that inform the project.

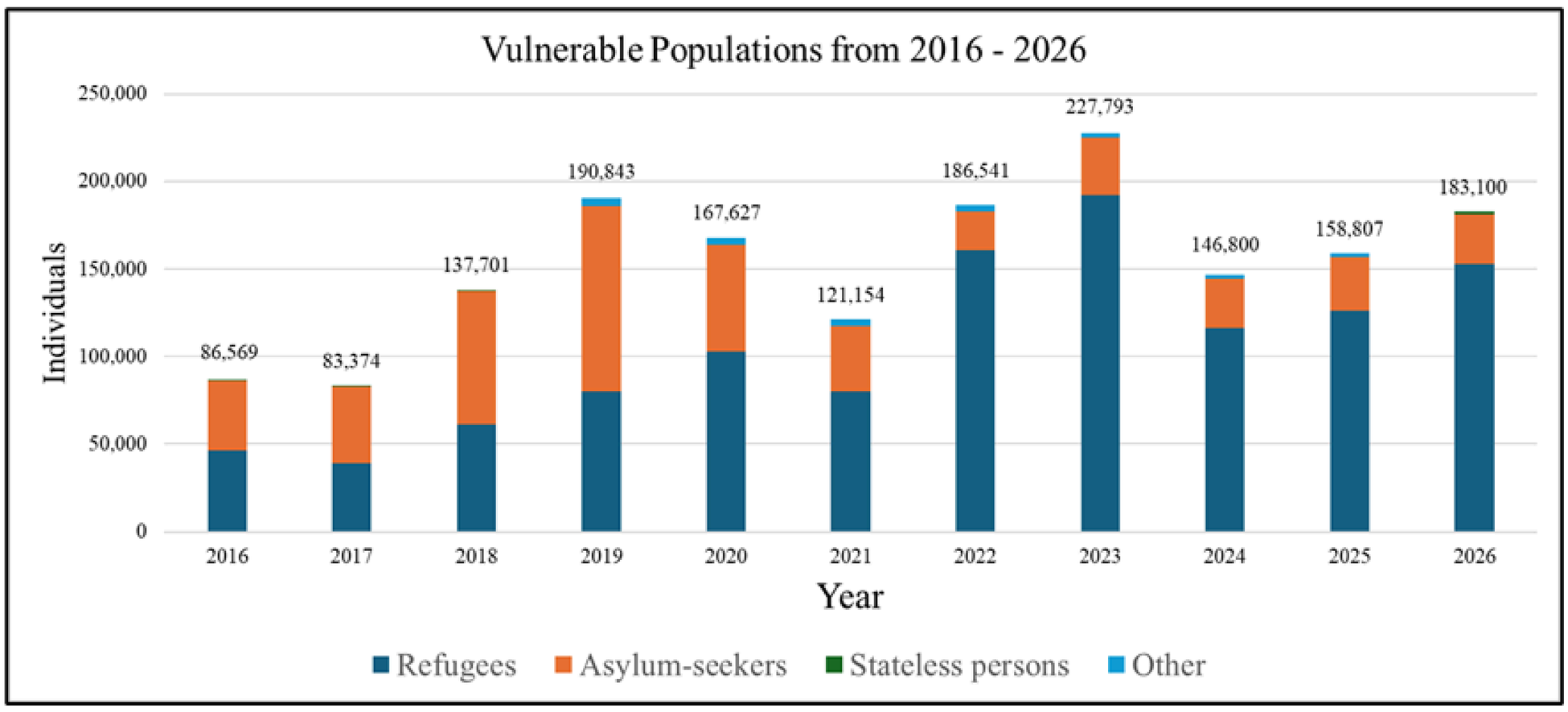


Figure 2.1 Vulnerable Populations in Greece 2016-2026 (UNHCR, 2025B)

Most of these individuals originated from Ukraine, Afghanistan, Syrian Arab Republic, and Egypt (UNHCR, 2025c). Specifically, Greece admitted an estimated 36,268 refugees from Ukraine alone between February 2022 and May 2025 (UNHCR, 2025c) and an estimated 18,046 Syrian refugees in 2024 (UNHCR, 2026).

Many refugees and asylum seekers in Greece reside in organized accommodation facilities distributed across mainland Greece, with a significant number located in northern regions near cities such as Thessaloniki, Serres, and Kavala (see Figure 2.2). These settlements often operate with limited resources while supporting large populations with diverse linguistic and cultural backgrounds. Residents frequently face challenges such as language barriers, dependence on humanitarian aid, and limited access to transportation and services.

Natural disasters create significant risks for refugees and asylum seekers. During crisis events, displaced populations often face direct exposure to hazards while also lacking the resources and infrastructure they need to adapt to rapidly changing conditions (Walton et al., 2021). Refugee settlements may rely heavily on humanitarian assistance and can have limited transportation access, emergency resources, and preparedness infrastructure. As a result, natural disasters can disproportionately impact refugees and asylum seekers compared to other populations.

Figure 2.2. Map of Mainland Refugee Camps (Refugee Support Aegean, 2024)

2.2 Infrastructure Failures During Natural Disasters

Extreme weather events can function as cascading disasters, in which an initial hazard such as heavy rainfall or flooding spreads its impact through the current social, environmental, and infrastructural systems. Rather than resulting in one type of damage, these events disrupt transportation networks, utilities, public health, and emergency response (Diakakis et al., 2016). This is especially relevant in regions where aging infrastructure and urban expansion into flood-prone areas amplify the consequences of extreme weather events (Lasda et al., 2010). Disruptions to critical systems such as roads, bridges, power, and water supplies not only limit access to essential services but they can also force residents to temporarily or permanently leave affected areas (IPCC Climate Change 2023: Synthesis Report, 2023). As infrastrucures fails, fieldworkers must operate in rapidly changing environments with reduced mobility and limited situational awareness, to support vulnerable populations and office staff attempting to move to a safer location.

2.2.1 Storm Daniel (2023)

Storm Daniel hit the Mediterranean region in September 2023 and caused severe flooding and infrastructure collapse across multiple countries. The storm mostly affected Libya, but Bulgaria, Greece, and Turkey also experienced significant damage as the flooding brought destruction and significant loss of life (World Meteorological Organization, 2023). Within Greece, the storm produced record-breaking rainfall totals, with “more than a year’s worth of rain on central Greece in just hours” (Stamouli, 2025, "A Region Under Water", para. 11) The scale and severity of the disaster placed strain on national infrastructure and emergency response systems, rendering areas like the Athens-Thessaloniki National Road completely useless as Figure 2.3 illustrates.

Figure 2.3 Athens-Thessalonki National Road flooded after Storm Daniel (Tsinidis & Koutas, 2025)

Flooding triggered cascading failures across transportation, power, and water systems restricting mobility and delayed access to affected areas. This only complicated evacuation efforts and coordination among responders nationwide (Diakakis et al., 2025).

2.2.2 Other Natural Hazards in Greece

Flooding is not the only hazard affecting Greece, as the country lies near one of the most seismically active regions in Europe (Begg et al., 2025). Earthquakes can cause significant physical and structural damage blocking evacuation routes and disrupting critical infrastructure such as roads and communication networks. These conditions severely limit mobility and delay evacuation efforts making it more difficult for individuals to reach safe assembly points or receive timely information.

In addition to these physical impacts, research examining earthquake-related trauma highlights elevated levels of stress, anxiety, and long-term mental health effects among affected populations (Madianos & Evi, 2010). This can influence how individuals respond to warnings and evacuation instructions. Madianos & Evi (2010) found that for refugees and asylum seekers who may have already experienced displacement, conflict, or previous disasters, the psychological impact of a new natural hazard can compound existing trauma and further affect how individuals perceive and respond to emergency warnings when in the aftermath as shown in Figure 2.4.

Figure 2.4 SolidarityNow Search and Rescue Operations in Hatay, Turkey (Tolga,2023))

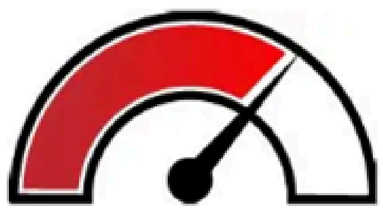
Wildfires are another major hazard that frequently necessitate large-scale evacuation in Greece. Studies of the 2021-2022 fire seasons cited widespread evacuation across dozens of Greek municipalities often at the border where residential development meets forests (Zikeloglou et al., 2024). Evacuation delays have caused

civilian fatalities, with “approximately 75% of the fatalities [being] civilians” (Diakakis et al., 2016). Improved preparedness and communication could reduce these outcomes.

2.3 Disaster Communication: Framework and Barriers

When supporting safe and efficient evacuations during natural disasters, communication between office workers and field workers in areas where vulnerable populations live is one of the primary challenges for humanitarian organizations coordinating a disaster response. Researchers have identified four properties that are present in all disasters and understanding these characteristics helps to maintain an organized evacuation. Table 2.1 illustrates these four properties: the warning time, severity of the disaster, where the disaster occurs, and how long analysts expect it to last, with respective examples.

Table 2.1 Four Properties Present in Natural Disasters

Warning Time	Severity	Location	Duration
Shorter warning: Fast-moving wildfires or floods **Longer** warning: Rain or snowstorms	**Minor** rain storm **Major** earthquake	**Highland** or **lowland** at risk **Refugee camps** at risk	**Varies** based on characteristics of the natural disaster
Impacts how much time to prepare	Impacts urgency of response 	Impacts who to alert	Impacts response strategies

Communicating about these factors to the fieldworkers helps with decision making in critical situations and should provide adequate support for vulnerable populations (Luna & Pennock, 2018). These four properties determine not only the urgency of response but also the structure and content of communication during evacuation efforts.

Effective communication during a disaster relies on selecting the appropriate method to transmit timely and reliable information. There are a range of approaches to establish communication such as community meetings, word of mouth, newspaper, radio, notice boards, websites, television, mobile phone, and social media, all of which are methods suitable for disaster recovery as they can communicate information quickly and efficiently (Roberts, 2019). Regardless of the communication method, an effective framework is necessary to quickly share information and

promote organized evacuation. Figure 2.5 illustrates this communication framework which consists of diagnosing the situation, then identifying the target audience and communication method. The response team needs to communicate the specifics of the disaster such as strategies, resources, and plans of action to the impacted parties. Finally, the organization must provide feedback to make the appropriate adjustments for recovery (Barrantes et al., 2009).

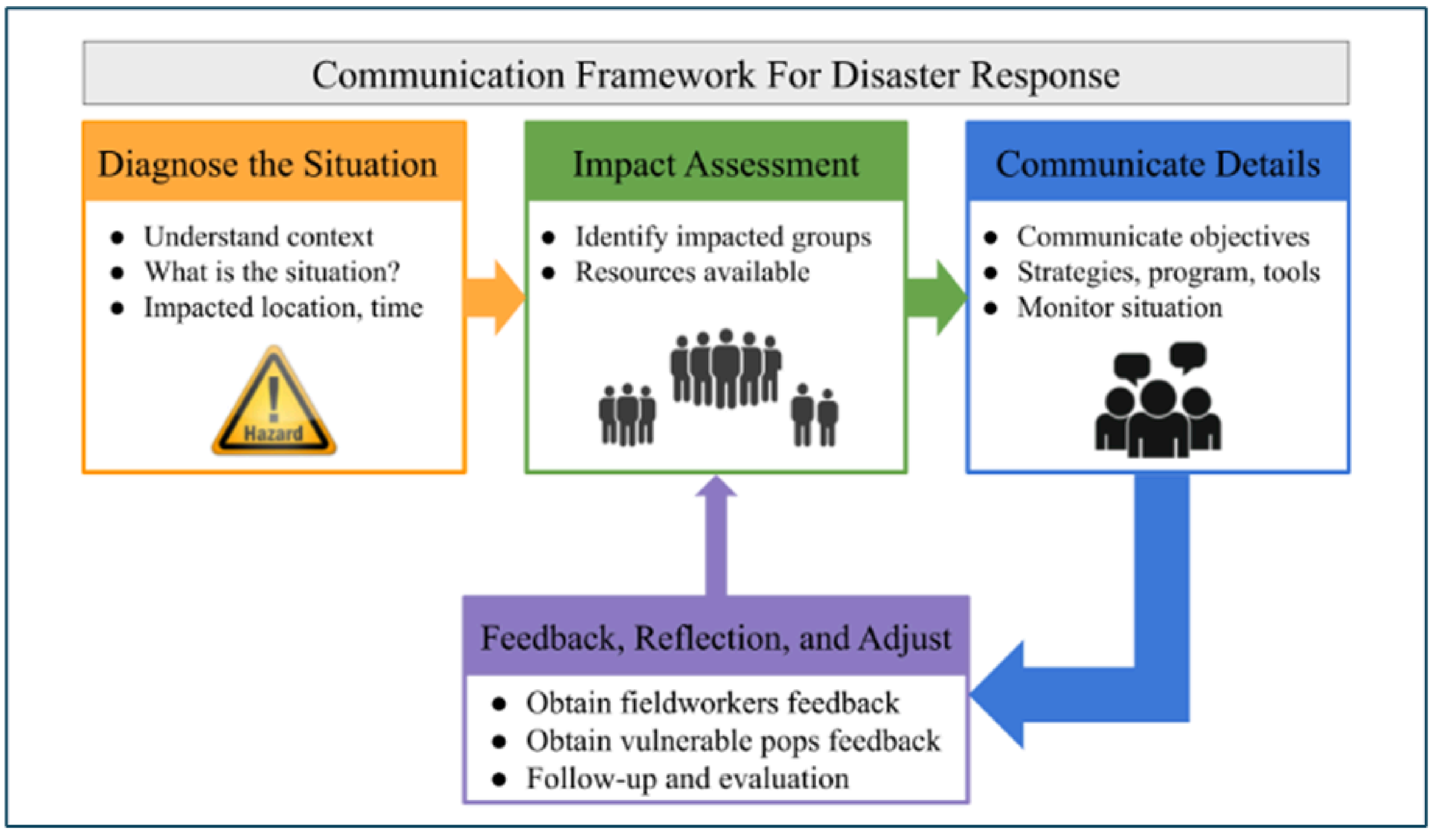


Figure 2.5 Disaster Communication Framework

The ability to communicate updates on evacuation strategies, plans, or disaster duration is vital during an organized emergency. Although this framework provides a structured approach to coordinated communication, disruptions frequently occur during implementation. These disruptions fall into three categories: technological, sociological, and organizational (Manoj and Baker, 2007).

2.3.1 Technological Communication Challenges

During a disaster, there must be real-time communication between office workers and first responders and between first responders themselves. Emergency response organizations consider mobile telecommunication as an optimal communication system as it helps first responders stay connected regardless of location (Natarajan & Hooks, 2023). Organizations must understand the availability of network connectivity, as disasters can severely damage or destroy fixed telecommunication infrastructure. Damaged or unavailable network infrastructure can challenge emergency telecommunication and can prevent responders from communicating with each other, causing a major technological challenge for emergency response. These scenarios require specialized technologies to maintain

telecommunication. Table 2.2 illustrates these current technologies: MANET, Bluetooth Mesh, and Satellite Systems.

Table 2.2. Communciation Technologies Assuming No Fixed Infrastructure

Technology	Description	Key Features	Disaster Application	Source
MANET (Mobile Ad-Hoc Network)	Network of mobile nodes connected by wireless links	Flexible; works indoors and outdoors; line-of-sight not required	Robust communication; large area coverage; long range; connects multiple ad-hoc networks	Luglio (2006)
Bluetooth Mesh	Device-to-device mesh network	Supports up to 32,767 devices; no single point of failure; ideal for small, vital information exchange	Post-disaster scenarios without fixed infrastructure	Álvarez (2019)
Satellite Systems	Satellite-based communication network	Robust communication; large area coverage; long range; connects multiple ad-hoc networks	Long-distance communication in disaster scenarios	Álvarez (2019)

2.3.2 Sociological Communication Challenges

\

The social challenges during a disaster involve understanding the emotional volatility of the vulnerable populations and building trust between them and the fieldworkers during an emergency. Maintaining consistent and updated communication with the fieldworkers who can then relay information to vulnerable populations, aids in reducing fear and stress associated with disaster response (Manoj & Baker, 2007). Other factors that affect the response of vulnerable populations during emergencies include age, language, length of residency, perception of risk, and community interaction. Younger ages and older adults may not receive and respond to alerts. Foreign speaking individuals including refugees and asylum seekers may not understand warnings that are not in their primary language. Refugees and asylum seekers recently arriving in Greece may not know the natural disasters that can occur

occur and may react differently to warnings (FEMA, 2014). Individuals' previous experiences and observations influence how they react to alerts, and these varied reactions can impact evacuation efficiency; some people may become overwhelmed by stress and have trouble listening to instructions, while others may be more relaxed and easily follow directions (FEMA, 2014). Finally, individuals with more contacts in the community will receive warnings and are more likely to respond to the alerts from the local emergency directors compared to those who live in isolation conditions. Being aware of these factors is important to provide accurate, precise, consistent, and timely warning messages about the disaster (Bangi, 2012).

2.3.3 Organizational Communication Challenges

Individuals such as educators and social workers may need to take on a new role in the evacuation to support vulnerable populations. For example, a teacher might change roles to help lead students through evacuation routes or provide first aid. As the roles of the staff change, there must be clear and accurate communication to assist in the re-organization during a disaster (Manoj & Baker, 2007). Addressing the technological, sociological, and organizational challenges strengthens disaster communication systems and facilitates delivering accurate and vital information.

2.4 The Role of Apps in Supporting Emergency Evacuation

Effective emergency communication depends on having a single, centralized platform that connects all employees. During critical situations, organizations must distribute information quickly and reliably across multiple groups, and they can only achieve this when everyone participates in the same communication system. To meet these demands, emergency communication apps must be intuitive and support two-way communication (Jan et al., 2025).

2.4.1 Communication Features in Emergencies

During evacuations it is difficult to understand what those who are amid an emergency are experiencing. To mitigate these barriers, emergency communication should enable both directors and staff to send and receive messages. Several researchers highlight the ability to report a disaster and the inclusion of an early warning system as two of the most important features of a safety app. Figure 2.6 presents findings indicating that users consider early warning systems and damage assessments to be the most important features in emergency situations, while news reports and quick links to external websites are viewed as the least important

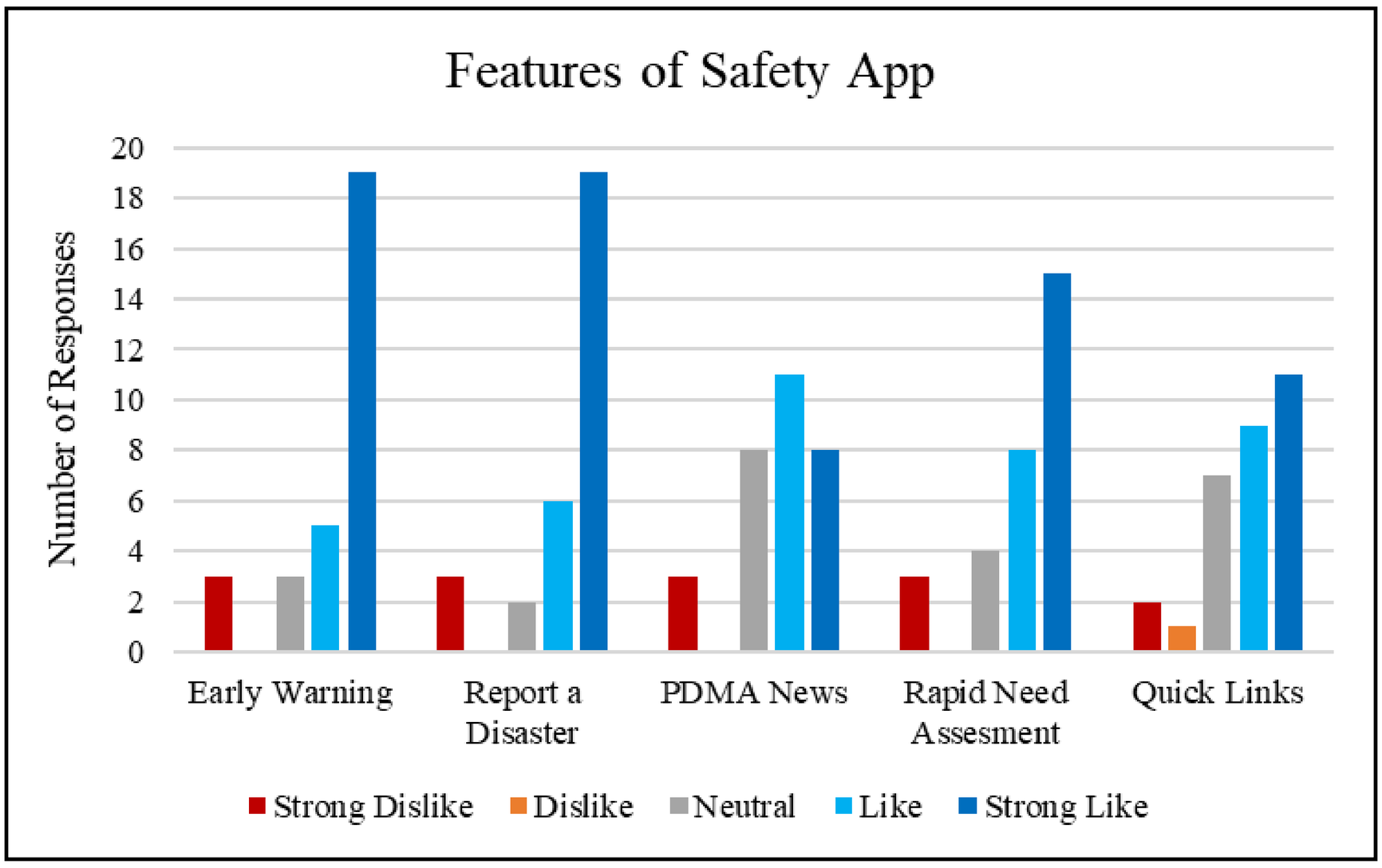


Figure 2.6 Features of Safety App (Adapted from Jan et al. , 2025)

Jan et al. (2025) conducted a study in Pakistan to determine the best features of an emergency communication app. This study concluded that an integral part of effective communication was the participation of civilians and volunteers. When this research surveyed 30 participants about the disaster reporting option in the app, 63% of users in the test population strongly supported it, while another 17% moderately supported it. These results demonstrate the effectiveness of enhancing disaster reporting efficiency and response (Jan et al., 2025).

Another study examining successes and gaps in public risk communication and disaster risk management reached a similar conclusion (Agyepong and Liang, 2023). Effective risk communication refers to the systematic and purposeful exchange of disaster-related information, illustrated by interactions among medical professionals, emergency services, and the public. Both studies emphasize the importance of two-way information exchange during emergencies.

This requirement becomes clear when considering the information mismatch that occurs during disasters. Support staff and volunteers on the ground often lack awareness of the broader scope of the event, while those removed from the situation do not have direct knowledge of rapidly changing local conditions where field workers are present. Research on Hurricane Katrina highlights how communication failures can disrupt disaster response coordination. Garnett and Kouzmin (2007) argue that Hurricane Katrina was “as much a communication disaster as it was a natural and bureaucratic disaster,” ,” noting that communication gaps and information failures delayed recognition of the crisis and hindered response efforts. These information gaps prevented agencies from sharing critical information, resulting in delayed and

poorly coordinated decision-making. Without two-way communication, these gaps prevent coordinated decision making. It is critical that as situations change rapidly, workers in the field can update the emergency directors who then can adjust evacuation plans for their safety.

2.5 SolidarityNow

SolidarityNow, is a Greek non-profit humanitarian organization that responds to the needs of vulnerable and marginalized groups without discrimination (SolidarityNow, 2026). The two main Solidarity centers in Athens and Thessaloniki offer a variety of services free of charge, such as legal aid and counseling, psychosocial support, employability services and support programs for parents and children (SolidarityNow, 2026). The SolidarityNow team includes 190 employees and 140 volunteers who work in the office as well as those in the field assisting Thessaloniki communities (SolidarityNow, 2026).

2.6 Summary

Due to its geographical location, Greece experiences floods, wildfires, and earthquakes on a regular basis. Effective evacuation during natural disasters requires more than access to communication tools; it demands a coordinated system that accounts for the characteristics of disasters, the needs of vulnerable populations, and the realities of field implementation. Warning time, severity, geographic scope, and duration shape how organizations design and deliver emergency messaging, while technological reliability, social dynamics, and shifting organizational roles influence how that messaging functions in practice. Without deliberate planning across these dimensions, communication gaps can delay response efforts and increase risk.

As humanitarian organizations continue to respond to increasingly complex emergencies, they must prioritize structured, two-way communication systems that connect decision makers and fieldworkers in real time. By integrating adaptable technologies with clear operational frameworks, organizations can strengthen coordination, support informed decision making, and protect both staff and the communities they serve during evacuations. This research guides the design of an emergency communication app tailored to SolidarityNow’s operational needs and equips fieldworkers and emergency directions with the tools necessary to coordinate evacuations effectively.

3.0 Methods

The goal of this project was to develop a safety communication app to assist SolidarityNow in providing real-time communication between members during evacuations. We accomplished this goal by carrying out the objectives using the methods illustrated in Figure 3.1. The following objectives for this project were:

1. Evaluate the effectiveness and feasibility of existing safety communication applications.
2. Investigate past experiences and challenges of field workers and emergency directors during evacuation scenarios.
3. Develop a communication solution for evacuation messaging.
4. Validate the effectiveness of the communication solution.

Our team conducted on-site research from March 16th to May 6th at the SolidarityNow centers in Thessaloniki and Athens, Greece. Appendix A provides additional details about the team's day-to-day activities and observations conducted throughout the project. Since SolidarityNow asked our team to create an app that will help evacuate vulnerable populations, it was important that our methodology does not interfere with the organization's internal operations.

Prior to arrival on-site, our team interviewed a Human-Computer Interaction professor at WPI and conducted a literature review of past apps and created a design matrix, which allowed us to understand what apps already exist and to develop a synopsis of what we could realistically create within the duration of our project. The interviews and observations with SolidarityNow staff at their locations provided a better understanding of who the app benefits and what needs the app must fulfill. We used the PowerPoint mockup to design the app in a form that was easily changeable and provided a visual tool we could show our sponsors to verify our direction, as well as to the SolidarityNow staff to give them insight into the project.

Our focus was to develop a communication app that allows staff to communicate by phone using existing network services. The team assumed that all devices using the application will have access to reliable Wi-Fi or cellular connectivity during operation. Due to the technical capabilities of our team and requests from the organization, the project focused on communication between mobile devices and desktop platforms and did not evaluate alternative communication technologies such as radios, satellite systems, or Bluetooth mesh networks.

SolidarityNow bases much of their communication through Microsoft Teams, so the design, testing and final integration of an application into Microsoft Teams reduced the learning curve for SolidarityNow members.

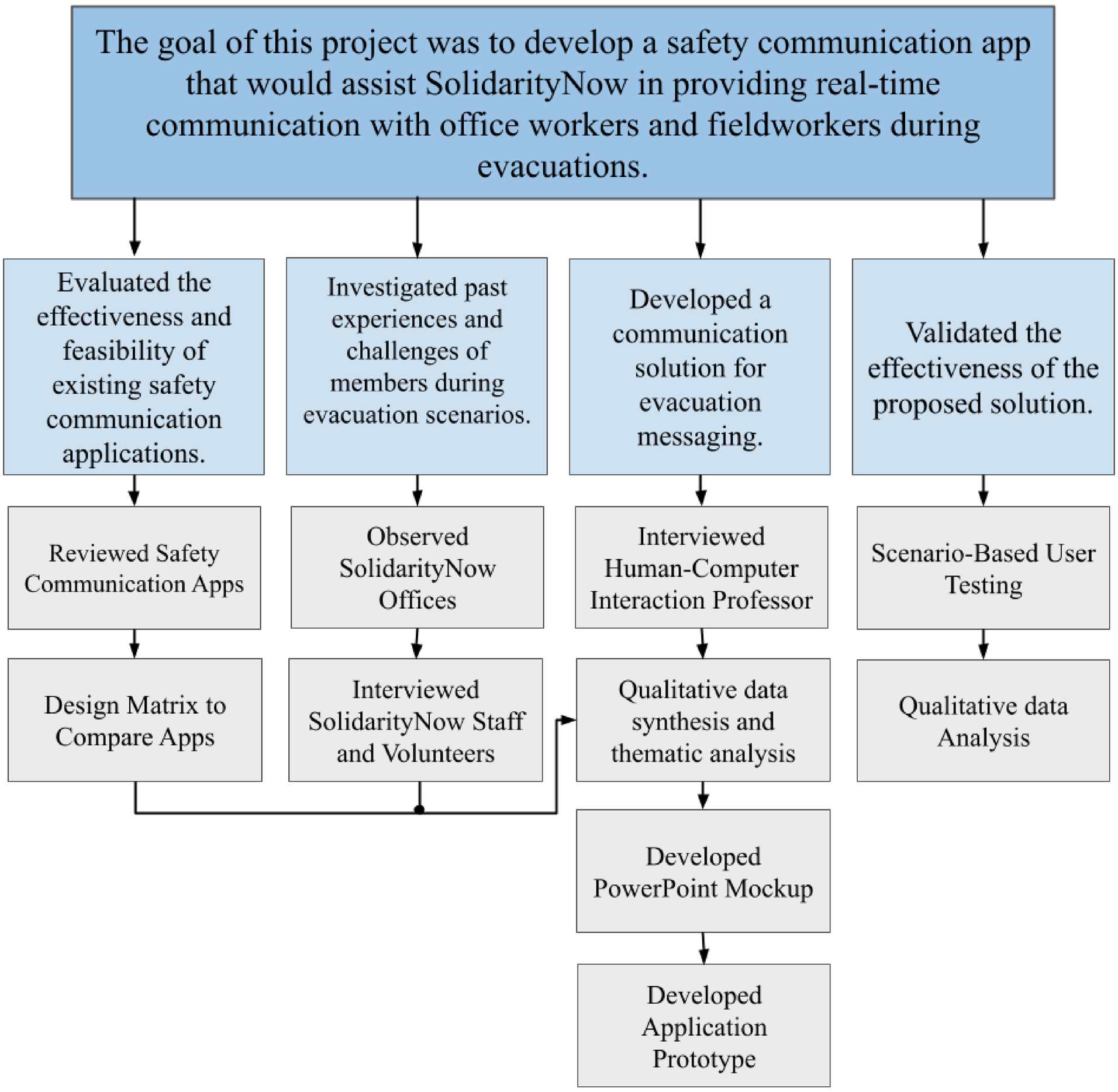


Figure 3.1 Methods Flow Diagram

3.1 Comparing Safety Communication Applications

Our team's first objective was to compare features of existing safety communication apps to evaluate what features provide an effective method of communication during emergencies. Our evaluation of existing apps focused on usability, robustness, and limitations of existing apps to determine the baseline for the app developed. To meet this objective, our team performed a literature review of similar apps and built a design matrix on features of existing apps.

3.1.1 Review of Safety Communication Apps

To achieve our first objective the team identified peer-reviewed case studies, academic journal articles, government and nonprofit evaluation reports, and usability studies that focused specifically on emergency alert systems, personal safety apps, crisis communication platforms, and disaster response communication tools for review. Our team's research identified those features, design strategies, and implementation approaches that prior researchers viewed as most effective in emergency-focused communication apps. By comparing similar applications, we identified the features users valued most, determined which design elements developers implemented consistently, and examined the strengths and weaknesses researchers repeatedly reported. Investigating best practices enabled our team to create a baseline framework for our own application design and to incorporate components of these evidence-based best practices into app design rather than relying solely on assumptions.

3.1.2 Design Matrix to Compare Apps

The second method for achieving this objective was the development of a design matrix, in which we identified four platforms and eight features used to assess them, based on the previously described app review. The matrix provided a clear visual to compare and evaluate features in current emergency communication applications to inform the development of an initial app prototype. The matrix examines four existing platforms: Zello, Red Flag, Are You Safe, and Microsoft Teams. This project drew on customer reviews, developer documentation, and structured in-house testing to construct the comparison.

The team first conducted in-house testing of the AreYouSafe plug-in, as our sponsor was already familiar with the application and recommended it to us. This plug-in allows creating groups within the application which enables participants to send and receive emergency alerts and generate incident reports. This simple scenario test provided direct insight into the platform's core functionality. For the rest of the design matrix, we relied on findings from the literature review of each application, and previous user experience and design choices documented in case studies and applications' websites. SolidarityNow currently uses Microsoft Teams as their main method of communication, so our team added Microsoft Teams to the matrix as a reference for easy comparison. We had access to Teams through our school accounts which allowed us to test its use as an emergency communication device. The completed matrix in Figure 3.2 presents the results of our evaluation, which includes

determining which applications support features such as translation, location-based messaging, and push notifications.

When an application supports a feature, the team indicated this with green fill in the corresponding box in the matrix and then added one point to the overall score for that app. If an app does not support a feature, the team put red fill into the corresponding box and the overall score for that app remained unchanged. This analysis did not weigh features differently because no single component contributes more to safety than another. Instead, our measure of effectiveness depended on how these eight features function together within a given emergency context.

Figure 3.2 depicts the results of the team's comparison, showing that the Are You Safe plug-in incorporates the greatest number of emergency communication features among the applications analyzed. In addition, it is the only application that supports Microsoft systems, as required by the project sponsor. Based on these criteria, the team selected this plug-in as the baseline for the project. These findings informed the initial stages of on-site methodology and app design.

	Zello	**Red Flag**	**Are You Safe**	**M365 Teams**
Location Grouping				
Push Notification				
Auto Translation				
Automation Capability				
Microsoft Compatible				
Free Use				
Two-way communication				
Templated Notifications				
Score	**3**	**4**	**5**	**3**

Design Matrix Legend	
Feature Exists	
Feature Missing	
Unknown	

Figure 3.2 Design Matrix for Emergency Communication App Feature Selection

3.2 Staff and emergency director Challenges During Evacuation Scenarios

To understand the challenges SolidarityNow members face during their training for emergency evacuation scenarios our team observed the offices and interviewed SolidarityNow members. These methods helped us gain a well-rounded perspective on the members' experiences in the office and how they respond to the needs of the most vulnerable and marginalized groups.

3.2.1 Observations of SolidarityNow Offices

Our team visited four SolidarityNow locations while in Greece: Thessaloniki Helios+ Center, Thessaloniki Premises, Athens Headquarters, and the Athens Solidarity Center. We toured each location with the director of that site and recorded observations of each of the locations. A SolidarityNow staff member explained the functionality of the offices and the roles of the staff and volunteers in the center. During our visits we observed the center's operations, including the capacity, environment and atmosphere, work pace, and services offered. All members of our team participated in performing observations to gain a thorough and well-rounded perspective of the centers. We recorded our findings in separate documents and after completing the observations, we merged them into one master document as shown in Appendix B. From the observations, our team learned first-hand the process and challenges refugees and migrants face when integrating into Greek society as well as the roles of the Greek workers who are assisting in the process. Our experience emphasized the organizations' goal to support and improve the lives and well-being of vulnerable populations as well as the need to have clear and effective communication during emergencies to ensure the safety of all individuals.

3.2.2 Interviews with SolidarityNow Staff and Volunteers

Our team also conducted interviews with members of different positions and experiences in the Athens Solidarity Center, the Thessaloniki Helios+ Center, and the Thessaloniki Premise as shown in Table 3.1. We developed a list of questions to guide discussions on topics related to communication, emergency situations, and features for the application (see Appendix C). To understand the challenges SolidarityNow faces during evacuation scenarios, we used a semi-structured interview guide as it allowed us to combine structured questions with additional questions that emerged

spontaneously from the interviewee (Lune & Berg, 2021, p.70). One individual from our team led the discussion while another transcribed the interview. We transcribed the interview using Microsoft's transcription tool, available on laptops and the basic recording app on our phones, to ensure we accurately captured all information.

Table 3.1 Interview Details (Colors Group Locations)

Interview #	Date	Location	Member Position/Roles
1	3/26/2026	Athens Solidarity Center	General Management
2	3/26/2026	Athens Solidarity Center	Office Worker
3	3/31/2026	Thessaloniki Helios+ Center	Human Resources
4	3/31/2026	Thessaloniki Helios+ Center	General Management
5	4/3/2026	Thessaloniki Helios+ Center	Office Worker
6	4/3/2026	Thessaloniki Helios+ Center	Office Worker
7	4/3/2026	Thessaloniki Premises	General Management
8	4/3/2026	Thessaloniki Premises	Office Worker
9	4/3/2026	Thessaloniki Premises	Office Worker
10	4/3/2026	Thessaloniki Premises	General Management

To conduct interviews at the Athens Solidarity Center, our team worked with the human resources department of the Thessaloniki Helios+ Center to notify the coordinator of our arrival and schedule a visit and tour of the facility. During our visit, we interviewed two staff members, an office worker and a member of general management, with the goal of understanding the roles of the members and how typical communication works in the center. To achieve this, the team added a new interview question: "Can you talk a little about what this center provides for the Athens community?" The semi-structured interview format worked well for this interview as the center coordinator provided answers and experiences that were different from what we were expecting, such as his personal experiences during natural disasters. Based on his experiences in emergency situations, the coordinator described what features he believed were necessary to include in an emergency communication application.

While at the Thessaloniki offices, we interviewed four members of the Thessaloniki Helios+ Center and four members at the Thessaloniki Premise location. We interviewed a representative from Human Resources, three members of general management, and four office workers. These participants reflected different perspectives and differing background knowledge of emergency planning and evacuation. Gaining different opinions and insights into current communication methods and high-valued features provided a strong understanding of what the application needed to include.

3.3 Develop Prototype Communication Application for Evacuation Messaging

For our third objective we developed a prototype communication application that supports evacuation messaging in the field. To meet this objective, our team interviewed a WPI UI/UX Design Professional and conducted a thematic analysis of the data from previous objectives. After identifying the necessary components our team created a PowerPoint mockup to finally develop a prototype application.

3.3.1 Interviewing WPI UI/UX Design Professional

Our team interviewed a Human-Computer Interaction Professor at WPI who researches and teaches graphic design, UI/UX design, and application development. The goal of this interview was to gain a stronger understanding of customized features and interface designs for emergency scenarios. Additionally, the professor provided a critical analysis of the current safety communication application that SolidarityNow recommended our team investigate. He provided suggestions and adjustments to implement in our team's communication solution. Our questions involved time-critical UI/UX designs, features that improve quick decision making, and strong testing methods (see Appendix D). Our team implemented these design choices in the PowerPoint mockup and used testing methods for improvements prior to developing the final prototype application.

3.3.2 Developing PowerPoint Mockup

Drawing from the thematic analysis of qualitative research and our interview with the Professor, our team created a PowerPoint mockup incorporating the UI/UX design features users valued based on our findings. The mockup design included two

applications: the mobile phone application for travelling members to address concerns in the field, and the dashboard for the coordinators to gain an overview of the incidents and SOS requests. Figure 3.3 shows the mockup dashboard with the reported SOS requests, incidents and the ability to create an incident, and the current teams.

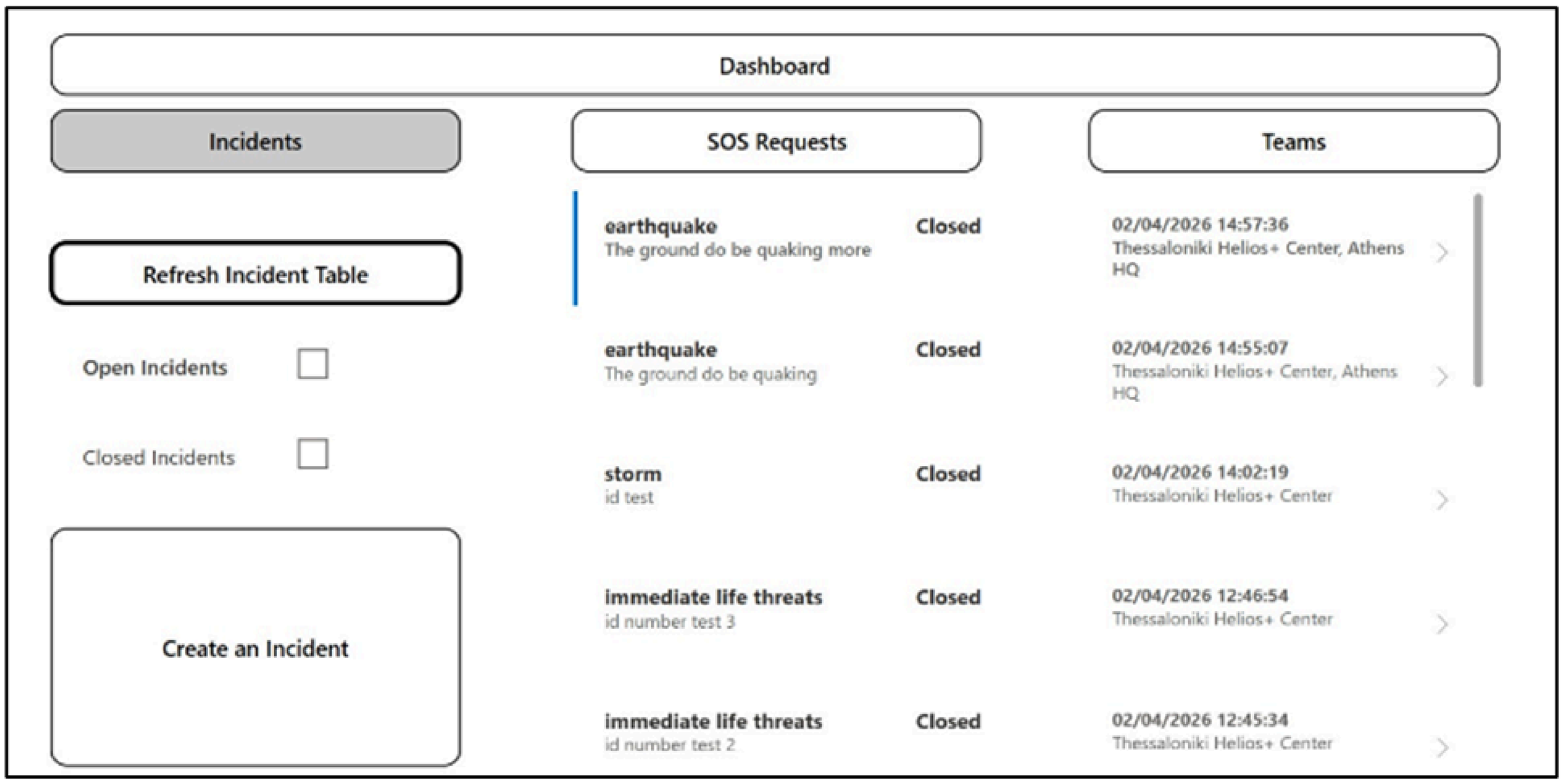


Figure 3.3 PowerPoint Mockup Interface Examples

Figure 3.4 below shows the mockup of a mobile application which allows users to send an SOS request, notify if you are safe or need assistance, or join a team. Our team used animations in PowerPoint to emulate the transitions of the real prototype application.

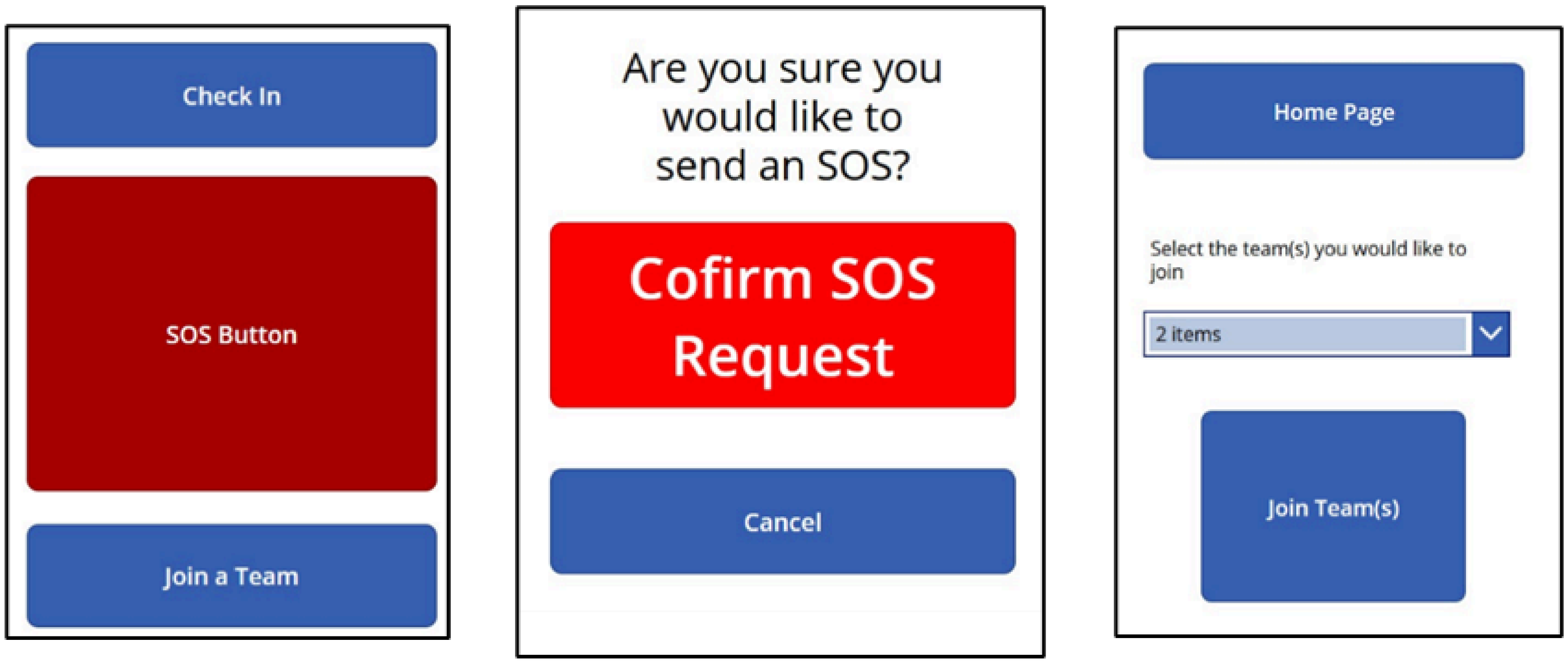


Figure 3.4 PowerPoint Mockup Mobile Applications

3.4 Testing the App

The team evaluated the application through scenario-based usability testing designed to simulate real-world emergency conditions. Testing involved ten SolidarityNow staff members participating in two simulated evacuation scenarios. The team instructed participants to respond as they would in a real emergency while using the application to receive alerts, communicate, and confirm their safety status. During testing, the team assessed key aspects of performance, including ease of navigation, effectiveness of communication, response time, and overall usability of the interface. The team selected these metrics based on interview findings that emphasized the importance of real-time communication and simplicity during emergencies. The team also conducted stress testing by triggering actions from multiple devices simultaneously to evaluate how the system handled concurrent usage.

Following the simulation, participants discussed their experience with the application. The discussion was a debrief for the emergency director as well as our team, and participants shared feedback on the app including what worked well, what caused concern, and what could be improved or adjusted.

3.5 Ethical Considerations

To work on the premises of SolidarityNow, all team members signed the SolidarityNow Code of Conduct and Ethics, SolidarityNow Child Safeguarding Policy, and Volunteer Service Agreement. Our sponsor required signed documents because they serve vulnerable populations, and three offices we visited function as service centers for those groups. These agreements allowed us to enter the offices where staff were helping beneficiaries and ensured that our presence did not violate any laws regulating who could be in the same spaces as specific groups such as refugees and asylum seekers. We also accessed the organization’s emergency plans and other sensitive internal documents, for which signing these agreements were necessary.

When we began conducting observations at the Athens Solidarity Center, we witnessed approximately fifty beneficiaries receiving help. Several ethical concerns emerged during this process. The team could not speak with vulnerable populations because we were not trained professionals qualified to assist beneficiaries, and such interactions fell outside the scope of the project. Engaging with them could have caused harm or created complications. Additionally, national laws in Greece strictly regulate interactions with refugees and asylum seekers, who make up a large portion of the vulnerable populations SolidarityNow serves. As Americans without relevant

qualifications, the team could not legally communicate with them while on SolidarityNow premises and we had no basis to receive this access. Similarly, we also could not take any pictures of beneficiaries as this would violate their rights. As a result, all our photographic documentation revolved around site layout and decoration. Exposure to the organization's internal operations and work reinforced the importance of maintaining confidentiality and respecting ethical boundaries.

Besides following our organization's ethical guidelines, we also ensured we upheld WPI's code of conduct. In accordance with WPI IRB requirements, we obtained verbal or written consent before conducting any interviews, observations or testing groups. In these consent statements, we explained the reason for the research we conducted, how long it would take, and that participants may stop at any time. We included all consent statements and forms at the beginning of all necessary appendices.

3.6 Summary

This chapter detailed the methodology used to develop and evaluate a communication application to support SolidarityNow during emergency evacuations. The team first evaluated existing safety communication applications through a literature review and design matrix comparison to identify effective features and limitations. Next, we conducted observations and interviews with SolidarityNow staff and volunteers to provide insight into current evacuation procedures, communication challenges, and desired application features. This informed the development of a prototype communication solution, beginning with a PowerPoint mockup and progressing to a functional Microsoft Teams integrated application. We evaluated the prototype through scenario-based usability testing, quantitative performance analysis, and participant surveys to assess its effectiveness and usability. We conducted final testing with our sponsors using the consent form found in Appendix E.

4.0 Findings

This chapter presents the results of our research into the challenges that office staff and emergency directors encountered during evacuation scenarios. Through this research, we found that physical evacuation constraints, unreliable communication channels, and delayed safety updates were the main barriers to effective emergency response. These findings formed the foundation of the preliminary design of our application, which provided clear information into stakeholders' expectations and needs. Together, these results highlight the communication challenges that arose during emergency evacuations and demonstrate what the initial application needed to incorporate to address evacuation issues.

4.1 Assessment of Emergency Egress and Occupancy

Our observations allowed us to document how the centers and offices of SolidarityNow operate. We visited four locations, Thessaloniki Helios+ Center, Athens Headquarters, Athens Solidarity Center, and the Thessaloniki Premises, illustrated in Figure 4.1.

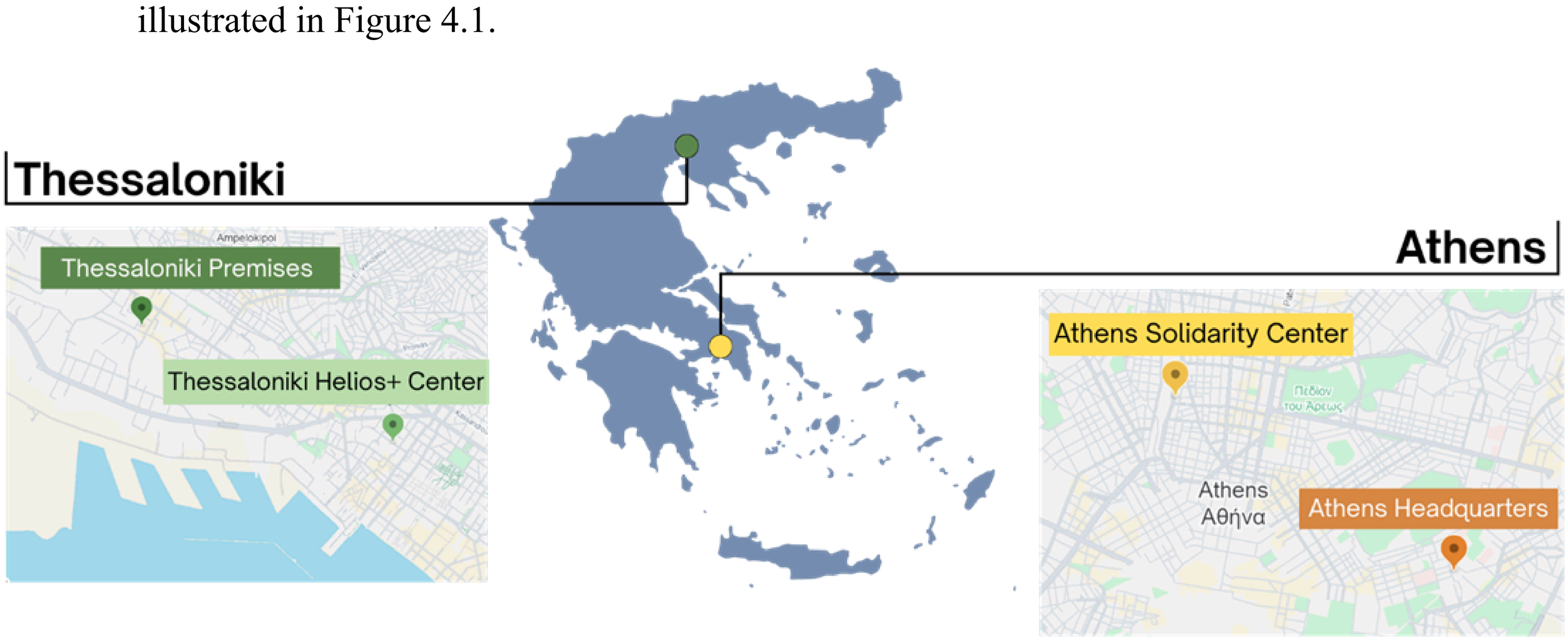


Figure 4.1 SolidarityNow Locations

The one commonality all centers shared was that each center is in a commercial setting and the first floor of each building is one to two floors above the main level. The only multi-level center among them is the Athens Headquarters. Because these centers operate within commercial buildings, they share the same egress paths as the other businesses in the building. This meant that if the entire

building needed to evacuate, the stairwells and exit routes may become occupied simultaneously by SolidarityNow staff and beneficiaries as well as by all other tenants. Such congestion could make it harder for SolidarityNow staff and beneficiaries to reach safety.

During our visits, we focused on the services each site provided, the current occupancy as well as the maximum occupancy, how occupants moved throughout the building, and the building's atmosphere. In addition, the team photographed each building's floor plan and created simplified versions (see Figures 4.2- 4.5) to clarify how occupants exit the building, identify areas of the building that could worsen evacuation challenges, and show where beneficiaries and staff were located throughout the building. Table 4.1 presents primary safety concerns from the observations, with each entry color-coordinated according to its respective city.

Table 4.1 Observation Summary

SolidarityNow Center	Date	Primary Safety Concerns
Thessaloniki Helios+ Center	March 16, 2026	• Locked entrance door • One exit
Thessaloniki Premises	April 3, 2026	• High occupancy • One exit
Athens Headquarters	March 26, 2026	• Spaces where people can get trapped • One Exit
Athens Solidarity Center	March 26, 2026	• High Occupancy • Occupants speak different languages

Thessaloniki Helios+ Center

The Thessaloniki Helios+ Center serves as a central office building for SolidarityNow in Thessaloniki, employing twenty staff members and typically assisting fifteen beneficiaries per day. This building maintains strong security by keeping the entrance door locked and requires visitors to press a button that alerts a staff member of their arrival, improving safety and security by preventing potentially dangerous individuals from entering.

One safety concern we noticed was that because the door always remains locked a person must press a button to exit. This could create a problem if people need to leave quickly, either because they might struggle to operate the mechanism in a panicked state or because visitors might not know how to use it at all. This insight

revealed that we might need to incorporate general notifications into our application design to give people basic information on how to leave the premises.

Figure 4.2 illustrates the organization of the office space, with SolidarityNow dedicating most rooms to office areas while using other open spaces for conferences and gatherings. The typical number of people ranges from two to three in a closed 45–60 ft² office space, which prevents the area from feeling cramped. With its central placement, the main entrance (identified by the orange circle in the Figure) serves as the only exit and provides all occupants with adequate access to exit the building if needed. The downside is that if the main entrance becomes blocked, there is no alternative exit, which raises safety concerns.

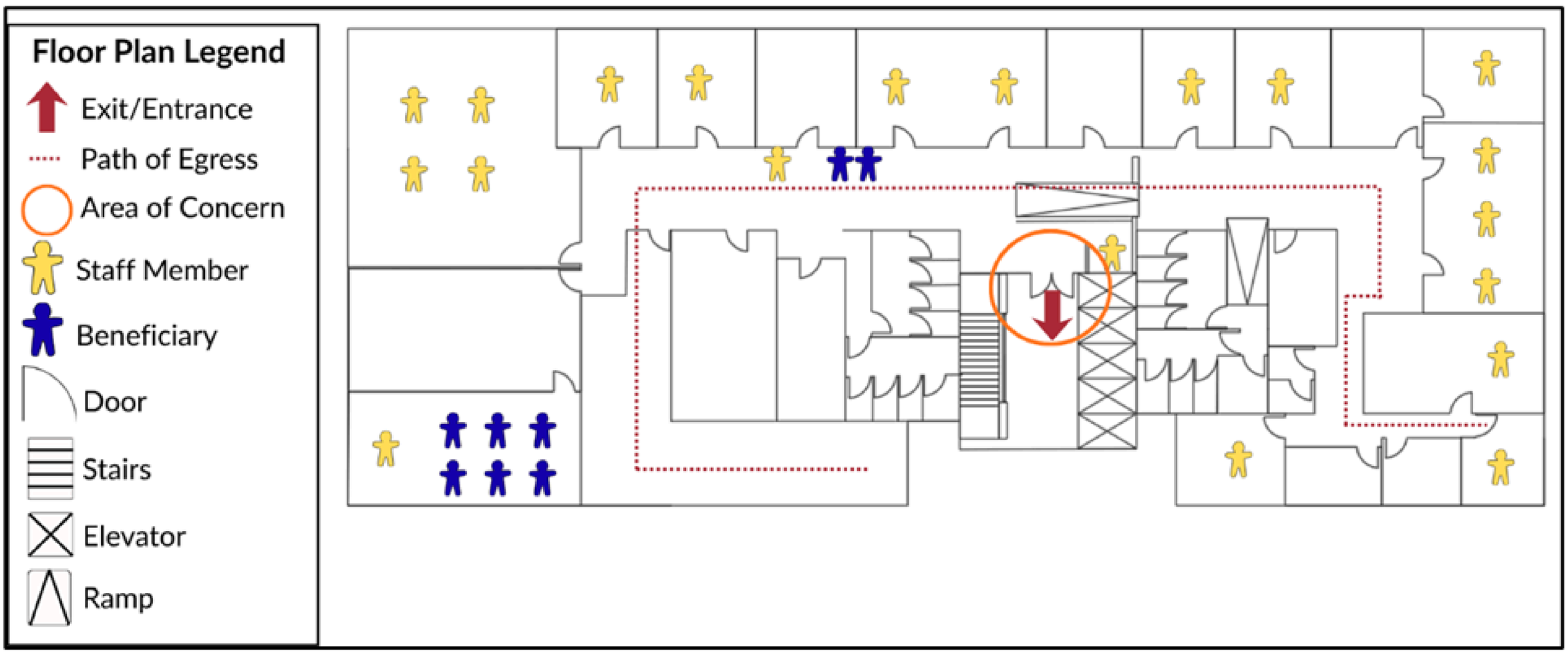


Figure 4.2 Floor Plan of Thessaloniki Helios+ Center

Athens Headquarters

The Athens Headquarters serves as an office space with twenty staff members but does not provide direct services to beneficiaries. Figure 4.3 illustrates a layout similar to the Thessaloniki Helios+ Center, with many closed office areas. The building also contains several extremely small and narrow rooms and closets, including one area on the second floor where four doors face one another in a tight corridor. During an emergency, individuals evacuating quickly could easily collide in this space. These observations highlight structural challenges: long and indirect evacuation routes, increased collision risk in narrow corridors, and the possibility of entrapment if a doorway becomes blocked.

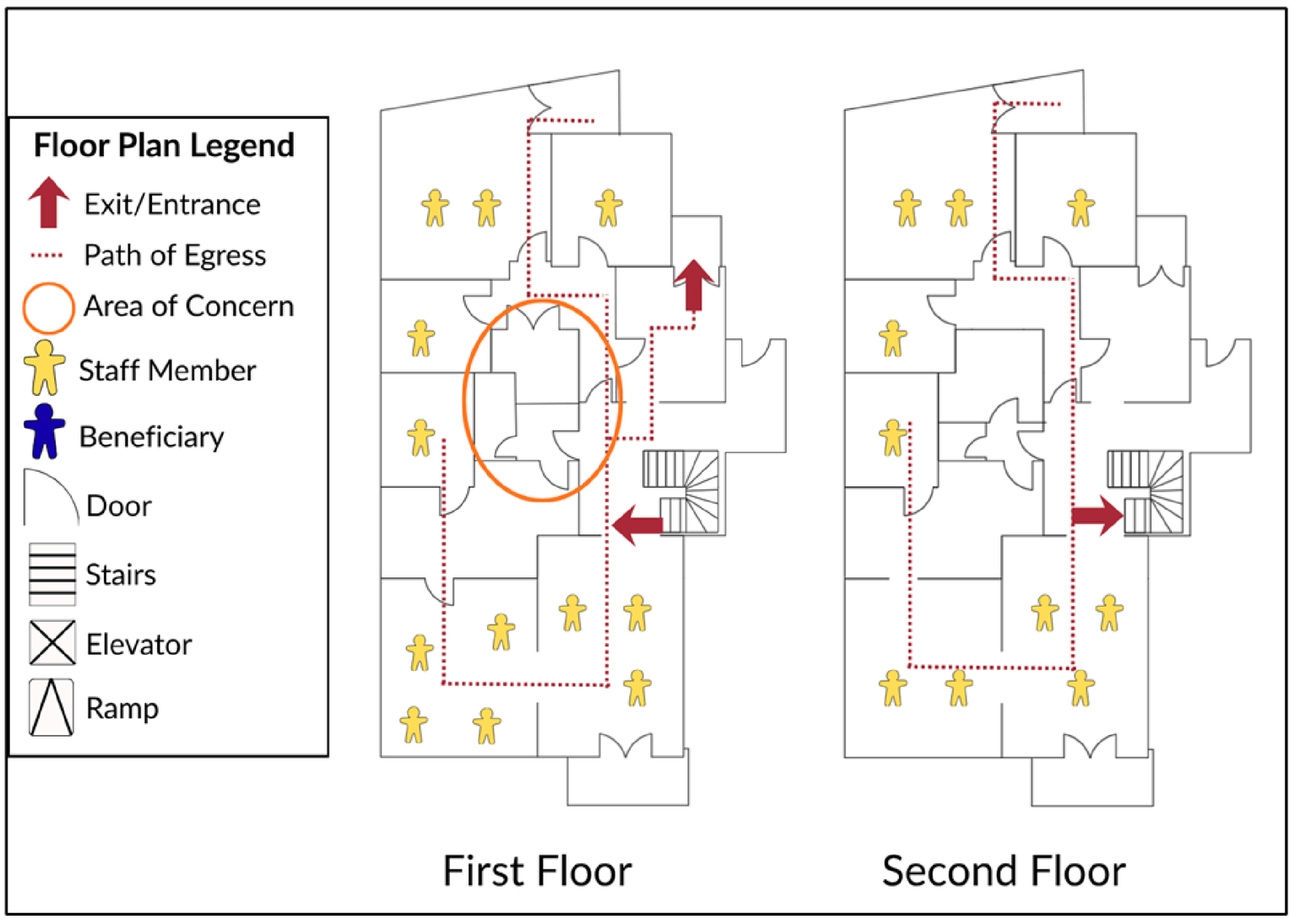


Figure 4.3 Floor Plan of SolidarityNow Athens Headquarters

Thessaloniki Premises

The Thessaloniki Premises currently has between 20-30 employees and provides services to around 40 beneficiaries a day, though few were present at the time we visited. Figure 4.4 diagrams the Thessaloniki Premises, which share several traits with the other locations, such as multiple office spaces and large areas where beneficiaries receive services.

A major disadvantage of this building, similar to some other locations, is that it has only one exit. However, this issue was even more concerning because the exit is at one end of the building rather than near the center, which could pose a threat to occupants who were farther away during an emergency. One advantage of this building is that it has larger open spaces connected to the hallways, allowing people to move through the building more easily during an evacuation.

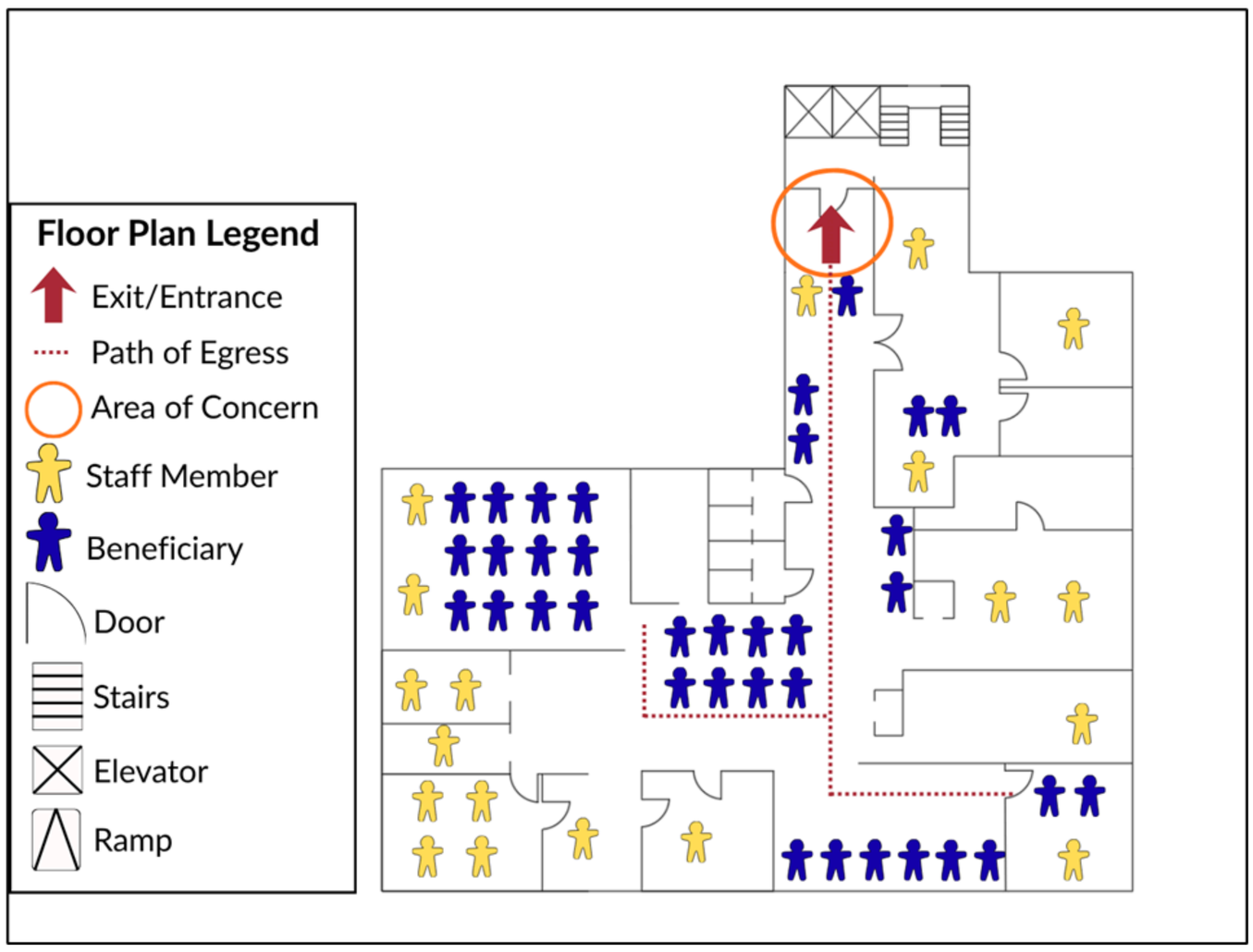


Figure 4.4 Floor Plan of Thessaloniki Premises

Athens Solidarity Center

The interior spaces were large, allowing people to move through them easily. A major advantage of this building is that it has two exits: the main entrance and an exit near the offices. The two exits provide sufficient evacuation paths for everyone in the building.

The Athens Solidarity Center has approximately twenty staff members and assists between 30-40 beneficiaries. The team visited the center on a day when many beneficiaries occupied the office in need of assistance. The moment we entered the building we noticed a chaotic atmosphere, with increased noise from multiple conversations and a high volume of movement throughout the space. The waiting room, located directly by the entrance, can accommodate up to 50 people. Beneficiaries wait there, while only two to three front-desk workers guide them to the correct service and ensure they receive assistance.

Figure 4.5 shows that the overall staff-to-beneficiary ratio across the building is approximately 1:3, but this ratio varies significantly by area. In the waiting room, for example, the ratio can reach as high as 1:16 at maximum capacity, whereas the classroom located in the left corner typically operates at a ratio closer to 1:6. This uneven distribution means that employees at the front must account for a much larger number of occupants than staff in other areas, making it more difficult to maintain order.

This was the first center we visited where we observed beneficiaries speaking languages other than Greek or English. Many beneficiaries come from countries where Greek is not the native language, and a substantial portion may not speak Greek at all. To address this challenge, four translators rotate on site throughout the week and collectively cover ten languages, including French, Farsi, and Arabic. While their presence helps mitigate communication barriers, their availability varies, and their language coverage may not always align with the needs of the beneficiaries present at a given time.

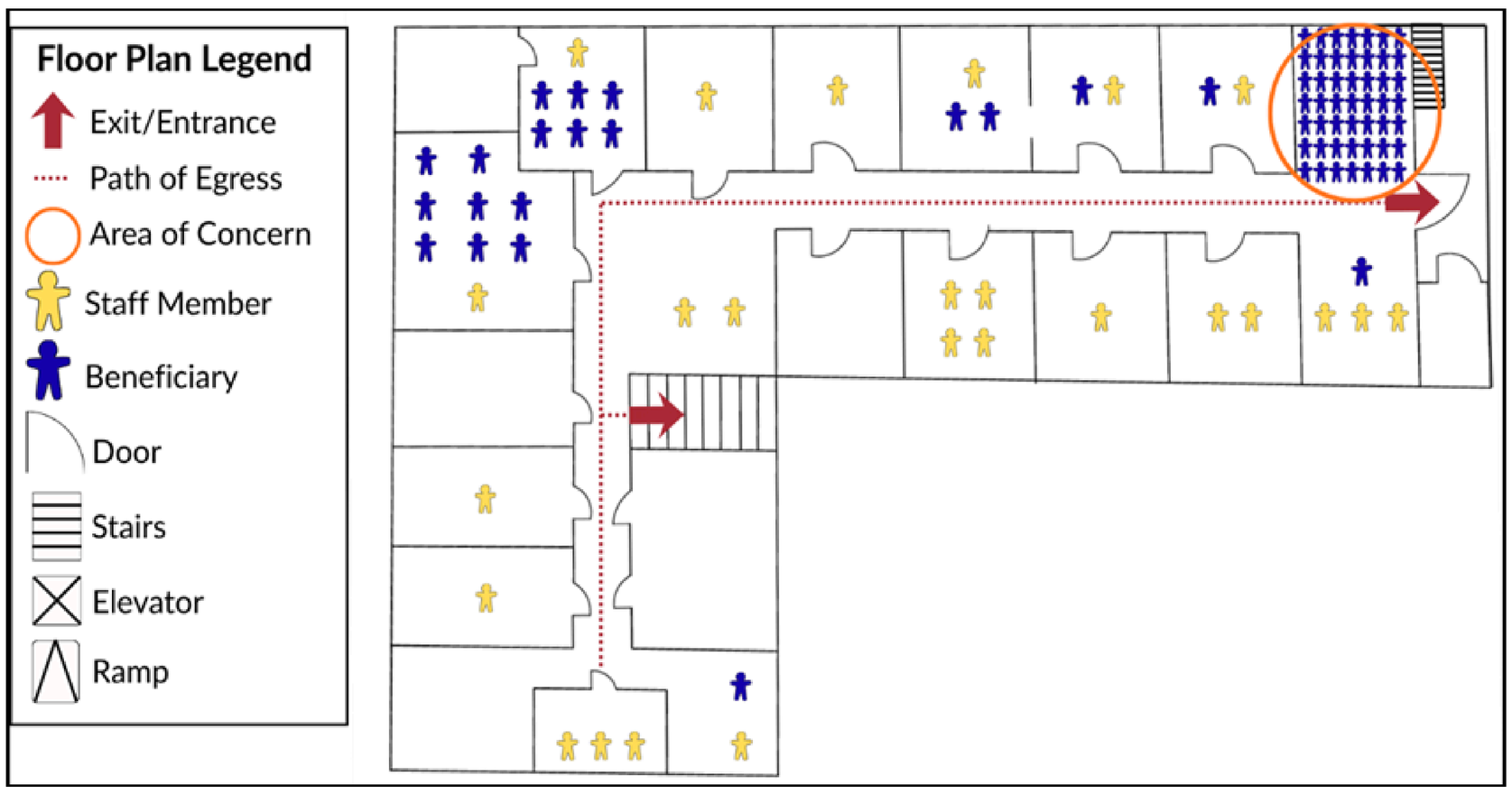


Figure 4.5 Floor Plan of Athens Solidarity Center

After reviewing the findings from these observations, it was evident that each building presents fixed obstacles. The number of exits and the available egress paths at each location consistently reveal a high potential for difficulties in evacuating occupants. Although the high number of occupants increases safety concerns, reducing occupancy is not a viable option, as these centers exist to serve as many vulnerable individuals as possible. The team therefore recognized that the purpose of this project is not to resolve these structural constraints but to support staff by improving communication during emergencies, ensuring that everyone can exit the building, or any SolidarityNow site, safely. This need becomes even more critical given the uneven staff to beneficiary ratios observed in certain areas, where staff must account for a disproportionately large number of occupants during an evacuation. In these situations, effective communication among staff is essential to ensure that everyone exits safely. Additionally, language barriers further complicate communication when individuals may not understand the situation or the urgency of instructions and there are limited translators on site.

4.2 High Risk Emergency Experiences and Communication Barriers

While the physical layouts and occupancy of each office contributed to evacuation difficulties, the interviews revealed that staff often entered high-risk environments during emergencies and faced significant communication barriers. These interviews also provided the team with the information needed to tailor the application to the organization's specific needs, ensuring that the features integrated into the app directly support staff during emergency situations.

4.2.1 Emergency Experience

When we analyzed our interviews, it became clear that SolidarityNow staff had varying levels of emergency experience. Figure 4.6 identifies three types of emergency experience involvement across the three locations where we conducted 10 interviews: none, active emeregency, and post emergency. Active emergency indicates that the participant was in a situation where an active emergency was occurring. Post emergency refers to assisting after the initial impact of an emergency, when hazardous conditions at the site may still be present but have stabilized enough to allow staff and volunteers to go to the site. Fifty-percent of respondents reported experiencing an active crisis and 30% experienced emergencies in both active and post emergency, indicating that emergencies were a common occurrence experienced by staff. The types of emergencies included earthquakes, floods, fires and human-related disasters.

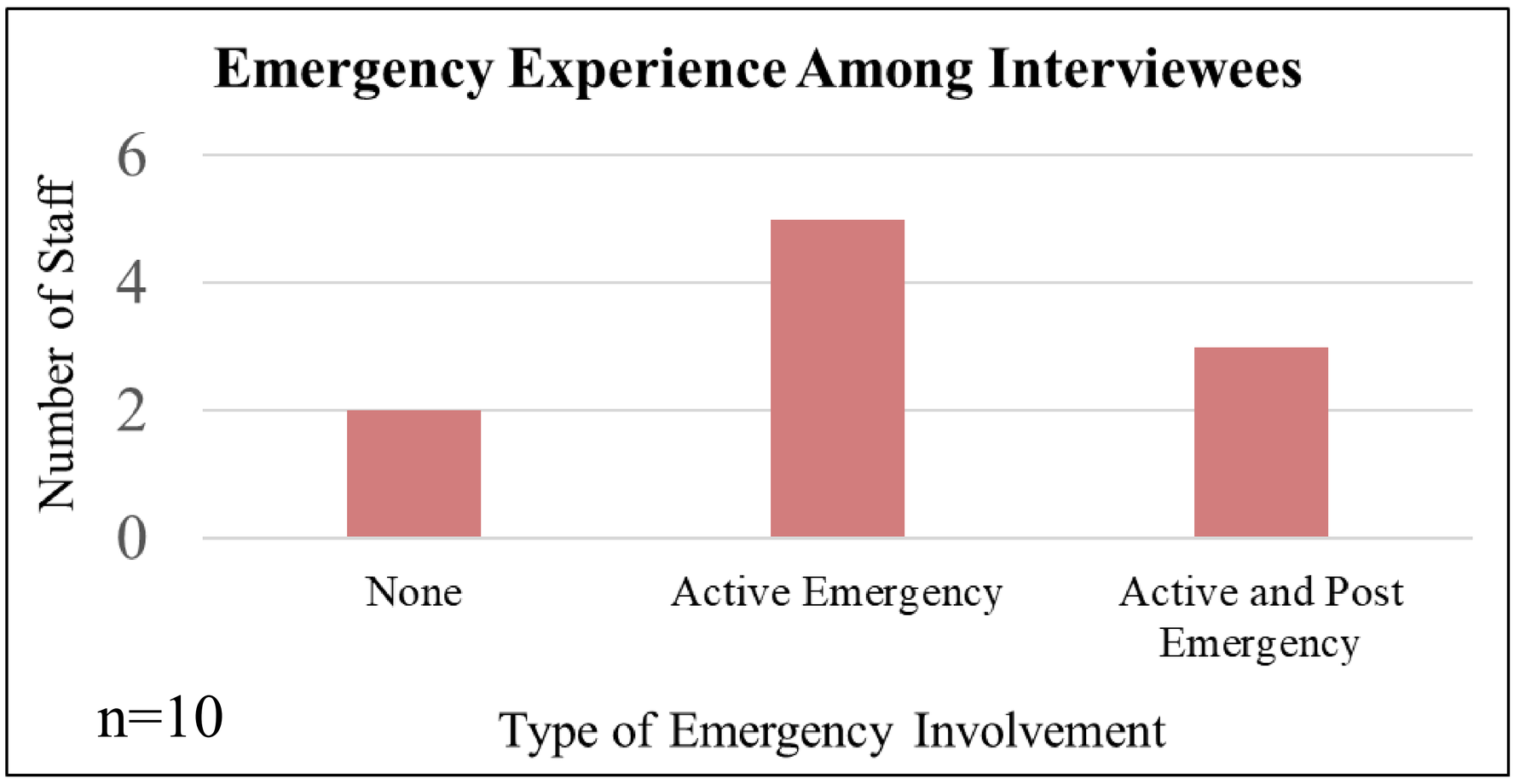


Figure 4.6 Emergency Experience Among Interviewees

Active emergencies at SolidarityNow sites, were primarily human-related and occurred either in the office or during missions in nearby refugee camps. One example came from the coordinator of the Thessaloniki premises, who described a human-related emergency involving a beneficiary family with a mother and two adult sons who were seeking asylum but did not accept that the center could not provide it to them. The family returned almost daily, and on one occasion their behavior became more aggressive than their usual shouting or spitting at staff and other beneficiaries. Their most aggressive actions occurred when they harassed the receptionist. The coordinator stated:

> "So he told them like, can you please stay a little far, you don't have to be next to me. And they started throwing stuff and shouting at him go back to your country and you pass from our country to come here… And so, we told them to go out and the next day they came and they started shouting again we told we brought the police because they didn't leave the place."

The initial incident, in which beneficiaries began throwing items, was an active emergency that escalated rapidly though its impact remained confined to the office and the organization used its security to resolve it, information that was later confirmed after the interview had concluded. The situation did not require an evacuation, and staff called the police immediately to handle the beneficiaries returning, following the only procedure staff follows for these scenarios. Our analysis showed that emergency communication does not only involve evacuating the premises but also includes ensuring that staff inside the building remain safe. Ensuring safety means that staff receive a notification that informs them of the situation and allows them to move to designated safe zones if the incident escalates so they can distance themselves from the immediate threat.

Emergencies in the office illustrate how quickly situations can escalate, but the accounts from refugee camps revealed an even greater need for coordinated evacuation. Experiences involving direct evacuation at refugee camps involved the heads of the organizations overseeing the camps and directing people to leave because of potential threats of human violence. When we asked individuals about their experiences at refugee camps, an individual noted that those who went to the camps were fully prepared to evacuate, a second Thessaloniki Premises employee and former fieldworker stated:

> "Ok, it's something that we had already planned from the beginning, how we would react. In case that we need to evacuate, [for example] in case of a fire, [and] not only if there was a conflict, if we need to leave… Also, everybody remembered what we had to do and we gather in the meeting point, which was close to the entrance and we left."

Refugee camps are high-risk locations that require staff to be fully prepared before entering, whereas none of the office interviewees demonstrated this level of preparedness for an active emergency. This gap in emergency planning across office centers can leave staff unprepared when a situation occurs.

SolidarityNow staff described experiences that occurred during post-crisis response efforts. The emergency director of the SolidarityNow Helios+ Center had responded to multiple natural disasters, including the 2023 floods where they stated they entered areas with "live flooding." They also provided aid during the wildfires in Athos, Greece. The respondent stated:

> "We went to the location where these fires were actually happening and we were able to support firefighters in the fields and people who were in locations that were actually stranded by the fires that cut them off [and] provide them assistance to transportation, food and very basis assistance."

These post-crisis examples involve staff entering areas that remain dangerous even after the initial impact of the disaster. The fire scenario shows that teams go directly to affected locations to assist people, yet the conditions on site can also hinder their mission. In some cases, staff themselves may become stranded and require rescue, which increases the number of people first responders or partner organizations must support. Although staff rely on the Emergency Response Team to confirm that an area is safe to enter, the examples above demonstrate that conditions can continue to evolve and may place staff at risk if they are not thoroughly informed and continuously updated.

Examples of both active and post-crisis emergency situations experienced by staff at SolidarityNow revealed environments that were consistently hazardous. These settings either required a certain degree of preparedness before staff could enter, carried a high potential for rapidly evolving conditions that could cause harm while providing aid, or demonstrated that emergencies can arise unexpectedly with little time to respond. Within this type of humanitarian work, risks exist regardless of location, as both human-related and natural disasters may occur at any point. The team recognized this inherent danger in the work, and while the proposed application cannot eliminate these risks, it can help mitigate them through the integration of specific features designed to guide people away from and out of danger.

4.2.2 Communication Methods

While most office operations at SolidarityNow remain routine, emergency situations require communication methods that can support rapid and reliable information sharing. Interviews with SolidarityNow staff also helped the team to identify the primary communication methods the staff prefer. Figure 4.7 summarizes the communication methods used by the ten interview participants, noting that respondents could select multiple options. The chart shows that Microsoft Teams is the most commonly used platform, followed by email and phone calls, while WhatsApp and other methods are used less frequently.

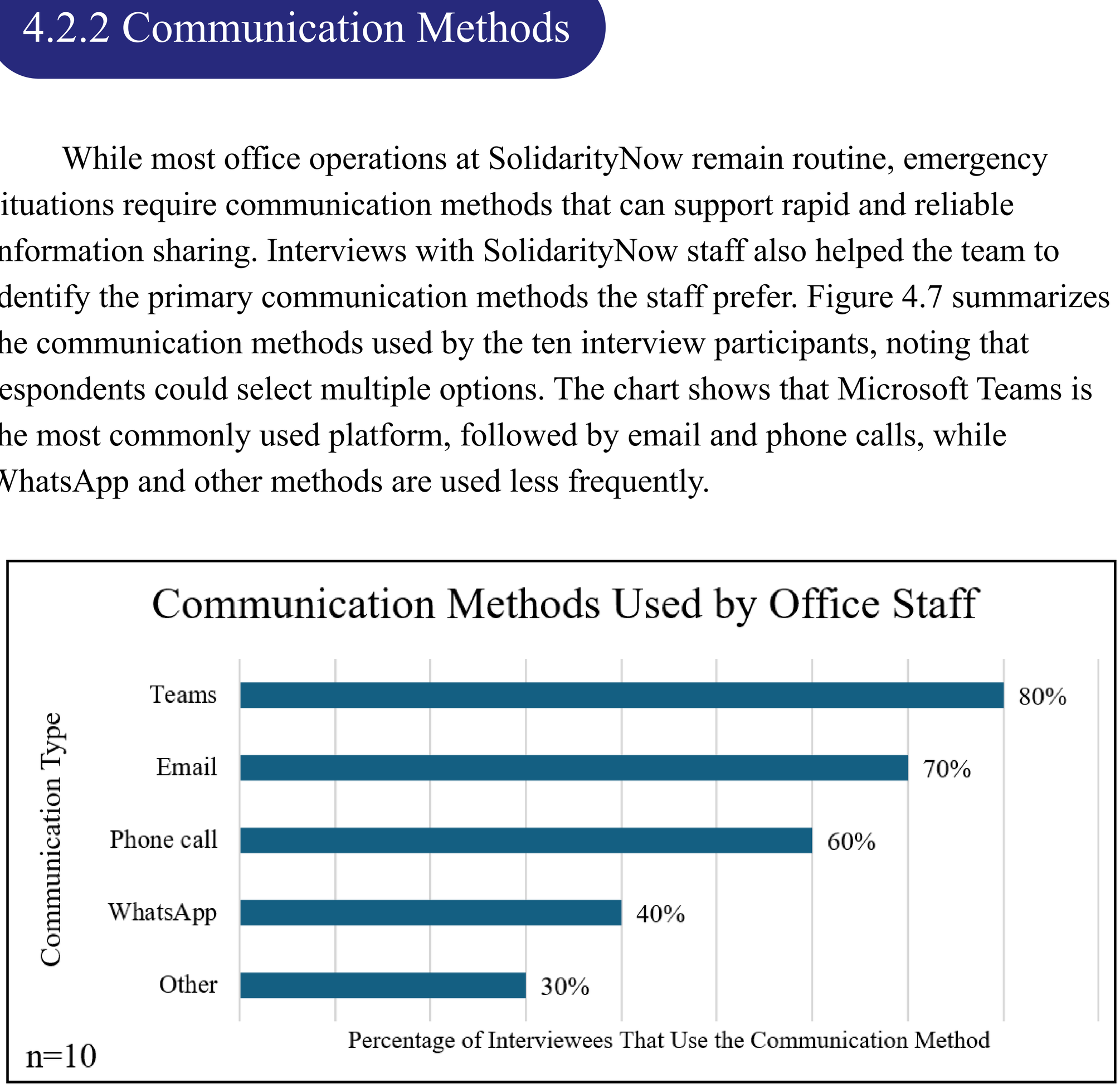


Figure 4.7 Communication Methods Used By Office Staff

This distribution indicates that, although Microsoft Teams serves as a central communication platform, staff do not rely on a single method. Instead, they choose communication channels based on urgency and context. For example, one interviewee stated:

"To me the information mostly comes through e-mail from my managers… If it's an emergency I suppose they will call me."

Because staff do not consistently use or monitor the same platform, relying on a single communication method risks delays in message delivery. To address this, the application design incorporates multiple notification channels. In this project, the team prioritized Teams chat and email notifications to reduce the likelihood of missed alerts.

4.2.3 Communication Challenges

In addition to identifying SolidarityNow's communication methods, our team asked interview questions about common challenges in both routine and emergency communication (see Appendix D). Figure 4.8 shows the six most common communication challenges. Five of the ten members (50%) identified confirming the safety of others and delays in relaying information. Conversely, they were least concerned about language barriers (10%) or information overload (20%) which suggests that respondents perceive the operational coordination challenges as more significant than the cognitive or linguistic barriers.

These findings highlight the importance of confirming others' safety and receiving real-time updates to maintain effective communication during emergencies. Participants identified several communication challenges, and they consistently emphasized the importance of real-time communication to address these challenges.

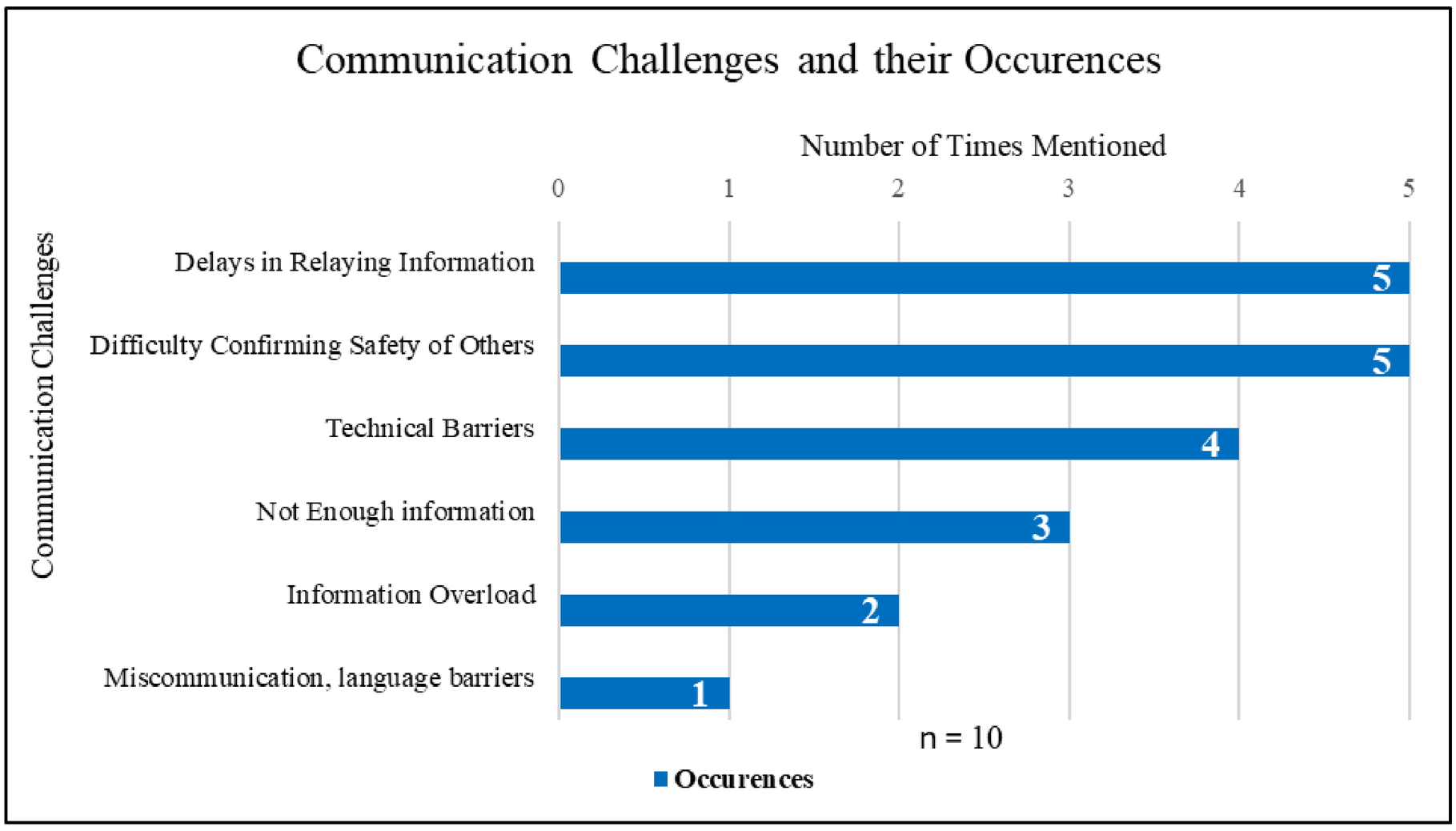


Figure 4.8 Communication Challenges and their Occurences

One office worker from the Thessaloniki Helios+ Center noted:

> "We also have the office spaces in the Thessaloniki SolidarityNow center which is like a 15-to-20-minute drive from here and I think [an application] might be useful to be able to know that they are doing OK."

This response illustrates how geographic dispersion increases the need for technology to help communicate the safety status of individuals who are not near one another. A general manager from the Thessaloniki Helios+ Center described the dangers of delayed information while discussing a past emergency response:

> "But the real time in the field, basically the location that they were sending us to was already an imminent threat from the fire […]. So, the information itself would be putting us further more in harm's way than it would be actually moving us a safe distance."

Since the information they received was out-of-date, at the current time of the emergency that information would put the affected individuals in harm. This interviewee highlights the importance of communicating information efficiently and promptly to protect staff members and the beneficiaries they support. Other interviewees also highlighted the issue of delays, with many attributing it to members being spread across different locations. As a Project Officer from the Thessaloniki Solidarity Center noted, "information has to travel around." Repeated, delayed or outdated information can compromise the safety of individuals.

Based on the team's findings, the application must enable users to confirm whether members and the beneficiaries are safe or need assistance when an incident occurs. Without rapid status confirmation, coordinators cannot accurately determine who still needs assistance, where coordinators should direct resources, or whether evacuation is complete. The application should provide simple, real-time updates on active incidents to help users to share urgent information quickly.

4.2.4 Emergency Features

The communication challenges identified in the previous sections emphasize several gaps in SolidarityNow's current practices. In response to these limitations and their own emergency experiences, participants identified desired features for a customized emergency communication application at the end of each interview, when their experiences with existing communication methods were still fresh. This approach helped elicit more practical, experience-driven suggestions for application design.

From the interviews with SolidarityNow staff, our team determined the most essential features for the project application. Figure 4.9 below visualizes the key findings highlighting the number of interviewees who mention various features. A key trend evident in the data is the strong level of agreement among staff, indicating shared challenges and aligned expectations for improved communication tools.

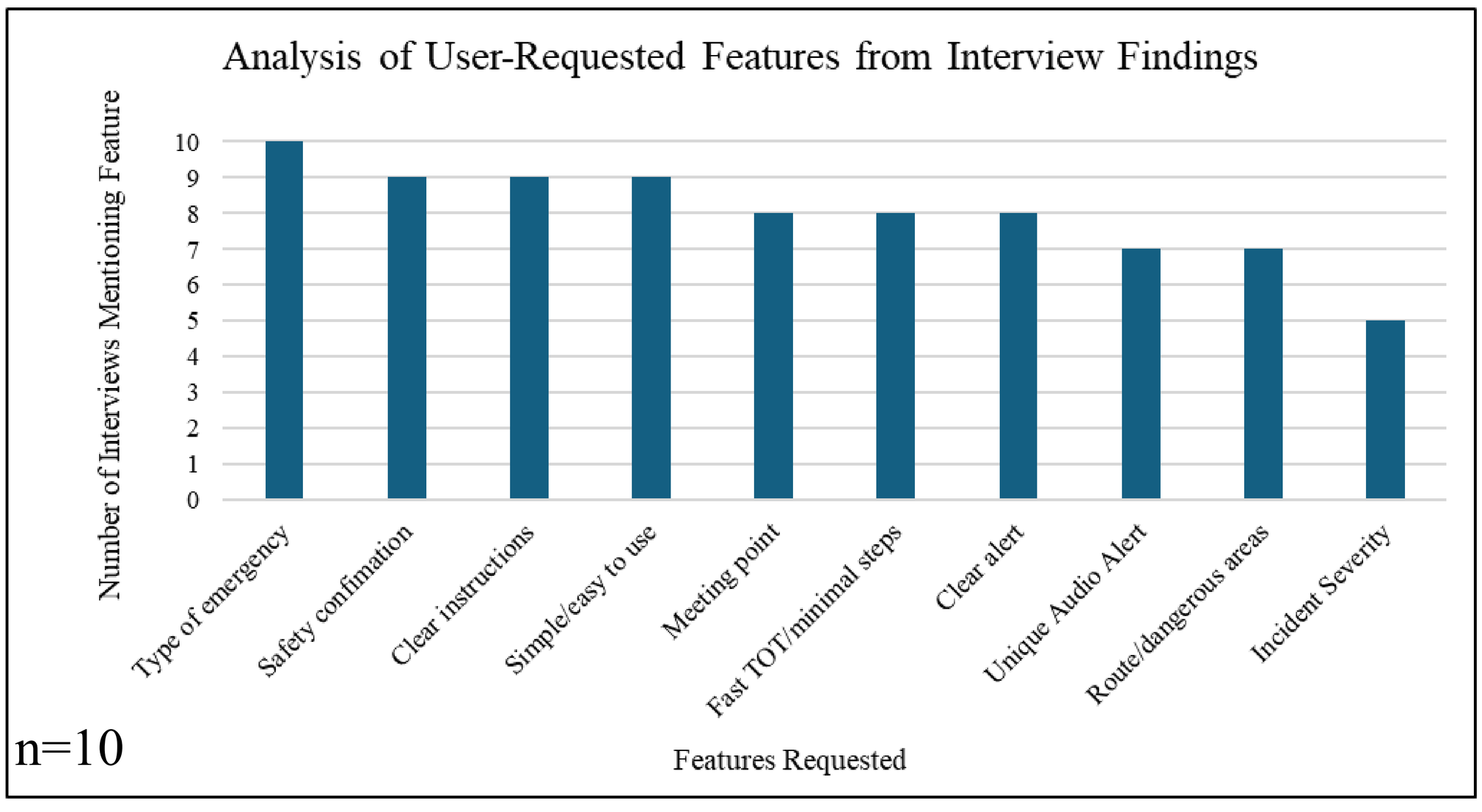


Figure 4.9 Analysis of User-Requested Features from Interview Findings

The most frequently requested feature, and the only feature that all ten interviewees mentioned was the “type of emergency.” All participants felt it was important to know the exact situation they are facing. The count of requests as well as the consistency across all participants made this the most vital feature to include.

The data shows that 90% of participants identified three additional key features: safety confirmation, clear instructions or messaging, and a simple, easy-to-use application. The safety confirmation feature demonstrated strong perceived effectiveness and participants emphasized the importance of having a way for colleagues to report their safety status. Many noted that such a tool does not currently exist and viewed its implementation as vital to the project. While this feature addresses communication challenges, staff also expressed usability concerns. Requests for clear instructions and a simple interface reflected a shared preference for a straightforward application that covers the organization’s basic needs. One of the Thessaloniki Premises staff said during their interview:

> “I think it should be as simple as it could be, user friendly, actually suitable in order to be, you know, easy to use in case of emergencies. Because when you are in a panic, I think the last thing that you need is to have complicated things in your hands.”

This was a critical insight as it connects not only to the features of the app but also speaks to communication challenges and informs app design. When people respond to a problem by using complicated technology in a panic, it can cause delays in communication and increase the risk of misinformation. Delays occur when users cannot navigate the app or are hesitant to attempt it, and those delays can cause outdated information as the situation continues changing. A prime example, cited in section 4.2.3, is when a SolidarityNow Emergency Response Team was caught in a fire due to delayed information regarding the change in wind patterns.

The data collected from these interviews established that our application needed to be quick, simple, and capable of reliably delivering essential information during an emergency. These findings directly shaped the design by guiding us in the structure of the app and what features we should include to best support our stakeholders.

5.0 Design Strategy

The findings from Chapter 4 informed our preliminary design of the proposed communication solution by identifying key challenges in emergency communication, including delays in information sharing, difficulties with targeted messaging, and gaps in coordination between office staff. This chapter outlines how we translated these insights and requested features into an initial design. It describes the overall design approach and how we applied it to develop both the mobile and desktop versions of the application. Figure 5.1 shows the initial (left) and final (right) designs of the mobile app, and Figure 5.2 presents the initial (top) and final (bottom) designs of the desktop app. The iterations focused on improving clarity, speed, and usability during emergency situations. The designs presented in this chapter represent the prototype and the chapter that follows details further evaluation and refinement through testing and user feedback.

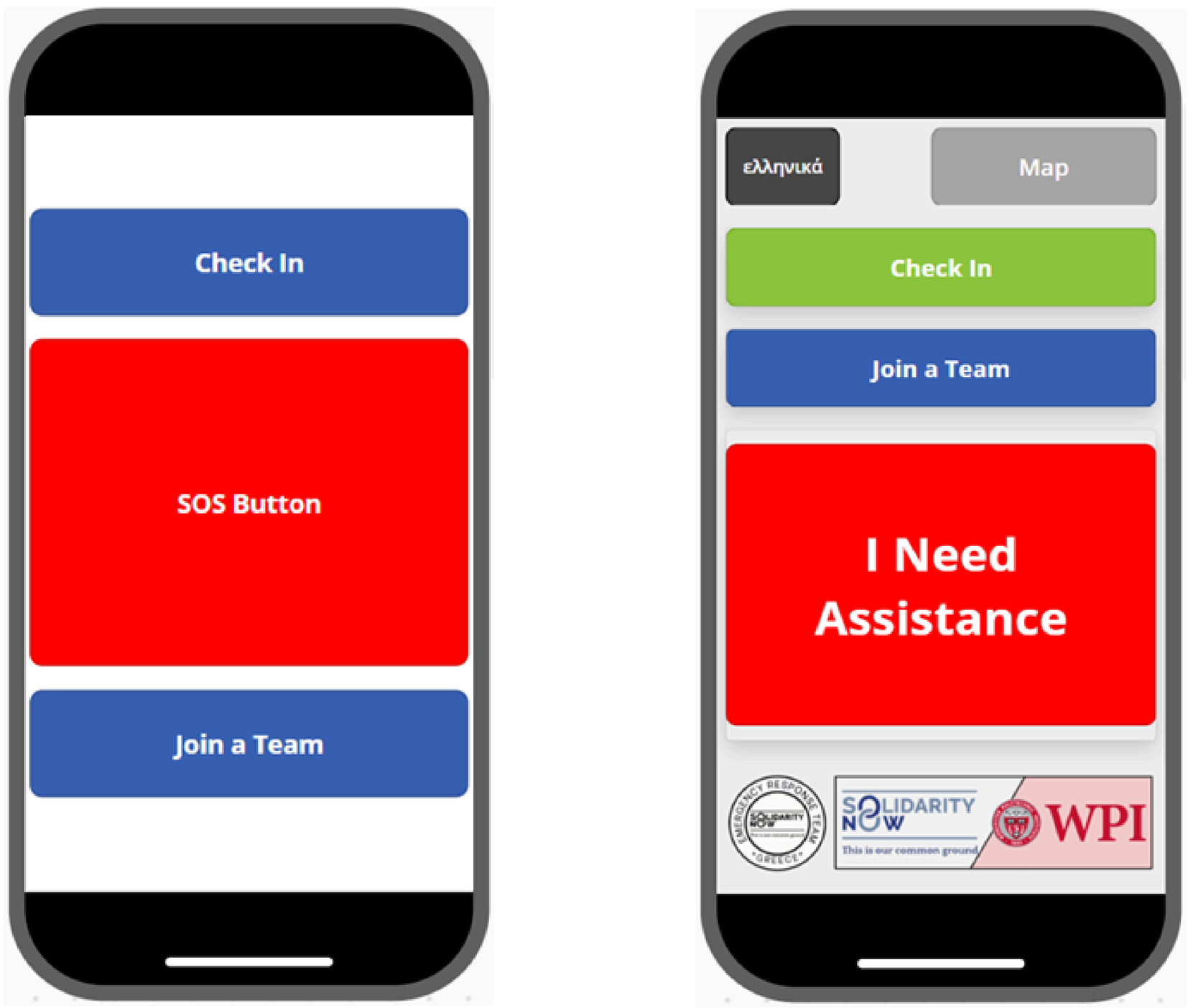


Figure 5.1 Initial (left) and Final Design (right) of the Mobile Application

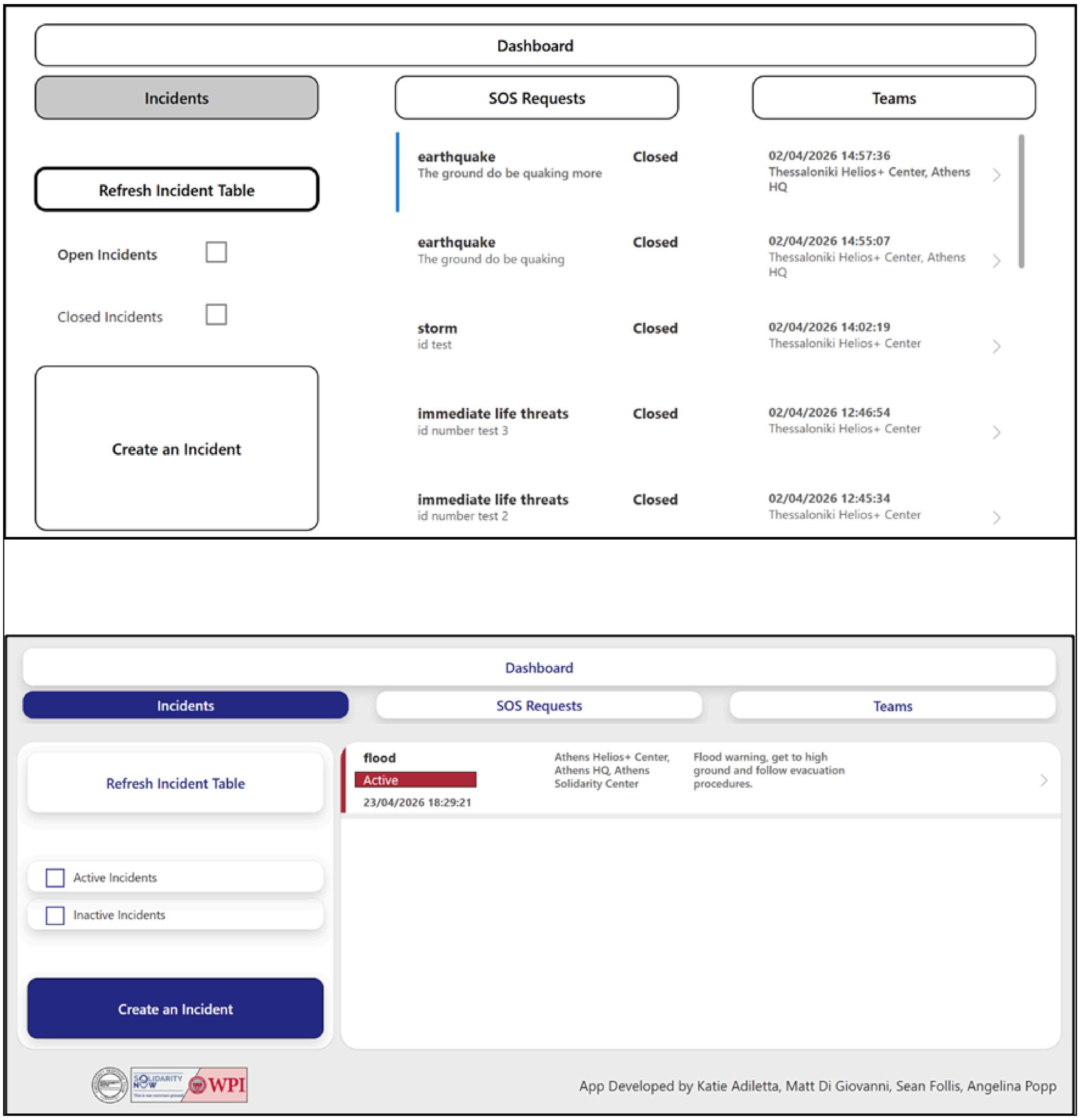


Figure 5.2 Initial (top) and Final (bottom) Design of the Desktop Application

5.1 Design Goals and Framework

We guided the preliminary design of the communication system by a set of core design principles established from interview responses, facility observations, and prior research on effective communication applications. Our team used these principles to ensure that the system addresses the specific challenges from our findings, while remaining practical to implement features within the constraints of the sponsor organization. Table 5.1 below outlines the design specification based on our findings and how we addressed the specification in our design solution.

Table 5.1 Design Specifications and Solutions

Specification	**Design Solution**
Minimizing User Effort Under High-Stress Conditions (Sections 4.1, 4.2.4)	Prioritize **simple layouts, minimal navigation steps, and clear actions** that reduce the time required to complete critical tasks.
Structured and Consistent Communication (Sections 4.2.3, 4.2.4)	Incorporate **predefined message formats** and **categorized incident types**, allowing users to quickly send clear and standardized information.
Two-Way Communication (Sections 4.2.3, 4.2.4)	Allow users not only to receive alerts but also to **respond with their status**, enabling better situational awareness and resource direction.
Targeted and location-based communication (Section 4.2.3)	Allow messages to be **sent to specific groups based on the location** assigned to their email, ensuring that users receive only the information that is relevant to them.
Accessibility and Feasibility (Section 4.2.2)	Built using Microsoft Power Apps and Power Automate, with SharePoint Lists to **integrate directly** with the existing ecosystem, eliminating additional costs while ensuring ease of deployment and long-term maintainability.

Together, these design goals form the foundation of the preliminary design and guide the development of both the mobile and desktop applications described in the following sections.

5.2 Logo Design

The team named the application Echo and designed a logo, seen in Figure 5.3, to create a consistent visual identity across both the dashboard and mobile app. The sponsor reviewed and approved the final name and logo design.

Figure 5.3 Final Application Design Logo

The name “Echo” reflects the system’s communication setup, where the dashboard sends an initial message and then the mobile applications rapidly respond. The signal waves design reinforces this idea by representing the movement of information between users. The use of red highlights the application’s focus on emergencies, as people commonly associate the color with urgency and alerts. It also helps distinguish Echo from other Microsoft Teams applications, making it easier to recognize during high-pressure situations.

5.3 Mobile Application Design

Our team developed the mobile application primarily for members of SolidarityNow deployed in the field who rely on mobile devices to communicate. The purpose of the mobile application is to enable staff who are on the move and have access to a mobile phone to communicate their safety status to the emergency director. From their office, the emergency director will have access to the desktop application to have a full view of all the incidents in the organization and communicate from afar to members.

The application consists of six screens: 1) ***Home***, 2) ***Assistance Confirmation***, 3) ***Join a Team***, 4) ***Incidents***, 5) ***Incidents Response,*** and 6) ***Map of Centers.*** Our aim was to maintain simplicity to reduce information burden for staff who need to communicate quickly during an emergency. The following sections describe each screen when navigating the application and their corresponding screenshots.

5.3.1 *Home* Screen

The ***Home*** screen allows users to select the app language between English or Greek, request assistance, join a team, check-in for an incident, and view the map of centers. Figure 5.4 below depicts the design for this screen with a button for requesting assistance which is larger and red to help users quickly send a request. The simplicity of the ***Home*** screen reduces information overload and promotes timely responses and requests. The different colors for the buttons allow for an intuitive way to quickly navigate through the app. From this screen, the user can press the "I Need Assistance" button and the ***Assistance Confirmation*** screen will appear. This screen requires users to press a button that is higher on the screen than the "I Need Assistance" button on the ***Home*** screen so the user must consciously press a different location on the screen to confirm their request. This ensures users do not accidentally click the "I Need Assistance" button.

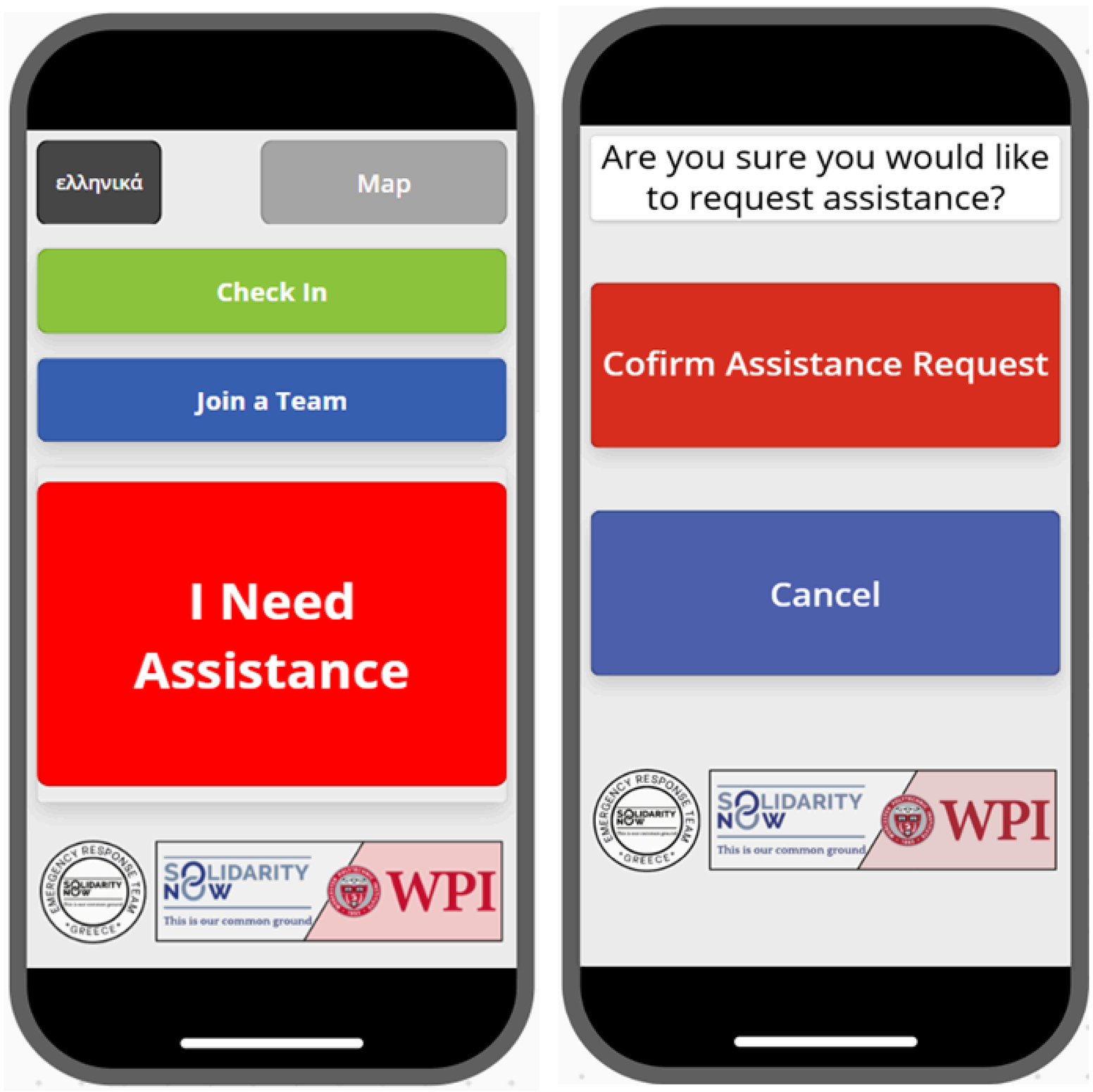


Figure 5.4 Mobile App Home Screen (left) and Assistance Confirmation Screen (right)

5.3.2 *Join a Team* Screen

Figure 5.5 illustrates the ***Join a Team*** screen, which enables the user to select a team to join which in turn gives them the ability to view incidents sent to that team. Figure 5.5 indicates five different teams: Athens Helios+ Center, Athens HQ, Athens Solidarity Center, Camps/Roving Team, and the Ioannina Pyxida Center. The emergency director can also create customized teams that members can then see in the list shown in Figure 5.5 and join. Having different teams is especially useful for the SolidarityNow organization as they have centers in several areas across Greece and incidents may affect only a specific team or area instead of the entire organization. This feature will reduce information overload to unaffected teams as they will only receive messages that are applicable to their location.

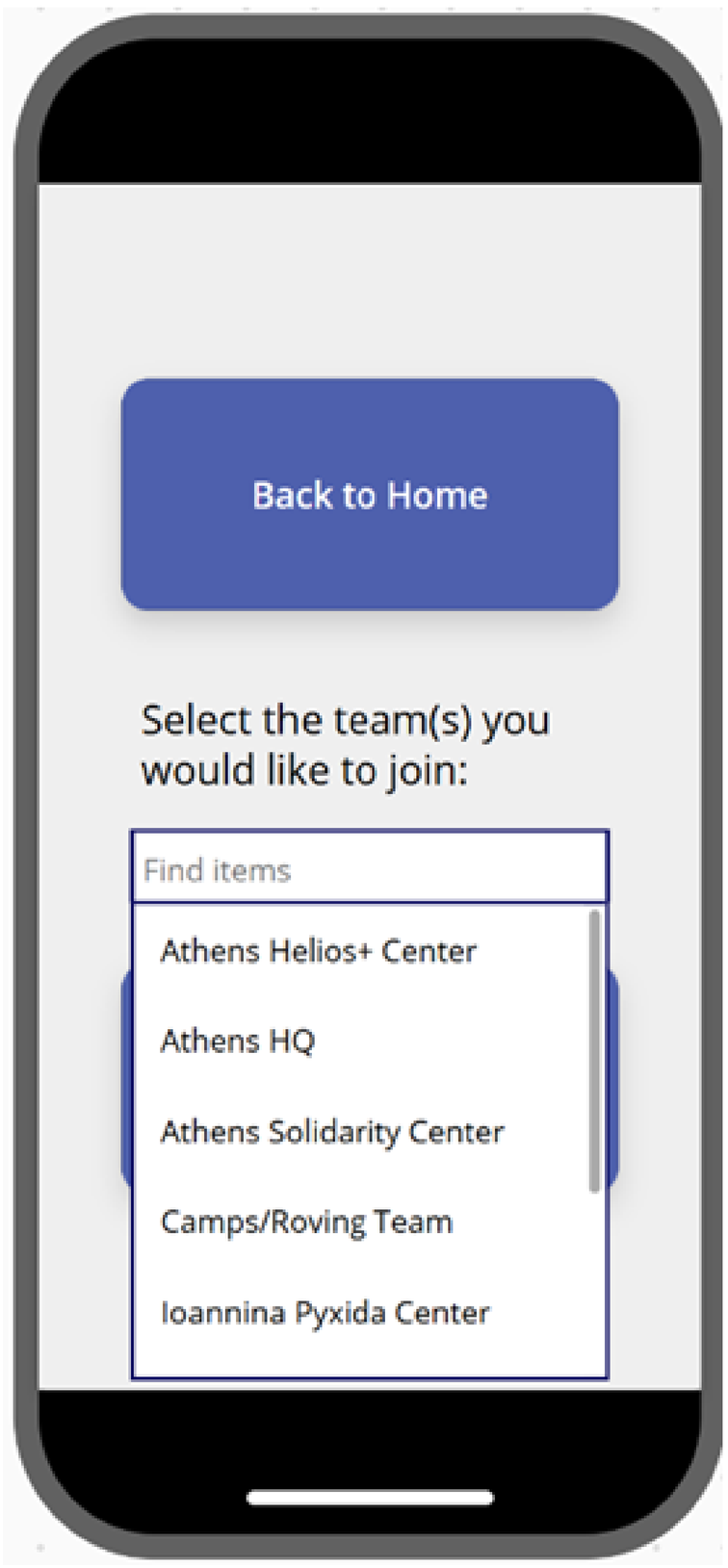


Figure 5.5 Join a Team Screen

5.3.3 *Incidents* Screen

When the user wants to check-in to an incident, they press the ‘Check In’ button in Figure 5.4 which navigates them to the ***Incidents*** screen, Figure 5.6, where users can see the active incidents the emergency director has identified. Clicking on the incident (in this example, Flood), brings users to the ***Incident Response*** screen, Figure 5.7, where staff can let the coordinators know if they are safe or need assistance for that specific situation.

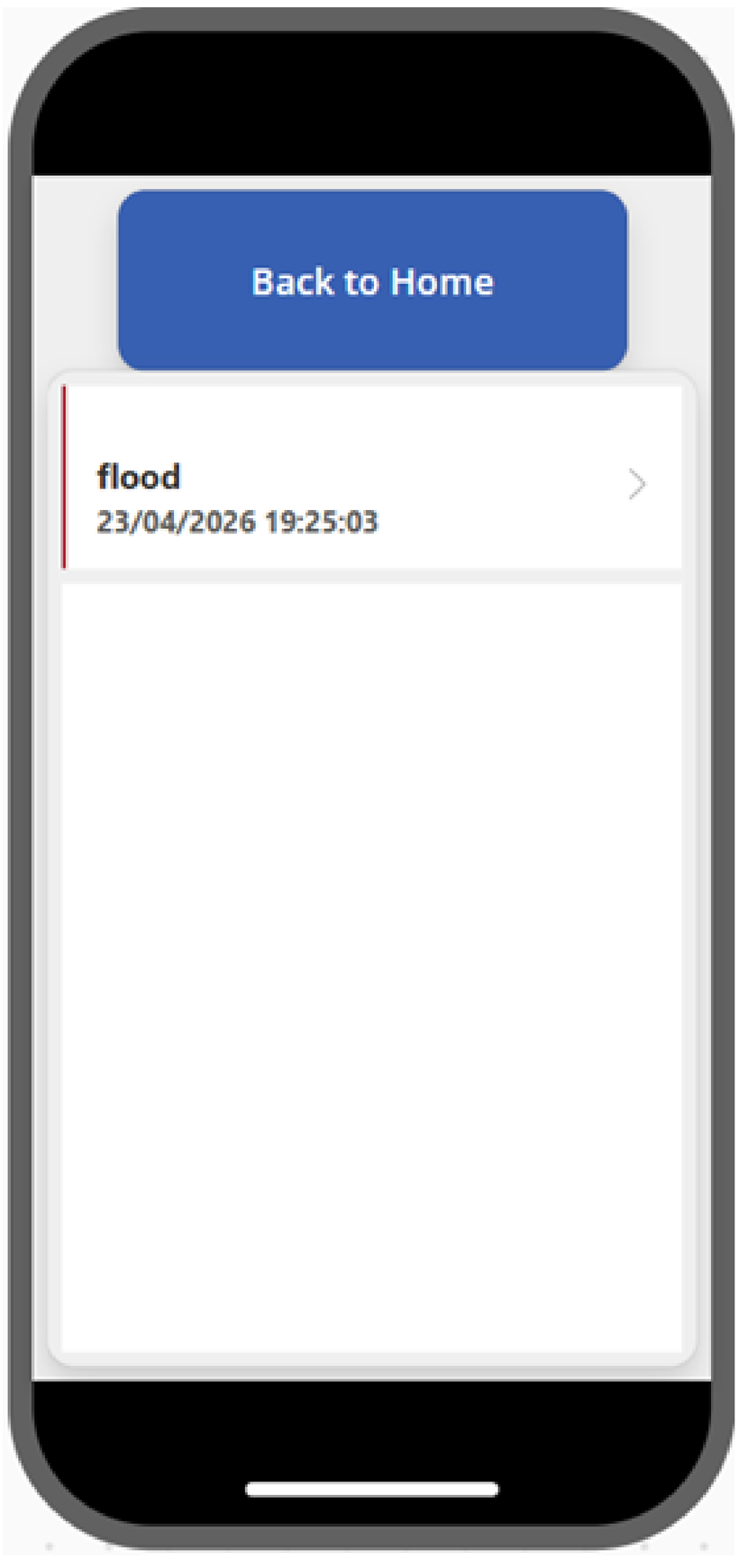


Figure 5.6 Mobile Phone Incident Screen

Figure 5.7 Mobile Phone Incident Response Screen

The green “I am Safe” button and red “I Need Assistance” in Figure 5.7 provides a visual guide for the user to quickly indicate their status. When the user presses, “I am Safe” or “I Need Assistance”, the app sends an update to the desktop application so the emergency director can see who needs assistance and who is safe for each incident or SOS request. This design enables members in the field to confirm they are safe during an incident or allow coordinators to direct resources to support individuals in need of assistance.

5.3.4 *Map of Centers* Screen

When the user presses the “Map” button on the top right of the ***Home*** screen, Figure 5.4 (left), it navigates them to the ***Map of Centers*** screen, Figure 5.8, that allows them to select a location from the list including: Thessaloniki, Athens, Larissa, and Ioannina in this example. This sends the user to an external Google MyMaps website where the user can view the different SolidarityNow centers. Figures 5.8 shows the ***Map of Centers*** screen and Figure 5.9 shows the external MyMaps website when the user clicks on “Athens Locations”.

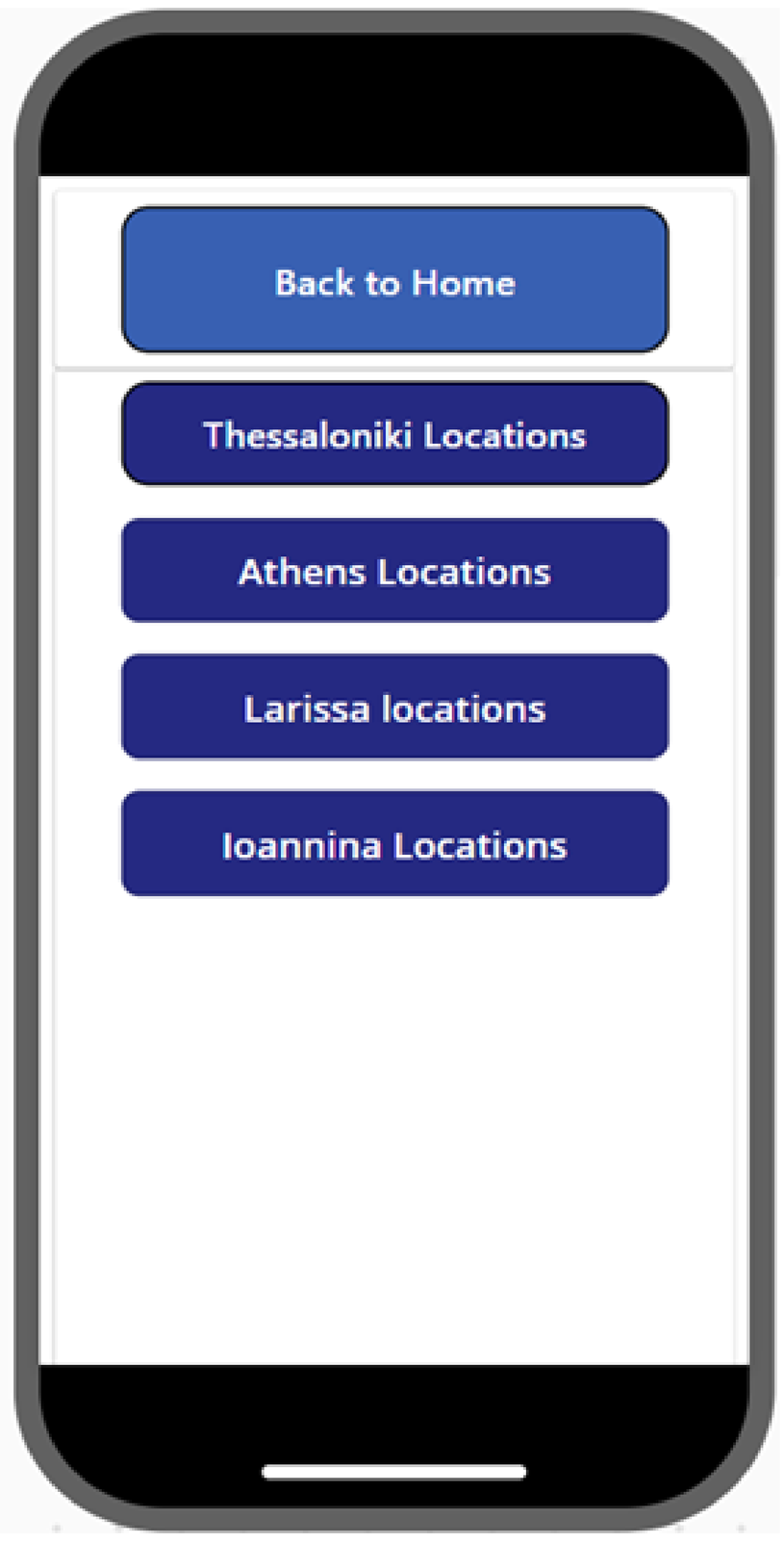


Figure 5.8 Map of Centers Screen

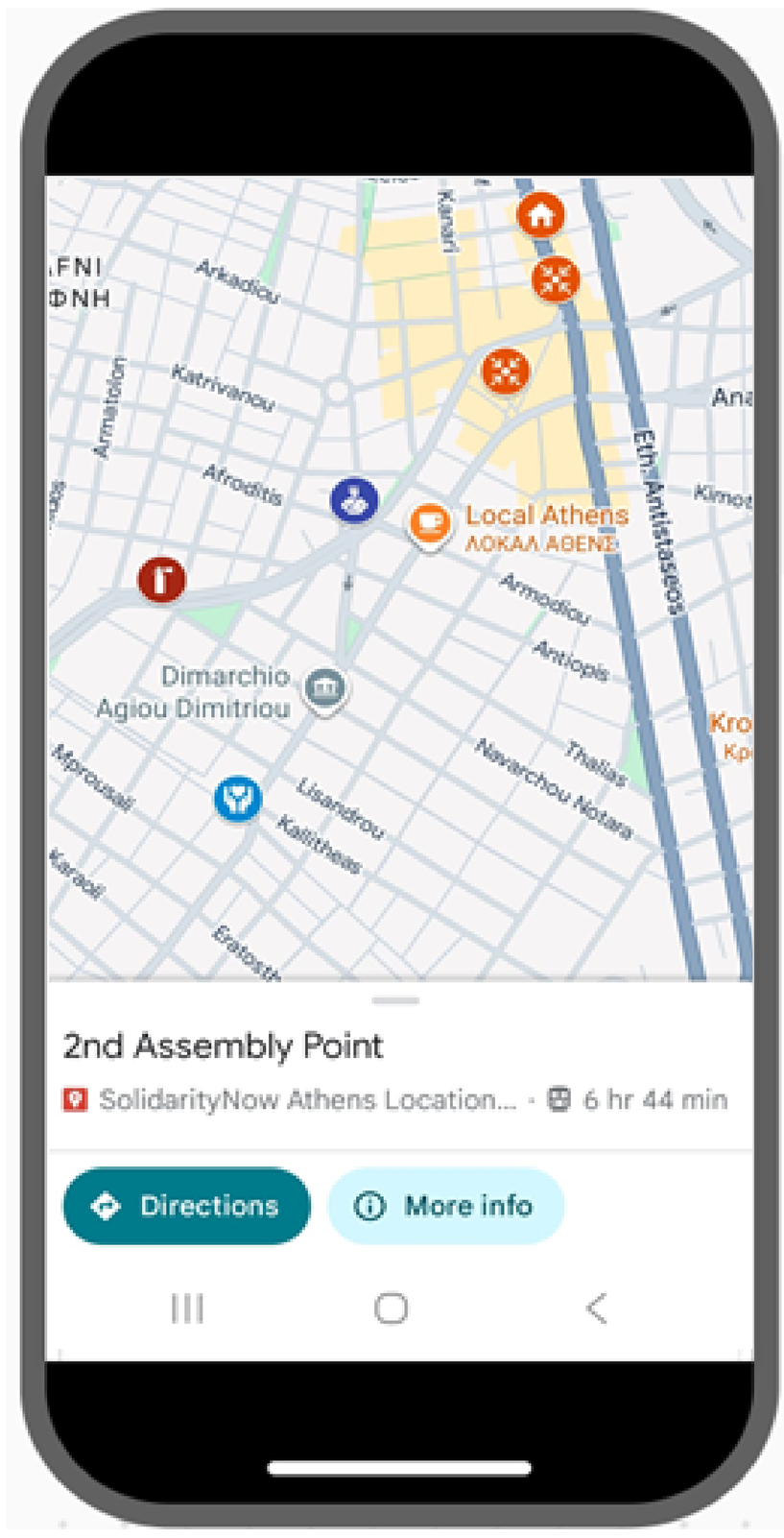


Figure 5.9 Map of Athens Locations with Legend

Figure 5.9 illustrates the different locations shown on the Athens Helios+ Center map such as the two nearest evacuation meeting points, police station, fire station, and hospital. This feature is simple and customized to view the important locations surrounding the SolidarityNow buildings during emergencies. We pulled these key locations from the specific evacuation procedure documents for each SolidarityNow location.

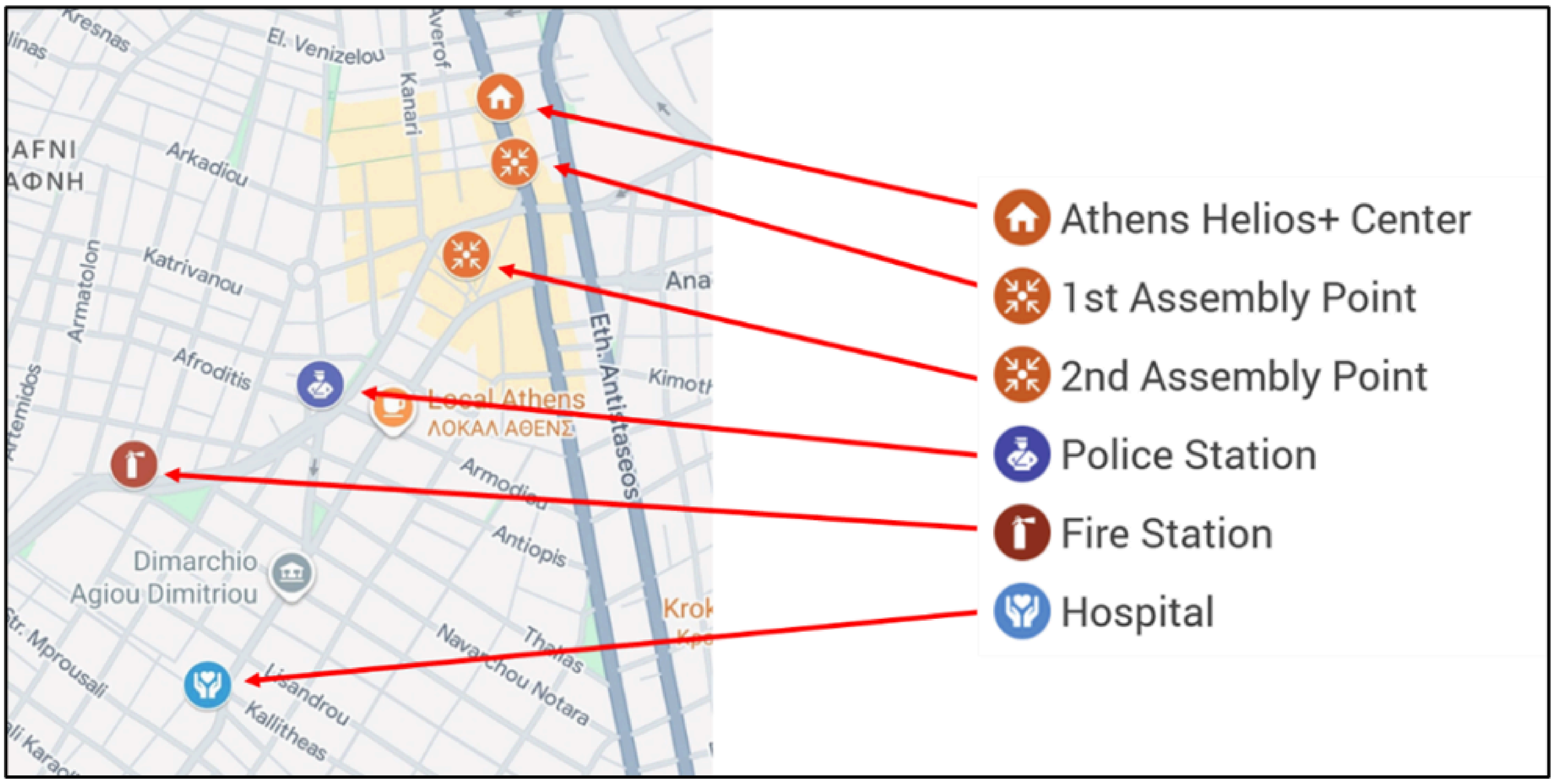


Figure 5.10 Map Locations Legend of Athens Helios+ Center

Overall, the mobile application design prioritizes simplicity, speed, and usability, enabling staff members to communicate effectively and respond promptly during emergency situations.

5.4 Desktop Application Design

The coordinators of the Emergency Response Team are the primary users of the desktop application, which is a master view of the incidents, SOS requests, and teams in the organization. This application consists of eight screens: 1) ***Dashboard***, 2) ***Incidents***, 3) ***Incident Details***, 4) ***SOS Request***, 5) ***SOS Request Details***, 6) ***Teams***, 7) ***Map of Centers***, and 8) ***Modify Teams***. The following sections detail the main screens associated with the application.

5.4.1 *Dashboard* Screen

The ***Dashboard*** is the main navigation screen for the emergency director as it provides ease of access to ***Incidents, SOS Requests,*** and ***Teams.*** Figure 5.11 illustrates the dashboard with green indicators for the different components of the dashboard. This section will walk through each part of the dashboard. As a note, the mobile application uses the term “Assistance Request” while the Desktop Application uses the term “SOS Request”, but they are equivalent.

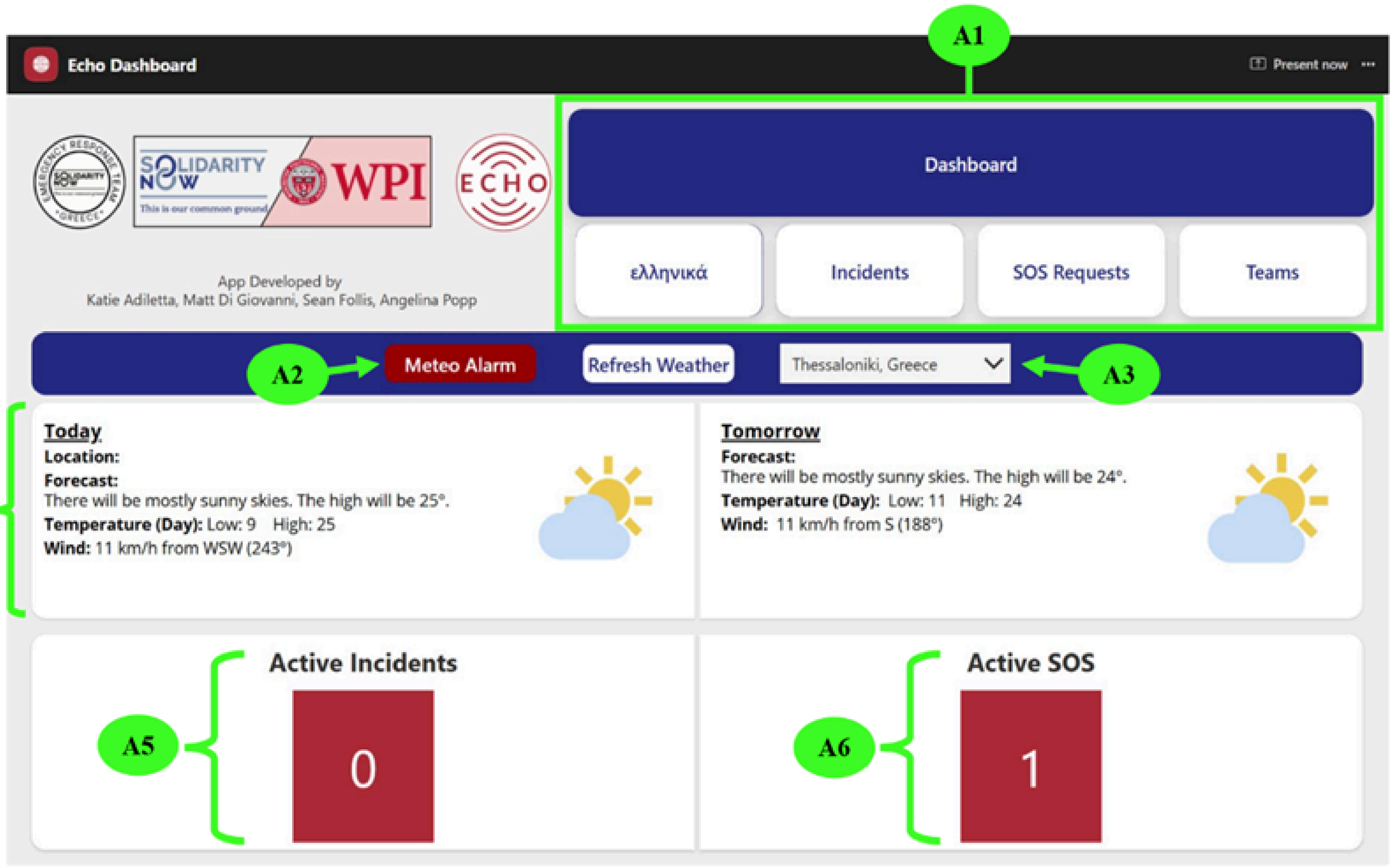


Figure 5.11 Desktop App Dashboard

Within A1, the navigation panel, the leftmost button reads “Greek” and will translate the app to Greek to improve accessibility and ease of use. This panel also allows for navigation to the ***Incidents*** screen, ***SOS Requests*** screen, and ***Teams*** screen. Next, A2 identifies a red button which is for the external website, “MeteoAlarm”, so the user can gain more information on severe weather information. MeteoAlarm is one of the main sources used by the emergency director when monitoring weather conditions. We added a “Refresh Weather” button to ensure the forecast for the selected location stays up to date. The emergency director selects the desired location via dropdown A3 (e.g., Thessaloniki in Figure 5.11).

Moving further down the screen, A4 shows a widget displaying the current and next-day forecast for the selected SolidarityNow location, including temperature and wind speed, alongside a weather icon. In the example (Figure 5.11), Thessaloniki’s .

current forecast indicates mostly sunny conditions, with a high of 25°C, a low of 9°C, and wind speeds around 11 km/h. The icon shows that it is currently sunny in the area.

Finally, A5 and A6 feature a clear view of the number of Active Incidents and Active Assist Requests on the dashboard. Seeing this information, directors can easily see how many active incidents are currently happening in the organization and how many people are requesting assistance from the ‘Active SOS’.

5.4.2 *Incidents* Screen

Using the navigation area in A1 of the Dashboard in Figure 5.11, the user can press the “Incidents” button, which will bring them to the ***Incidents*** screen, Figure 5.12. This screen displays active, inactive, or all incidents using filters. Figure 5.12 shows an example with both active and inactive filters unchecked, highlighted in B1, so the app shows all incidents on the right side. If the user only checks active, only the active incidents would show on the right side and if the user only checks inactive, only inactive incidents would show on the right side. This feature is helpful for the emergency director to prioritize incidents and organize where they should send support.

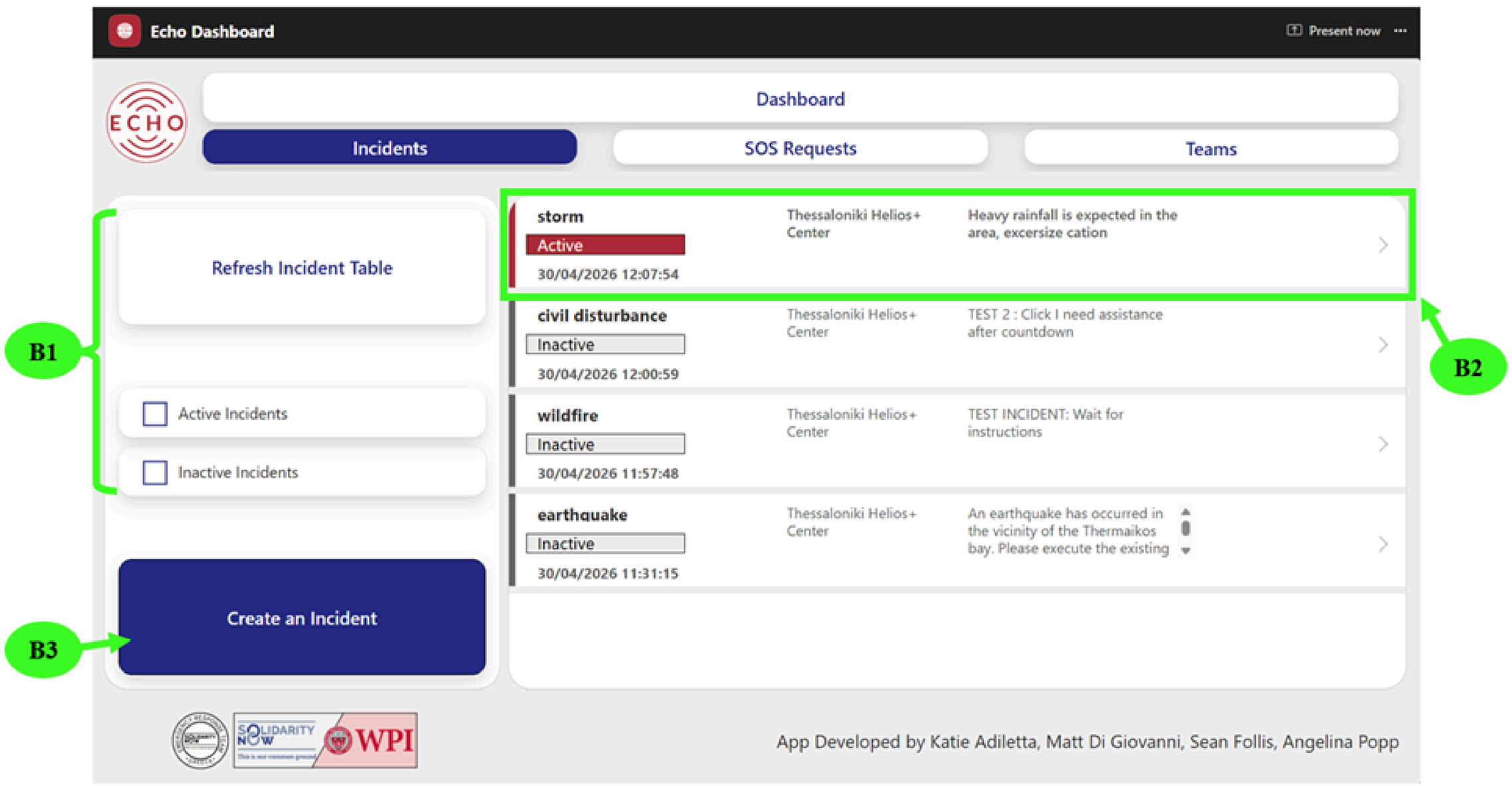


Figure 5.12 Incidents Screen

Next, B2 highlights in green an incident which includes a title, a date and time the user sent the incident, the teams the user sent the incident, and a message with the incident. This provides the emergency director with the information necessary to respond in a timely manner and maintain awareness of all the incidents. In this specific incident, the title of the active incident is “storm”, and the app sends the incident to the Thessaloniki Helios+ Center with the message “Heavy rainfall is expected in the area, exercise caution.” If a user presses on an incident, for example, the “storm” incident, another screen, Figure 5.13, illustrates details on the incident. At the top, B2.1 shows a widget which displays the status of the incident. Details shown in B2.2 include the type of incident, time of incident, locations affected, and description. Another area, B2.3, reflects how many individuals recorded they are safe, how many individuals did not respond, and how many individuals requested assistance (sent an SOS Request). Finally, B2.4 points out the emergency directors’ ability to deactivate or delete an incident. This feature provides the emergency director with greater control over current incidents, and which incidents are important for the organization.

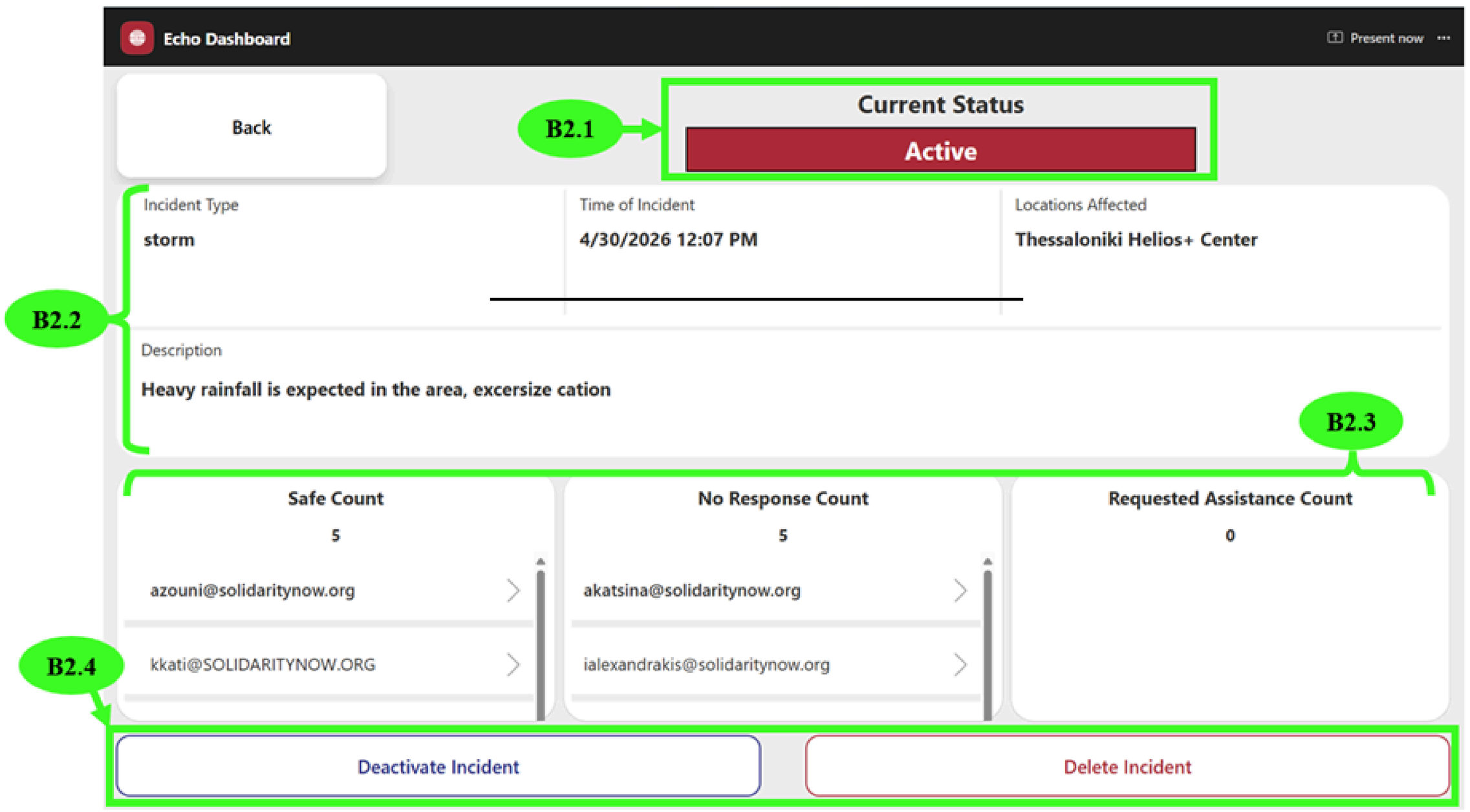


Figure 5.13 Incident Details

From Figure 5.12, B3 highlights the “Create an Incident” button—in the bottom left-hand corner—from the ***Incidents*** screen. Selecting B3 activates a pop-up, Figure 5.14, to appear and enable the user to create an incident. In the pop-up, B3.1 shows the types of incidents to choose from, a text box for entering a description or message, and a dropdown that allows the user to select which teams need to be notified (users can select more than one team here). Then, B3.2 allows the emergency director to send the incident. The goal of the ***Incidents*** screen is to provide the director with the information necessary to support affected teams.

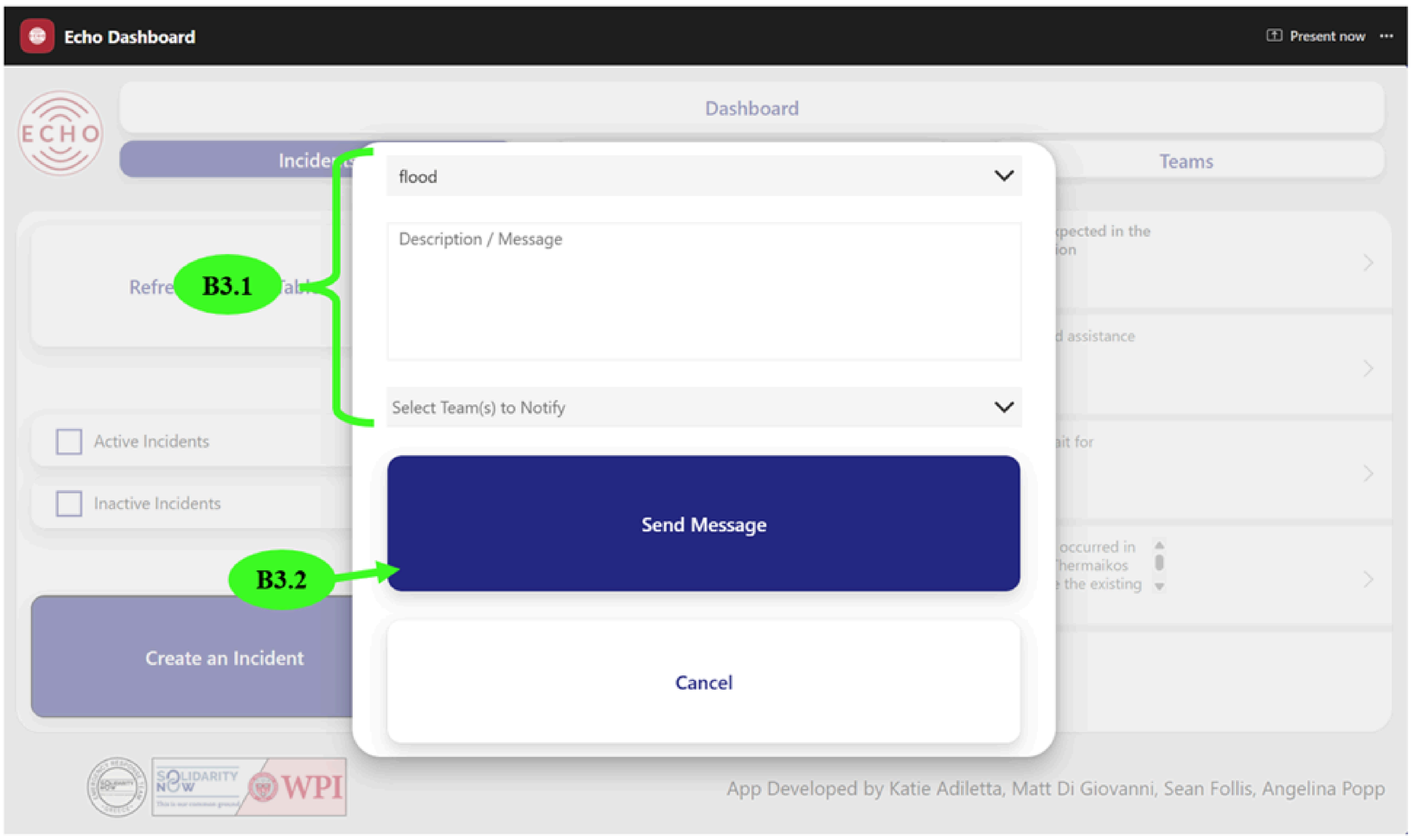


Figure 5.14 Create-Incident Pop-up

5.4.3 *SOS Request* Screen

The navigation area A1 of Figure 5.11 allows users to go to the ***SOS Request*** screen, Figure 5.15, by pressing the "SOS Requests" button. The C1 area includes active, inactive, or both SOS requests from the organization and allows users to refresh the SOS table to view the most updated SOS requests. On the right side, C2 indicates an SOS request with its active/inactive status and the email associated with the SOS request.

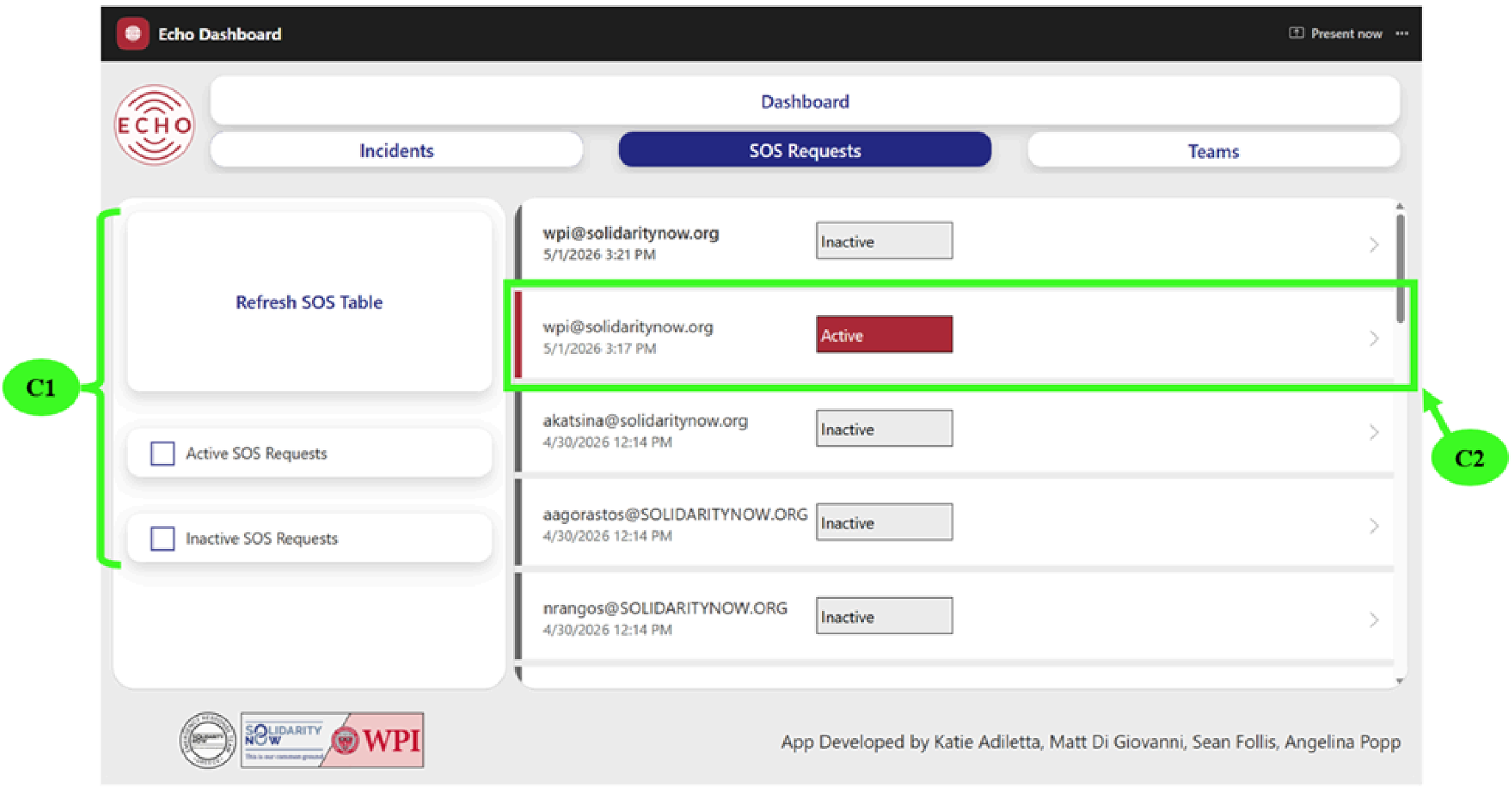


Figure 5.15 SOS Request

When the user selects an SOS request from Figure 5.15, another screen displays the ***SOS Request Details*** (see Figure 5.16, C2.2) including the sender's email, time of the request and location of sender. This screen permits the director to start a chat with the sender (C2.3), locate the sender's coordinates on Google Maps (C2.4), or deactivate the request (C2.5). Since the organization integrates the application into Microsoft Teams, selecting "Open Teams Chat" opens the Teams chat between the SOS request sender and the emergency director. The goal of this communication system is to ensure the director can address and locate SOS requests in a timely and efficient manner.

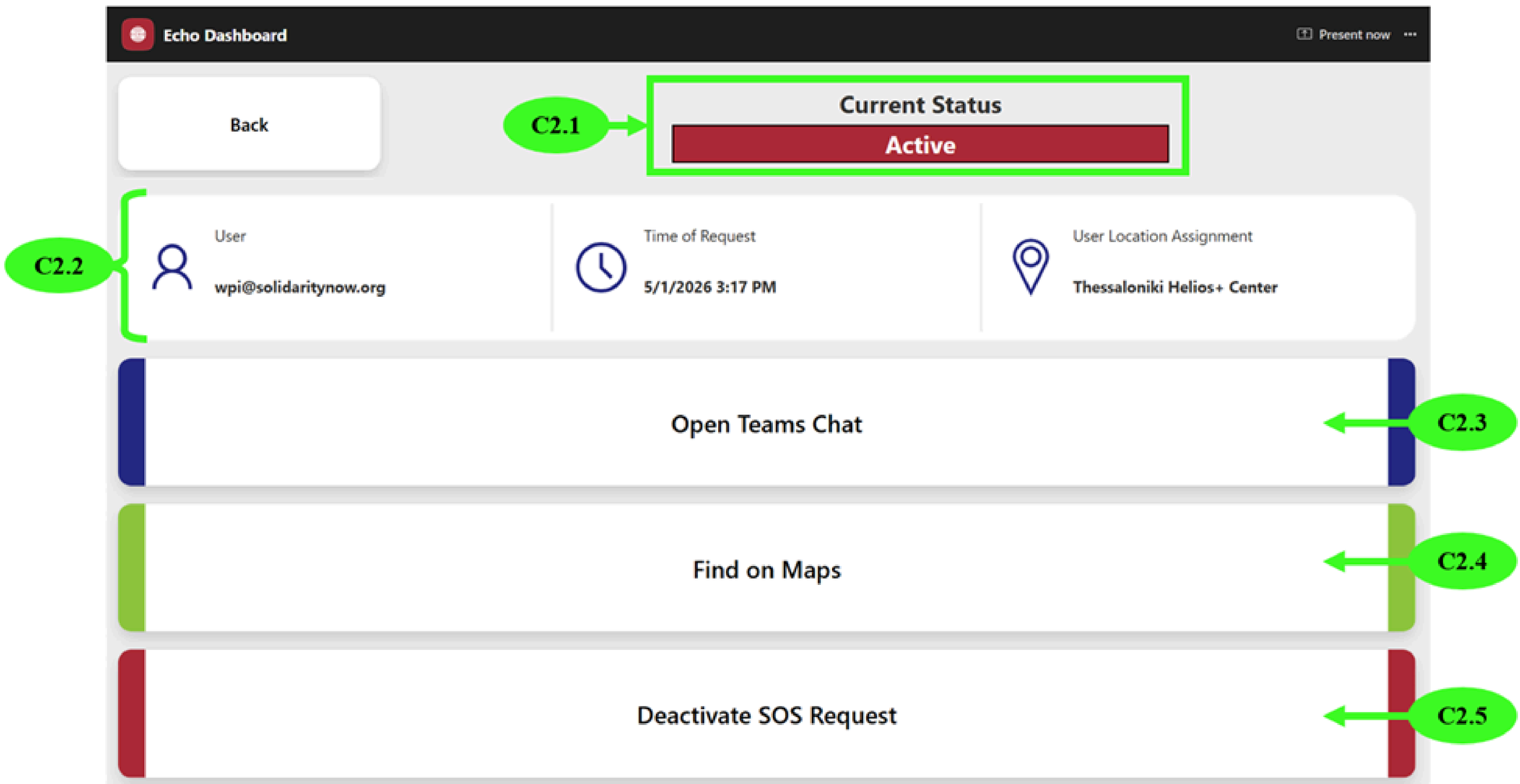


Figure 5.16 SOS Request Details

5.4.4 *Teams* Screen

Users can also navigate to the ***Teams*** screen from the ***Dashboard*** by pressing the "Teams" button highlighted in area A1 of Figure 5.11. This takes the director to the ***Teams*** screen, Figure 5.17, giving an overview of the teams, the members in each team with the ability to modify the teams, and the following descriptions will further describe this. Area D1 highlights the left column of the ***Teams*** screen which gives users the ability to choose specific teams. For example, this Figure does not have any location checked. After choosing a team, the right side will display all the emails of the members in that team. In this example, all the members of the organization are listed in the right as the user has not selected a specific location.

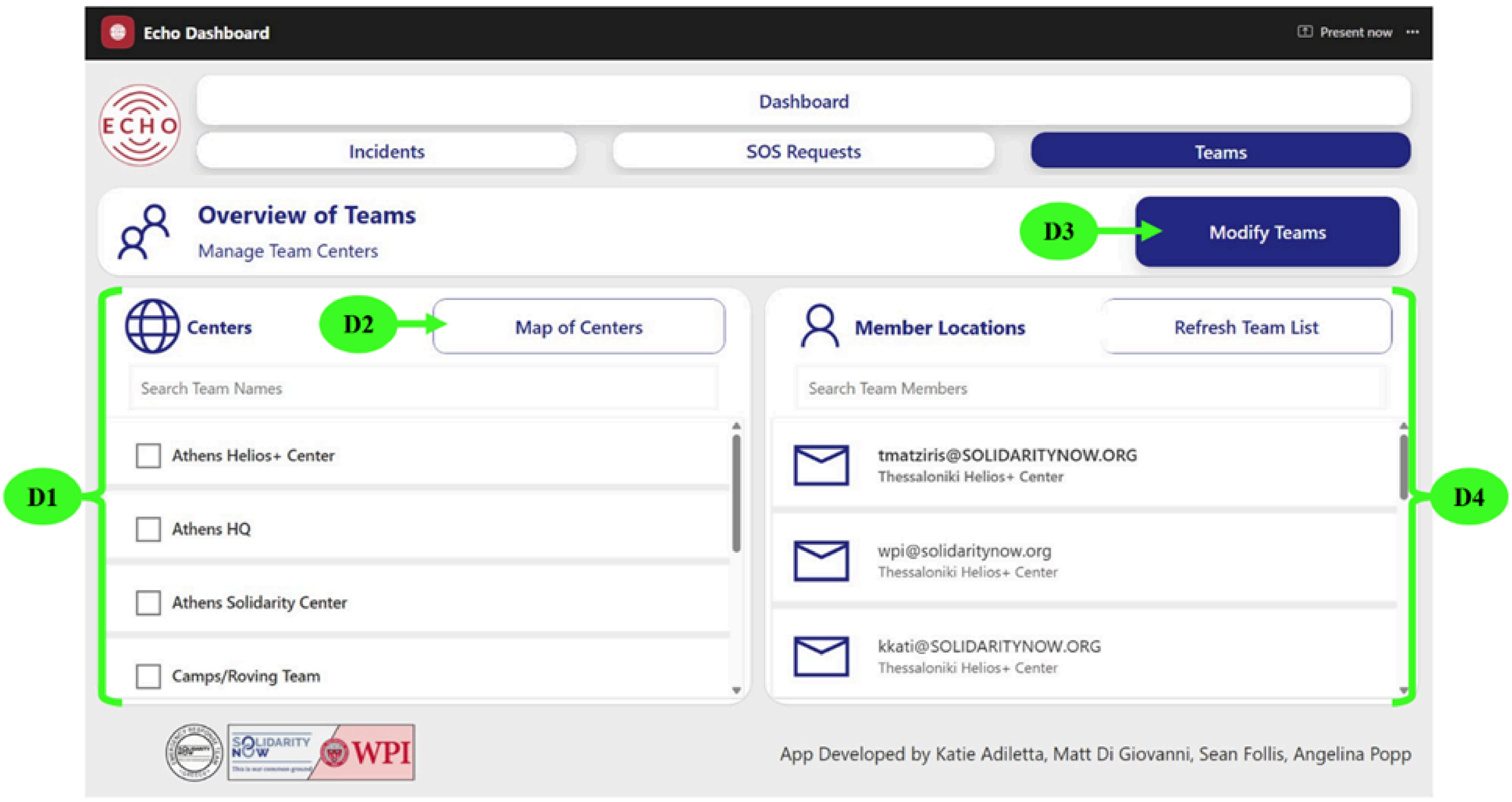


Figure 5.17 Teams

Figure 5.18 illustrates the ***Modify Teams*** screen which includes the ability to add or remove teams, D3.1, by pressing the "Add or Remove Teams" button. After the user presses this button, a pop-up appears (see Figure 5.19) that allows the user to input a team name, area D3.1.1 in Figure 5.19 to create a new team or select a team to remove given by area D3.1.2. Indicator D3 in Figure 5.17 highlights the option to modify the current teams through the ***Modify Teams*** screen. Figure 5.18, the ***Modify Teams*** screen, highlights the ability to select a team to modify, in this case the user selected the Athens Helios+ Center, indicated in D3.2. After the user selects which team they want to modify, the region of D3.3 shows the user can either search for a staff member's name in the organization or input their email to add them or remove them from the team with the buttons in D3.4.

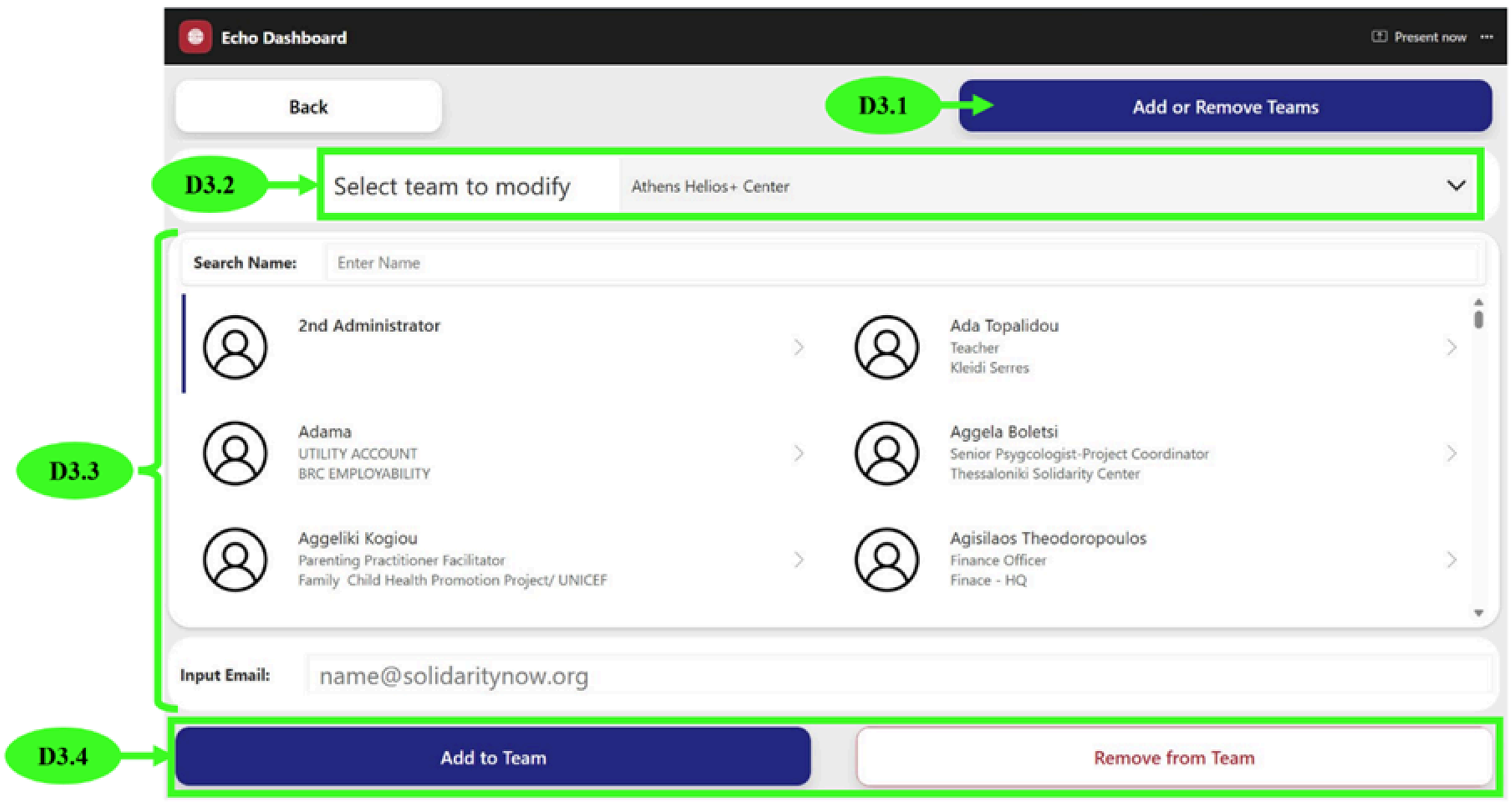
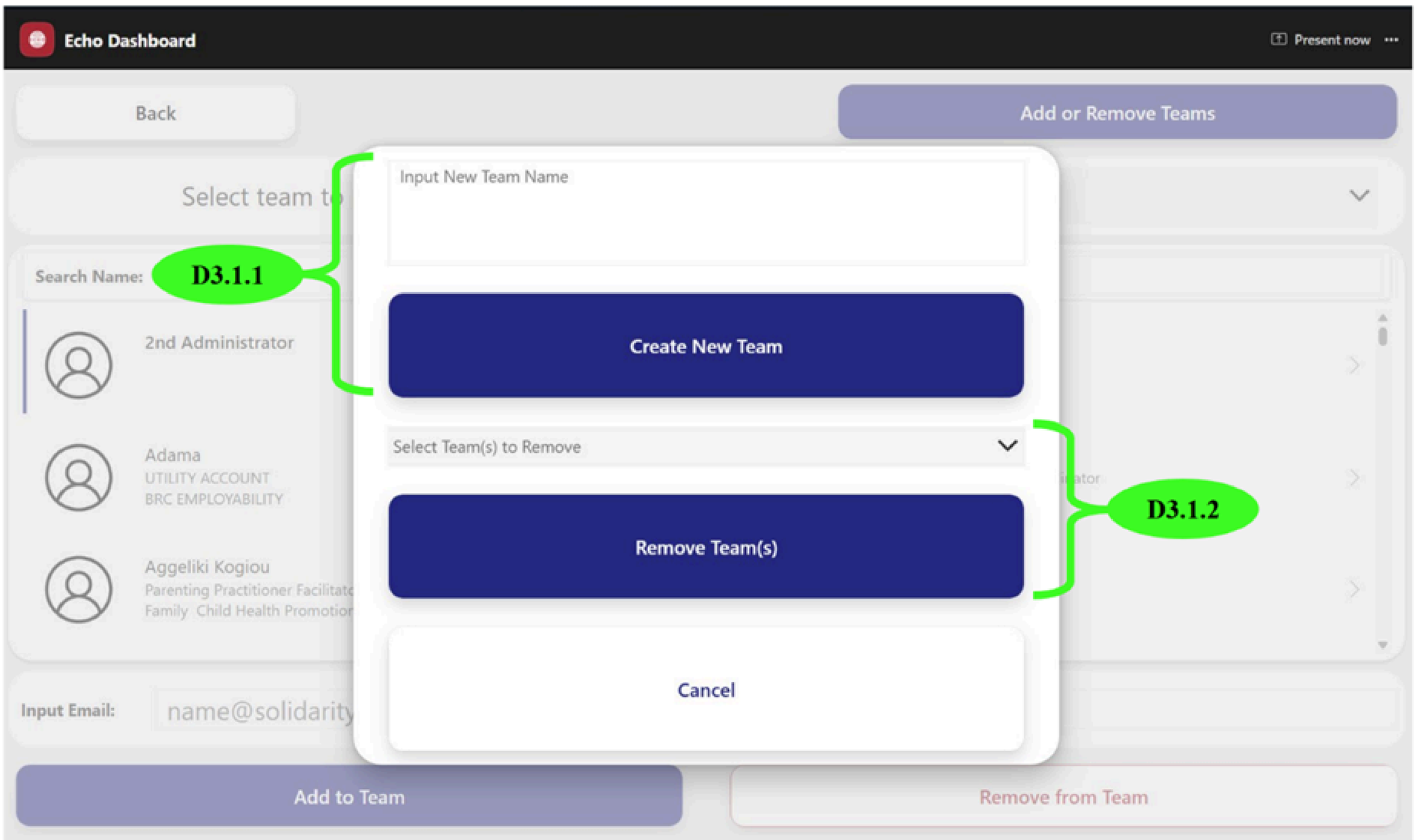


Figure 5.18 Modify Teams



The aim of the ***Teams*** screen is to provide the director with a comprehensive understanding of the teams and the ability to change them as they see fit to enable flexibility and control.

5.4.5 *Map of Centers* Screen

The final screen the users can navigate is the ***Map of Centers*** from D.2 in Figure 5.17. The ***Map of Centers*** screen (see Figure 5.20) displays the different centers in a location and the key locations for each center. Users can view the different SolidarityNow locations through the dropdown menu marked with D2.1. Region D2.2 lists each center along with its first and second assembly points, as well as the nearest police station, fire station, and hospital (as detailed in SolidarityNow's internal evacuation protocols, which this report excludes for security reasons). The left side of the screen lists the legend for key locations, while the right side displays a static map of the location.

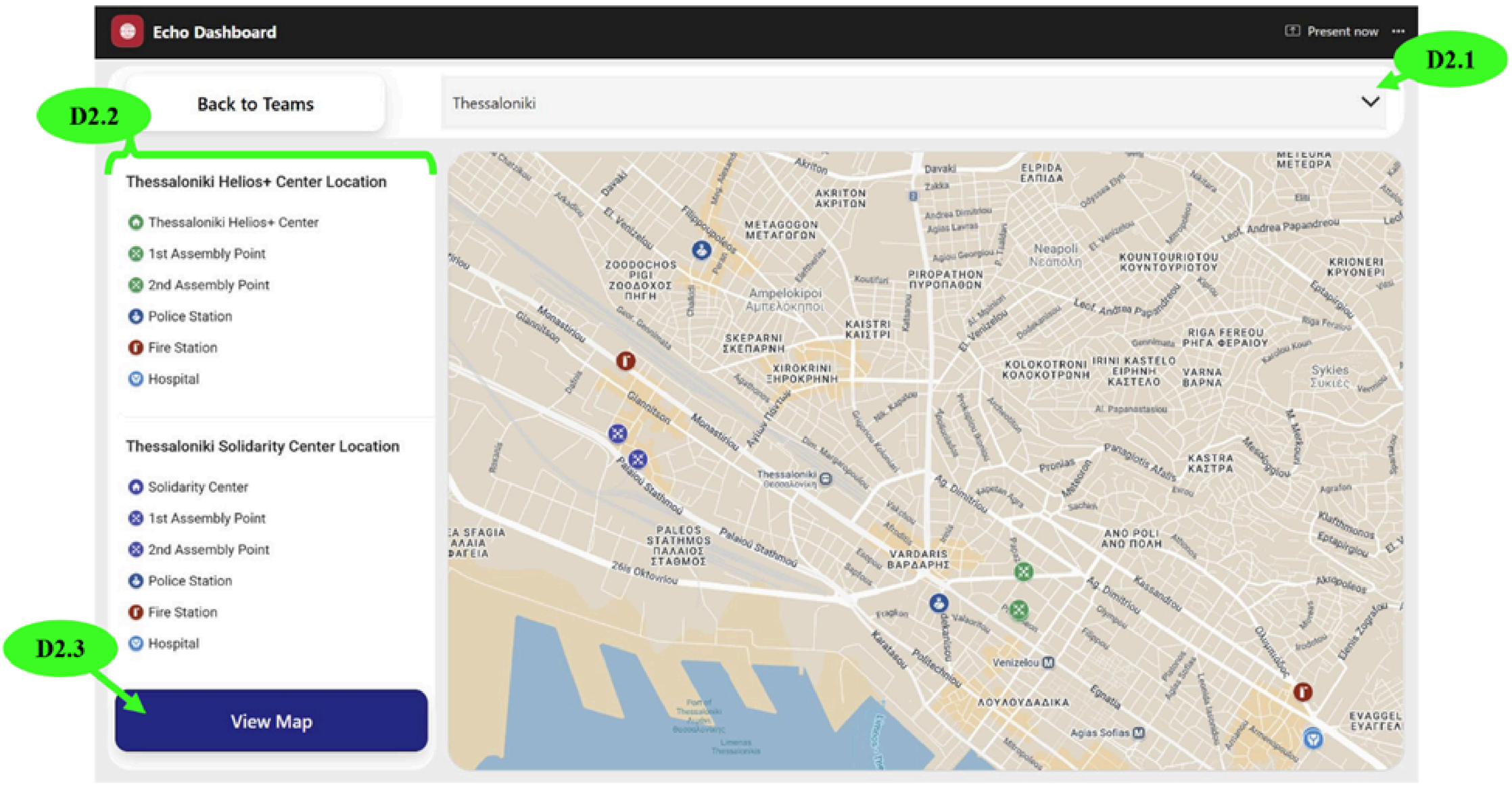


Figure 5.20 Map of Centers

When the user presses the “View Map” button, D2.3, the app opens a Google Maps screen that allows the user to get directions to a key location. Figure 5.21 depicts a zoomed-in Google MyMaps page that appears after clicking the “View Map” button. This map component provides the director with an understanding of the different key locations and how to navigate the locations.

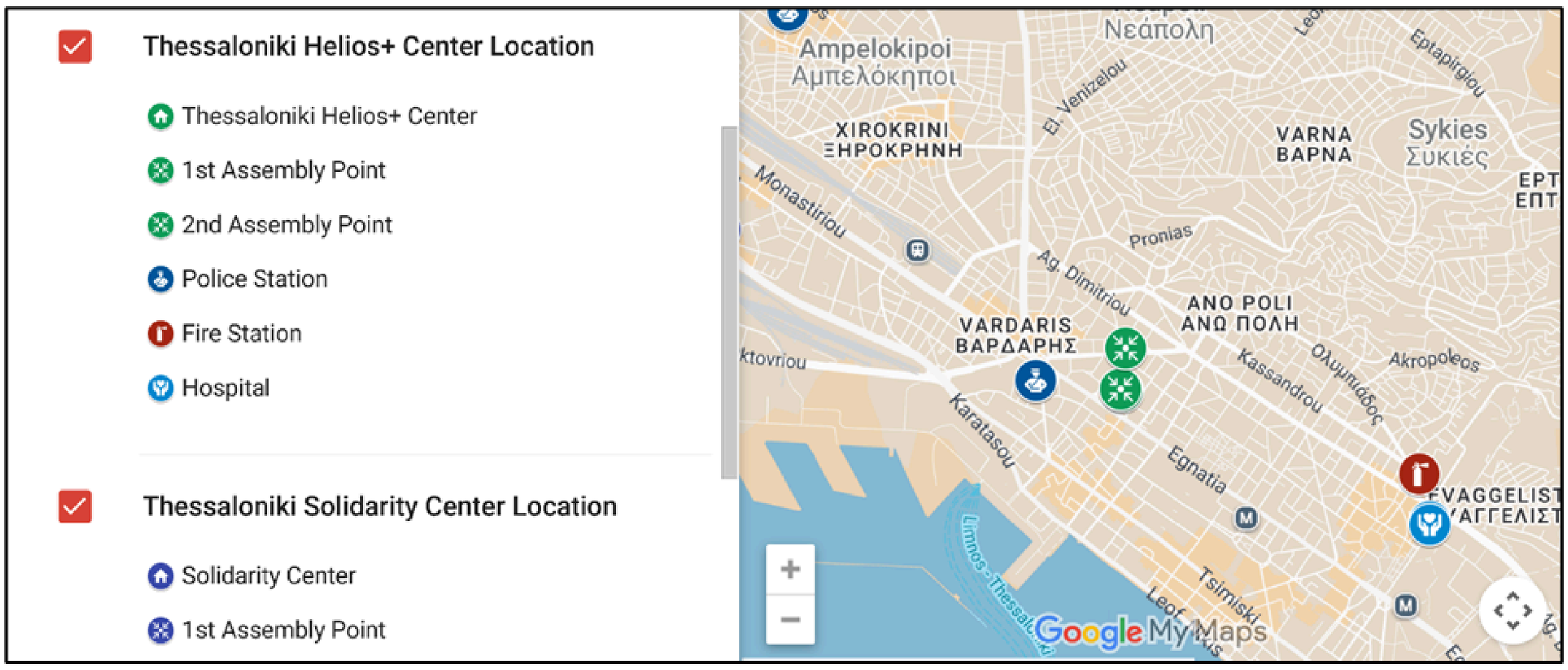


Figure 5.21 Zoomed-In “View Map” Button

5.5 Integrating with Microsoft Workspace

A key component of the communication system is its integration with Microsoft Teams and Outlook, which SolidarityNow already uses for internal communication. Rather than introducing a new platform, the app uses these existing tools to deliver alerts in a manner that feels familiar and accessible to staff. Microsoft Power Automate enables this integration by automatically generating and distributing messages based on key presses in the application. When a user creates an incident, the system sends both a Microsoft Teams message and an email through Outlook. Section 4.2.2 of the results chapter informed this redundant communication approach, showing that relying solely on Teams messages was not sufficient, since not all staff consistently use the platform. By incorporating email as an additional communication method, the system increases the likelihood that all SolidarityNow staff receive critical information.

Power Automate also supports communication in both Greek and English, which our sponsor requested for the SolidarityNow organization. The system uses branching logic to format and deliver messages in the appropriate language based on the user's preference in the app. In addition, Power Automate updates the SharePoint lists that store all data, including incident details, timestamps, team assignments, and staff SOS requests. This approach keeps all data consistent and up to date across both the mobile and desktop application, while maintaining a centralized data system.

Overall, integrating the application within the Microsoft workspace through Power Automate strengthens the reliability and accessibility of the communication system. By combining Microsoft Teams, Outlook, and SharePoint into a single connected system, SolidarityNow can confidently distribute and maintain information across the platform. The following chapter further evaluates this integrated system through user testing and analysis, highlighting where the app performs well and where it requires improvement.

6.0 Verifying The Application Solution

6.1 Testing Methodology

To evaluate the effectiveness of Echo, the team conducted scenario-based usability testing with eight SolidarityNow staff members on the Emergency Response Team (ERT). This approach placed participants in realistic emergency conditions while the team observed performance, usability, and communication effectiveness.

Our sponsor developed two evacuation scenarios based on potential emergency situations (see Appendix F). In each scenario, participants received or sent alerts, interpreted information, reported their status, and coordinated actions using the application.

The team conducted testing sessions in person at SolidarityNow sites with minimal intervention. There were eight participants in total, although some tests in the session did not include all participants at the same time. Two team members remained inside to monitor the dashboard and act as emergency directors. The other two team members accompanied participants to evacuation points, where they observed staff behavior and relayed information back to the team monitoring the system.

6.2 Evaluation Metrics

The team evaluated Echo by measuring performance during the evacuation scenarios. These metrics focused on both system reliability and user interaction during real-time conditions.

- Whether the dashboard did not receive any updates sent from the mobile application
- System behavior under simultaneous user activity

6.3 Evaluation Results and Observations

Testing demonstrated that Echo reliably handled communication during evacuation scenarios. When seven participants marked themselves as safe at the same time, the system processed all responses without delay or data loss. Figure 6.1 shows the diagnostic page for Power Apps after running the seven-participant test, and it shows that all flows ran for the expected duration and succeeded even though they were all activated at the same time.

Apr 30, 11:43 AM (2 d ago)	Succeeded	00:00:04
Apr 30, 11:43 AM (2 d ago)	Succeeded	00:00:03
Apr 30, 11:43 AM (2 d ago)	Succeeded	00:00:04
Apr 30, 11:43 AM (2 d ago)	Succeeded	00:00:04
Apr 30, 11:43 AM (2 d ago)	Succeeded	00:00:03
Apr 30, 11:43 AM (2 d ago)	Succeeded	00:00:03
Apr 30, 11:43 AM (2 d ago)	Succeeded	00:00:04

Figure 6.1 Power Flow Results from Load Test

Similarly, when eight participants pressed the “I Need Assistance” button from Figure 5.4 simultaneously, the system successfully delivered all messages to the dashboard. Although a network error appeared during this test, the system still transmitted all information correctly.

Participants completed evacuation tasks efficiently, and the dashboard received all critical updates during the process. The system maintained consistent communication even when multiple users interacted with the same feature simultaneously. However, participants noted minor performance issues. Some users experienced slight delays within the application, and some buttons required multiple presses before registering the input. While these issues did not prevent task completion, they affected the overall user experience.

6.4 User Feedback and Feature Requests

After testing, participants provided feedback on usability and potential improvements. Overall, users responded positively to the application's simplicity and ease of use. Participants stated that the interface felt intuitive and required minimal explanation, which is critical during high-pressure situations.

Participants also suggested additional features to improve functionality. The most notable request involved allowing emergency directors to manually update the status of staff members, such as marking individuals as safe or in need of assistance. This feature would provide greater control and flexibility during emergencies, particularly if staff members cannot respond.

In addition to application-specific feedback, the testing session served as the first evacuation practice for the office. This added value beyond the scope of the project, as staff gained experience with evacuation procedures while interacting with the system.

7.0 Limitations and Recommendations

During the execution of this project, we encountered a range of technical, scheduling, and cost-related challenges. This chapter outlines the limitations that affected research on staff experiences and the development and testing of the application. It also presents recommendations for future maintenance and improvements to the application.

7.1 Limitations

7.1.1 Interviewee Availability

At the beginning of our research, we encountered difficulty getting survey responses. Although we distributed surveys to the approximately 150 members of SolidarityNow staff, we only received three responses. After learning more about the Thessaloniki Helios+ Center workers, we found that staff members were more willing to participate in interviews when approached in person, and most were comfortable scheduling interviews on the same day or the following day. Recognizing that the staff preferred spontaneous, on-the-spot arrangements, we applied this approach to the remaining sites.

During our visits to the two Athens offices, we conducted observations at each location and secured two interviews, only one of the interviews we had scheduled in advance. Throughout these interviews, staff members frequently needed to answer phone calls or step out to assist beneficiaries. This reinforced our understanding that the staff were managing demanding workloads, and it made us even more appreciative of the time they dedicated to speaking with us.

Across all sites, interviewees generally expressed enthusiasm about participating. However, time constraints limit some individuals, requiring the team to keep questions concise. This occasionally limited the depth of certain responses, as some interviewees were unable to elaborate fully. Despite these constraints, each interview provided valuable insight, and we remained mindful and respectful of the time staff members offered us.

7.1.2 Cost Considerations

One of the primary challenges in this project was cost considerations. We created the initial version on a platform that ultimately proved unusable due to the cost required to operate it. As a result, we had to restart the development process on a different platform, which significantly reduced the time available for both building and testing the application.

Cost also limited the integration of live data from MeteoAlarm, which provides real-time alerts on hazards such as strong winds and floods. Although SolidarityNow uses this tool during emergencies, integrating it into the application required a paid web hosting subscription. Instead, the team implemented a two-day forecast using the native Microsoft weather service.

Including an interactive map posed a similar challenge because having a map that users can navigate with interactive key locations requires a paid API key. Instead, we implemented a static map marked with the key locations using Google MyMaps, each location links to the interactive, external Google Maps to get directions. This allows members to quickly identify designated meeting points and important nearby facilities such as fire stations, police stations, and hospitals (as detailed in SolidarityNow's internal evacuation protocols, which this report excludes for security reasons). However, this setup requires extra steps on the part of the user to get directions to key locations or see images of the locations to verify they are in the correct spot.

7.1.3 Technical Limitations

The application only functions when the device has an active internet or service connection, but network reliability is not always guaranteed during emergency situations. This means that if the disaster disrupts the network infrastructure, users must rely on alternative methods.

Another limitation affects the emergency response coordinators as they can only access the dashboard on a laptop due to the complexity of the interface and its inability to scale effectively to a mobile screen. A mobile screen lacks sufficient visual space to effectively display the full range of dashboard content. This restricts the devices the coordinators can use and limits where they can access the application during emergencies. However, coordinators are aware of this issue and can create plans to work around this limitation.

7.1.4 Testing Setbacks

On the first day of scheduled preliminary testing, we encountered another major setback: our team had difficulty uploading the application correctly to the organization's Microsoft Teams applications. Members testing the application were unable to use the full functionality of the application and forced us to postpone testing, which further reduced the time available for making revisions, analyzing test results, and conducting additional rounds of testing. These delays ultimately limited our ability to refine the application as thoroughly as intended.

While we were unable to test the app that day, management was able to use that time for an emergency evacuation training session (see Figure 6.1). During the training, the emergency director outlined the designated assembly points outside the building and specified who was responsible for confirming that all staff had exited safely, a procedure that most staff had not fully understood beforehand. He also reviewed the items included in the designated safety kits shown in Figures 7.2-7.5, where staff did not indicate they knew the use of these items. This observation demonstrates that SolidarityNow staff would benefit from more frequent practice scenarios and stronger overall emergency preparedness. Our application can support this preparedness by giving staff an additional tool to use during training exercises, helping them build the knowledge and confidence needed to stay safe during a real evacuation.

Figure 7.1 Emergency Coordinator Giving Evacuation Training

Figure 7.2 Radios, Vest and Other Safety Gear

Figure 7.3 UNHCR First Aid Kit and Ready Kit

Figure 7.4 Ready Kit Contents

Figure 7.5 UNHCR First Aid Contents

7.2 Recommendations

We offer the following recommendations based on our work designing, implementing, and evaluating the communication application for SolidarityNow. They incorporate findings from our research, development process, and user testing to support continued improvement and long-term use of the system.

7.2.1 Assign a Knowledgeable Staff Member

SolidarityNow should assign a dedicated staff member with PowerApps expertise to maintain and update the application. To ensure long-term functionality, SolidarityNow should assign a staff member within the IT department who has experience in Microsoft PowerApps and capable of maintaining the system. Findings from Section 4.2.3 show that delays in relaying information and confirming safety were among the most frequently reported issues, each identified by half of the

participants in Figure 4.8. Addressing these challenges requires a system that reliably manages real-time updates and structured data. Because the application integrated multiple components, including SharePoint lists and automated workflows, maintaining its functionality will require technical assistance from time to time. Additionally, organization-specific data, such as mapped locations and team structures, will need periodic updating. Assigning a knowledgeable staff member will ensure that this individual performs these updates efficiently and that the system continues to support effective emergency communication.

7.2.2 Incorporating the Application into Training Scenarios

SolidarityNow should integrate the application into regular evacuation training scenarios to improve user familiarity and effectiveness. Interview findings in Section 4.2.1 show that staff members have varying levels of experience with emergencies. Furthermore Figure 4.6 implies that some interviewees have no direct experience while others have participated in active or post-disaster situations. Additionally, observations from Section 4.1 describe emergency environments as chaotic, particularly in the Athens Solidarity Center where high levels of occupancy, noise, and movement created a high-stress atmosphere during normal operations. These findings indicate that staff may struggle to effectively use unfamiliar technology during real emergencies. Incorporating the application into training scenarios will allow users to become comfortable with its features in controlled conditions.

7.2.3 Expanding Application Features to Improve Communication

Future development should expand application features to improve communication clarity, urgency, and accessibility. Findings from Section 4.2.2 illustrate that while Microsoft Teams is the most commonly used platform (Figure 4.7 illustrates that 80% of interviewees use Microsoft Teams), it does not guarantee that users will see messages immediately. This limitation in Microsoft Teams contributes to communication gaps, as further supported by Section 4.2.3, where half the participants identified delays in relaying information and confirming safety as important factors to consider in a communications app. In some cases, delayed information placed staff in dangerous situations, with one interviewee describing how the team directed them toward an area that had already become hazardous. Additionally, Figure 4.9 in Section 4.2.4 reveals that interviewees would like clear and simple communication, with 90% requesting straightforward instructions and an

easy-to-use interface. These findings suggest that future improvements should include marking Teams notifications as urgent, so they repeat if unanswered, adding multiple links to emergency websites on the dashboard to cross-examine information, and implementing automatic translation from Greek to English for multilingual communication. These features directly address the communication barriers identified and would improve the application’s ability to show accurate and timely information during emergencies.

8.0 Conclusion

Through observations at our sponsor's centers, as well as interviews and prototype testing with our SolidarityNow colleagues, our team developed an emergency communication application, Echo, to support staff in coordinating responses during emergencies. Visits across multiple center locations revealed both the operational realities of emergency response and the challenges faced by staff responsible for supporting vulnerable populations in these settings.

When first asked about the current emergency communication methods, several staff members in the organization had a different answer depending on the location's communication style and individual's past experiences. Multiple offices relied on walking to each room informing people there was an emergency and having someone stay behind to check for empty rooms. This reliance on individual responsibility places additional cognitive and physical pressure on staff in already high-stress situations. It also introduced inconsistency in response, potentially delaying action when clarity is most critical. As the emergency director noted, "You might not feel it, but the work you've done will make a difference for us," highlighting the perceived value of a more structured and reliable system.

While the immediate focus is on improving staff coordination during crises, the broader impact extends to the vulnerable individuals they support. In moments of uncertainty, the clarity and confidence of staff responses play a key role in shaping the sense of safety experienced by those in their care. For individuals already struggling with language barriers, trauma, or uncertainty, effective communication becomes essential to maintaining trust and stability. In this context, the app's value is not just about how it functions, but about how it helps staff respond in a calm, coordinated, and reassuring way during emergencies.

Bibliography

Agyepong, L. A., & Liang, X. (2022). Mapping the Knowledge Frontiers of Public Risk Communication in Disaster Risk Management. *Journal of Risk Research,* 26(3), 302–323. https://doi.org/10.1080/13669877.2022.2127851

F. Álvarez, L. Almon, H. Radtki and M. Hollick, "Bluemergency: Mediating Post-disaster Communication Systems using the Internet of Things and Bluetooth Mesh," 2019 IEEE *Global Humanitarian Technology Conference (GHTC)*, Seattle, WA, USA, 2019, pp.1-8, doi: 10.1109/GHTC46095.2019.9033063.

Bangi, D. E. (2012). Characterization of Hazards, Vulnerability and Risk of Disaster Management. *Advances in Environmental Biology,* 6(3), 955-966. https://www.researchgat e.net/pub lication/292 049151_Characterization_of_hazards_vulnerabi lity_and_risk_of_disaster_management

Barrantes, S. A., RodrIguez, M., Pérez, R., Agencia Española de Cooperación Internacional para el Desarrollo., Canadian International Development Agency., Pan American Health Organization., & United States. (2009). Information Management and Communication in Emergencies and Disasters: Manual for Disaster Response Teams. *Pan American Health Organization*. Retrieved on February 28, 2026 from, https://iris.paho.org/items/59433890-3d1e-44d5-baff-a5b5d8caa87c

Begg, J. G., Mouslopoulou, V., Heron, D., & Nicol, A. (2025). AFG - Active Faults Greece: A Comprehensive Geomorphology-Based 1:25,000 Fault Database. *Scientific Data*, 12(1), 1853. https://doi.org/10.1038/s41597-025-06283-z

Diakakis, M., Xanthopoulos, G., & Gregos, L. (2016). Analysis of forest fire fatalities in Greece: 1977–2013. *International Journal of Wildland Fire,* 25(7), 797–809. https://doi.org/10.1071/WF15198'

Diakakis, M., Sarantopoulou, A., Gogou, M., Filis, C., Nastos, P., Kapris, I., Vassilakis, E., Konsolaki, A., & Lekkas, E. (2025). Cascade Effects Induced by Extreme Storms and Floods: The Case of Storm Daniel (2023) in Greece. *Water*, 17(7), 912. https://doi.org/10.3390/w17070912

EM-DAT, & CRED/UCLouvain. (n.d.). *Timeseries of Natural Disasters Statistics* 980-2024 [Dataset]. Retrieved February 6, 2026, from https://climateknowledgeportal.worldbank.org/country/greece/natural-disasters-historical

FEMA. (2014). *Communicating in an emergency.* Retrieved March 6, 2026, from https://training.fema.gov/emiweb/is/is242b/student%20manual/sm_03.pdf

Gray, B. J., & Colling, M. (2021). Understanding Interoperability in Humanitarian Aid Organizations. In A. Adrot, R. Grace, K. Moore, & C. W. Zobel (Eds.), ISCRAM 2021 conference proceedings: *18th International Conference on Information Systems for Crisis Response and Management.* ISCRAM (pp. 439-447) Virgina Tech. https://idl.iscram.org/files/brionygray/202 1/2345_BrionyG ray%2BMatthewColling2021.pdf

Garnett, J. L., & Kouzmin, A. (2007). Communicating Throughout Katrina: Competing and Complementary Conceptual Lenses on Crisis Communication. *Public Administration Review*, 67(s1), 171–188. https://doi.org/10.1111/j.1540-6210.2007.00826.x

Intergovernmental Panel on Climate Change. (2023). *Climate change 2023: Synthesis report.* Retrieved on February 2, 2026 from, https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_FullVolume.pdf

Jan, M. A., Ullah, S. I., Ullah, W., Ullah, S., Ali, A., Hisham, T., Fernando, T., & Saeed, M. (2025). Testing and evaluation of Pakistan's pioneer disaster risk communication app: A case study of PDMA Madadgar android-based app. *Frontiers in Communication*, 10. https://doi.org/10.3389/fcomm.2025.1572206

Kapucu, N. (2006). Interagency Communication Networks During Emergencies: Boundary Spanners in reagency Coordination. June 2006, 36(2), 207-225. https://doi.org/10.1177/027507400528060 5

Kangana, N., Kankanamge, N., De Silva, C., Mahamood, R., Ranasinghe, D., & Goonetilleke, A. (2025). Harnessing Mobile Technology for Flood Disaster Readiness and Response: A Comprehensive Review of Mobile Applications on the Google Play Store. Urban Science, 9(4), 106. https://doi.org/10.3390/urbansci9040106

Lasda, O., Dikou, A., & Papapanagiotou, E. (2010). Flash Flooding in Attika, Greece: Climatic Change or Urbanization? *Ambio*, 39(8), 608–611. https://doi.org/10.1007/s13280-010-0050-3

Luglio, M., Monti, C., Saitto, A., & Segal, M. (2006, May). Interfacing Satellite Systems and Ad Hoc Networks for Emergency Applications. In *Third Advanced Satellite Mobile Systems Conference.* https://www.semanticscholar.org/paper/Interfacing-Satellite-Systems-and-Ad-hoc-Networks-Luglio-Monti/46549a94a479aa27ec50ec38b521126f66b1f6ef

Luna, S., & Pennock, M. J. (2018). Social media Applications and Emergency Management: A Literature Review and Research Agenda. International Journal of Disaster Risk Reduction, 28, 565–577. https://doi.org/10.1016/j.ijdrr.2018.01.006

Lune, H., & Berg, B. L. (2021). A Dramaturgical Look at Interviewing. In *Qualitative research methods for the social sciences* (9th ed.). Pearson.

Madianos, M. G., & Evi, K. (2010). Trauma and Natural Disaster: The Case of Earthquakes in Greece. *Journal of Loss and Trauma,* 15(2), 138–150. https://doi.org/10.1080/15325020903373185

Manoj, B. S., & Baker, A. H. (2007). Communication Challenges in Emergency Response. *Communications of the ACM, 50*(3), 51–53. https://doi.org/10.1145/1226736.1226765

Ma, C., Qirui, C., & Lv, Y. (2023). "One Community at a Time": Promoting Community Resilience in the face of Natural Hazards and Public Health Challenges. *BMC Public Health*, 23(1), 2510. https://doi.org/10.1186/s12889-023-17458-x

Natarajan, N., & Hooks, E. (2023). When Disaster Strikes, Emergency Communicators Need to Get Connected and Stay Connected. Cybersecurity and Infrastructure Security Agency. Retrieved March 6, 2026, from https://www. cisa.gov/news-events/news/when-disaster-strikes-emergency-communicators-need-get-connected-and-stay-connected

Refugee Support Aegean. (2024). Refugee Camps in Mainland Greece. Retrieved March 4, 2026, from https://rsaegean.org/en/refugee-camps-in-mainland-greece/

Ritchie, H., Rosado, P., & Roser, M. (2022). *Natural Disasters- How many people die from disasters, and how are these impacts changing over time?* Retrieved February 13, 2026, from https://ourworldindata.org/natural-disasters

Roberts, L. (2019). Communication During Disaster Recovery: Communications Sector Guidance Note. *Global Facility for Disaster Reduction and Recovery, World Bank.* https://www.gfdrr.org/en/publication/communication-during-disaster-recovery

SolidarityNow. (2026). *SolidarityNow.* Retrieved on February 18, 2026 from, https://www.solidaritynow.org/en/

Stamouli, N. (2025, September 20). Europe's Climate Refugees: The Greek Communities Wiped Off the Map. *Politico* https://www.politico.eu/ar ticle/europe s-cli mate-refugees-the-greek-villages-wiped-off-the-map/

Tsinidis, G., & Koutas, L. (2025). Geotechnical and Structural Damage to the Built Environment of Thessaly Region, Greece, Caused by the 2023 Storm Daniel. *Geotechnics*, 5(1). https://doi.org/10.3390/geotechnics5010016

UNHCR. (2026, June 16). Estimated Number of Refugees from Ukraine Recorded in Europe and Asia since February 2022 as of May 2025, by Selected Country [Graph]. In *Statista.* Retrieved February 18, 2026, from https://www.statista.com/statistics/1312584/ukrainian-refugees-by-country/

UNHCR. (2025a, June 30). Estimated Number of Refugees and Asylum Seekers in selected European Countries in 2024 [Graph]. In *Statista.* Retrieved February 18, 2026, from https://www.statista.com/statistics/1622772/top-refugees-asylum-seekers-europe/

UNHCR. (2025b). Ranking of the Largest Syrian Refugee-hosting Countries in end-2024 [Graph]. In *Statista.* Retrieved February 18, 2026, from https://www.statista.com/statistics/740233/major-syrian-refugee-hosting-countries-worldwide/

UNHCR. (2025c). *Greece Fact Sheet.* https://www.unhcr.org/sites/default/files/2025-10/bi-annual-fact-sheet-2025-09-greece.pdf

Walton, A. A., Marr, J., Cahillane, M. J., & Bush, K. (2021). Building Community Resilience to Disasters: A Review of Interventions to Improve and Measure Public Health Outcomes in the Northeastern United States. *Sustainability*, 13(21), 11699. https://doi.org/10.3390/su132111699

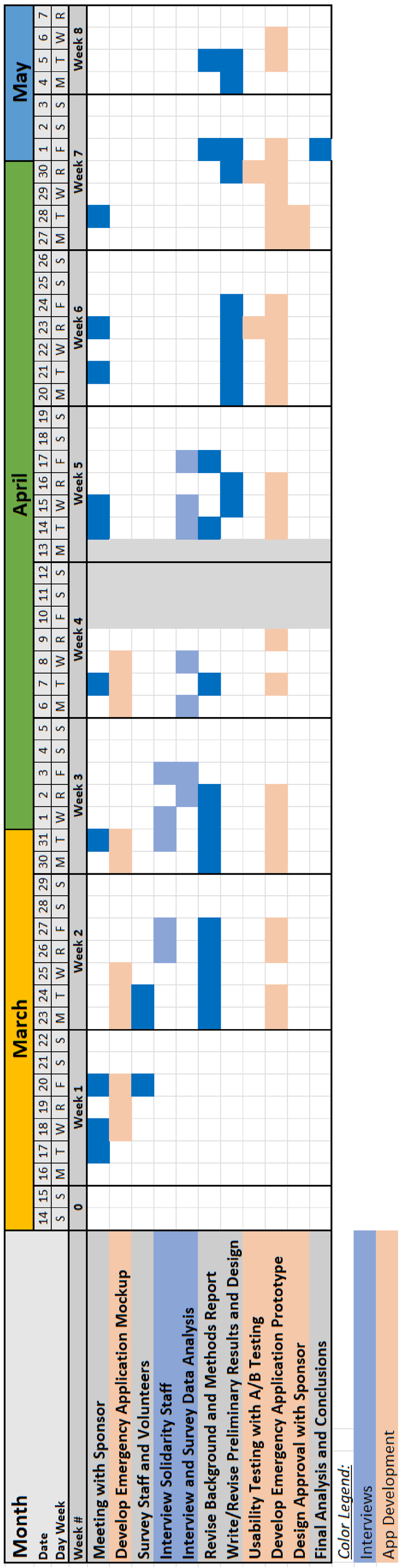
World Meteorological Organization. (2023, September 14). Storm Daniel leads to Extreme Rain and Floods in Mediterranean, Heavy Loss of Life in Libya. https://wmo.int/media/news/storm-daniel-leads-extreme-rain-and-floods mediterranean-heavy-loss-of-life-libya

Zavvos, S., & Polena, M. (2023). *SolidarityNow Annual Report* (No. 23; p. 89). SolidarityNow. https://www.solidaritynow.org/wp content/uploads/2025/09/annual-2023 - ENG.pdf

Zhou, L., Wu, X., Xu, Z., & Fujita, H. (2018). Emergency Decision Making for Natural Disasters: view. *International Journal of Disaster Risk Reduction*, 27, 567–576. https://doi.org/10.1016/j.ijdrr.2017.09.037

Zikeloglou, I., Lekkas, E., Lozios, S., & Stavropoulou, M. (2024). Community's Evacuation Planning and Response for the 2021–2022 Fire Seasons in Greece. *Safety Science*, 172, 106434. https://doi.org/10.1016/j.ssci.2024.106434

Appendix A: Gantt Chart



Appendix B: Observations

March 16th , 2026

Observers: Kathryn Adiletta, Matt Di Giovanni, Sean Follis and Angelina Popp

Thessaloniki Helios+ Center : Ptolemeon 29α, 2nd floor, Thessaloniki 546 30

- Around 20 staff members
- Serves maybe around 5 benefacaries a day
- Go up several floors in a commercial building with lots of other businesses
- Locked door
- Mainly consists of offices with no open seating, except beneficiaries seating waiting to be helped

March 16th , 2026

Observers: Kathryn Adiletta, Matt Di Giovanni, Sean Follis and Angelina Popp

Athens Headquarters: Monis Petraki 4, Athina 115 21

- ~ 10 Staff (some were out due to the Greek Independence Day)
- Composed of office workers, no vulnerable population present
- Smaller than HELIOS Center, two floors, one larger conference room
- Slower paced compared to the Helios Center, similar to the one we are based in
- Lobby receptionist did not speak English
- Dimly lit in areas, darker furniture
- Mainly open spaces with offices/departments separated by half walls
- Bulletin boards with office notices and documents (emergency evacuation package, ect)

March 16th , 2026

Observers: Kathryn Adiletta, Matt Di Giovanni, Sean Follis and Angelina Popp

Athens Solidarity Center: Domokou 2, Athina 104 40

- Serve 30-40 people per day
    - Waiting room can hold 50 people
- Free services
    - 100 staff & volunteers
    - 3 social workers
    - 4 lawyers
        - Most services are for people who just came to Greece or have expired papers
    - HW Support for 14-17 yr olds
    - Employability Services
    - Children creative space
        - Books, ping pong table
        - Accounting
    - Psychologist– 2, 1 active
    - 4 translators (combined more than 10 languages)
        - Farsi, Arabic, French
- Fast pace, many people walking around
- Loud in lobby so private rooms remain closed so that you can hear the conversations
- Much more important for us to wear our badges around this center
- Vulnerable population in house services
- Arguing can be heard while in the hallways, people clearly are very passionate about what issues they are trying to solve
- Much brighter, white walls, good lighting
- Offices/departments are separated with closed doors, only waiting area and lobby are open areas
- Often answering emergency phone calls

April 3rd , 2026
Observers: Kathryn Adiletta, Matt Di Giovanni, Sean Follis and Angelina Popp
Thessaloniki Premises: I. Koletti 25D, Thessaloniki 564 27

- Conference room hosts: Seminars, trainings, other organizations
- Currently has menstrual health program funded by government (ministry of health, + ++)
- There is a counseling department
- Teach about menstrual health for children from 12-16
- Support Parents in group sessions to helm with the role of a parent
- Training about AI happening currently (free training) – 2 counselors
- Female friendly space, parenting activities, learn skills, three other locations with this
- Safe work, job exploration for women happening currently
- While appt in center, children have place to play (Children Friendly Space, CFS)
- Storage room that has donations (clothes soaps, essential items)
- Internet corner for new people to contact family that they're finally in Greece and safe
- Front desk is coordinator of appointments
- 40 beneficaries come into office, can be more
- Less than 30 office workers right now, depends on the programs happening
- Always have social workers, lawyers, and job counseling
- 15 staff members will always be working
- People in waiting room around 5

Appendix C: SolidarityNow Staff Interview Consent forms and Questions

Interview Consent

We are students from Worcester Polytechnic Institute, Massachusetts, USA, working with SolidarityNow to develop a safety communication app that will assist SolidarityNow in providing real-time communication between members during evacuations. We are conducting interviews to help us gather information related to one or more of the following project objectives:

1. Compare existing safety communication applications to evaluate their effectiveness and feasibility.
2. Investigate past experiences and challenges of fieldworkers and emergency directors during evacuations.
3. Design a communication solution for evacuation messaging.
4. Test and evaluate the communication solution.

This interview will take approximately 45 minutes. Your participation is completely voluntary, and you may stop the interview at any time or refuse to answer any questions that we ask. This interview is confidential—no names or identifying information will appear in any project reports or publications *unless* you have explicitly agreed to have your name published.

With your permission, we will be audio recording this interview and using the recording for transcription purposes.

Should you have any questions or concerns upon completion of this interview, we can be reached at gr-solidaritynow-d26@wpi.edu or through our advisors Melissa Butler (mbutler@wpi.edu) and Robert Kinicki (rek@wpi.edu). For more information about this research or about the rights of research participants, please contact Ruth McKeogh irb@wpi.edu.

Verbal Consent

Do you consent to this interview?

Do you consent to having this interview recorded?

Interview Question

B1. Can you describe your role at SolidarityNow?

B2. Can you describe your experience (practice or actual) during a past evacuation or emergency?

B2.1. What worked well, what did not?

B2.2. What was the disaster?

B2.3. Were you currently assisting people while this occurred? If yes, how did you manage their needs and what steps did you take to guide them to safety?

B3. Can you provide your impression of how communication typically works (practice or actual) during an emergency?

B3.1. How do you receive updates?

B3.2. How do you confirm others are safe?

B4. Have you experienced miscommunication during an evacuation (practice or actual)?

B4.1. Explain the circumstances

B4.2. How did this affect you and impact your role?

B5. Are there delays in relaying information between fieldworkers and office staff? If so, what kinds of delays have you experienced? How often would you say these kinds of delays occur?

B6. Can you describe a time when you ever felt you did not have enough information to make a decision related to an evacuation or evacuation practice?

B6.1. What would have helped you be more confident?

B7. What information is most critical to communicate quickly?

B8. Are there specific features you would look for in an emergency communication app?

All Interviewee Transcipts Are Located in "Master Document with all Interview"

Appendix D: Interview Questions and Responses - UI/UX and Emergency Communication

Transcriptions were unavailable at the time, interview summarized using bullet points. Questions denoted by italicized font.

Interviewee: WPI Human-Computer Interaction Professor
Interviewers: Katie Adiletta, Matt Di Giovanni
Notetakers: Sean Follis, Angelina Popp
Date: February 6, 2026

C1.Experience with UI/UX design in emergency communication applications

- Focus on minimizing round trip times of using the apps
- Make things standard so that there are templates into free form text
- Full restrictions make it much worse since we can never predict all the cases

\

C2.Are there UI/UX patterns that work well in time-critical systems?

- UX log (Robustness principle) being able to accept input from user in multiple value forms
- We don’t want the use to have to conform to it
    - Multiple ways to send an SOS or incidents
- Be very consistent and restrictive in what we output
    - Standard for color danger levels, sorting of messages – should be consistent to let users more easily understand what's going on
    - Don’t want to cause cognitive overload
- High consequences choices should have confirmations
    - Make sure the information they are validating is still visible

C3. How would you recommend designing interfaces to support quick decision making?

- Templating (such as fill in the blank)
- Free form textboxes that fills in the box (mini programming language – i.e., auto complete) - Makes it easier to get quick at it
- Figure out the norms of the messages
- People will tend to fit into the norms of the apps

C4. Are there any resources, case studies, or tools you would recommend we investigate as we continue this project?

- 2016 Hawaii missile false positive
    - Links to decide what each was, tests and real issues are combined, so the alert went to everyone when someone clicked real issue
    - No confirm or cancel page
    - Good case study for what not to do
- Fire rescue (walkie talkie phone app)
- Participatory design (qualitative research methods)
    - Interaction/design.org
    - Nielson Norman group, UX design site

C5.What are your opinions on the “Are You Safe” application?

- Popup isn't needed, you should use a drop down box
- Filter the people out for the “who send to”
    - Typing name should automatically do it and add it to top and keep typing to add more
    - Only use checkboxes if less than 7 options
- Meta data for sorting categories of emergencies
    - Need a tagging system (for example, tags for different disasters to quickly select them)
    - Users can make their own tags

C6. Where should the placement of SOS and Incident

- Hard to click if you’re left-handed (on the “Are You Safe” application)
    - Make it easier to click accessibility options
    - Might not want to make the SOS easy to hit to avoid false positives
    - If you only have one hand to use (holding something with the other hand) you should still be able to use the app
- Panel in the bottom right/left that expands when clicked on
- SOS in top right means you need to use two hands which makes it harder to accidentally click
- Is accidental press a realistic risk (experimentally validate this)
    - Force them to put their phone in the pocket unlocked to see if it sends something
    - Could compare to emergency phone call on our phones

C7. What testing strategies are there for evaluating applications?

- Timing how long it takes to report an incident (Key performance indicator KPI)
    - Time on task
- Think aloud
    - Instances or Time (some count) of searching vs navigating vs doing
    - You want to eliminate searching, minimize navigating, and decide what can't be optimized
    - Searching: I know what I want to do but don't know how to do it
    - Navigating: I know what I want to do and I know where it is and I'm doing the necessary work to get there
        - Minimize time by providing macros that combine steps
    - Doing: Minimal amount of work that you can't optimize (writing the message to send to people)
- Make several paper mockups first here while in ID2050 (A B testing) to try with people
- Trade and Grade (Did they get stuck at any points on the app)
- Look at the categories

Appendix E: App Testing Consent Form

App Testing Consent

We are students from Worcester Polytechnic Institute, Massachusetts, USA working with SolidarityNow to develop a safety communication app that will assist SolidarityNow in providing real-time communication with office workers and fieldworkers during evacuations. We are conducting tests to help us gather information related to one or more of the following project objectives:

1. Compare existing safety communication applications to evaluate their effectiveness and feasibility.
2. Investigate past experiences and challenges of fieldworkers and emergency directors during evacuations.
3. Design a communication solution for evacuation messaging.
4. Test and evaluate the communication solution.

This study will take approximately 20 minutes. Your participation is completely voluntary, and you may stop the study at any time or refuse to answer any questions that we ask. This study is confidential—no names or identifying information will appear in any project reports or publications unless you have explicitly agreed to have your name published.

Should you have any questions or concerns upon completion of this study, we can be reached at gr-solidaritynow-d26@wpi.edu or through our advisors Melissa Butler (mbutler@wpi.edu) and Robert Kinicki (rek@wpi.edu). For more information about this research or about the rights of research participants, please contact Ruth McKeogh irb@wpi.edu.

Written Consent

By typing your name below, this will be an electronic signature stating that you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

_____ *Date:* _____

Study Participant Signature

_____ *Date:* _____

Signature of Person who explained the study

Appendix F: Scenarios For Application testing

EMERGENCY APPLICATION FOR ASSISTANCE IN THE EVACUATION AND SAFETY OF SOLIDARITYNOW ERT STAFF WHEN IN DISTRESS.

Subject: Trials for the review and testing of the prototype application development.

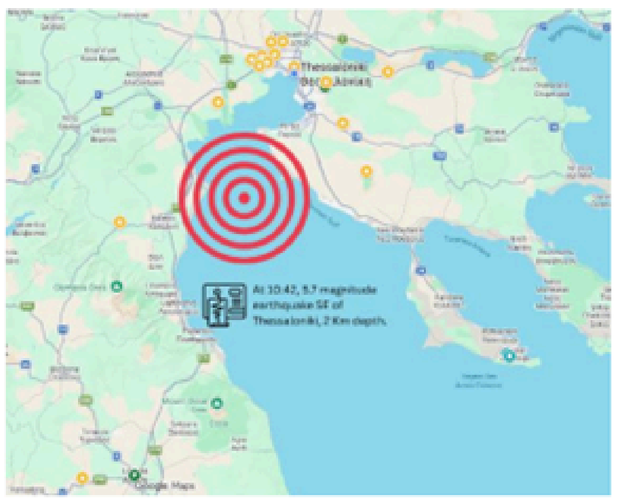
Date of trial: 23/04/2026

Location: Thessaloniki, HELIOS+ center, Ptolemaion 29A 2nd floor.

Testers/volunteer SN staff: Sotiris Perperidis, Triantafyllos Matziris, Nikolas Stavridis, Kelly Kati, Rafaella Kargiou, Katerina Katsina, Ilias Alexandridis, Amir Karimi, Alexandros Agorastos, Kostantina Chatzoudi.

<u>Scenario A:</u>

An earthquake has occurred in the vicinity of the Thermaikos bay on 23/04/2026 at 10:42 of a scale of 5.7 R and with a depth of 2km from the surface. The 112 number has been sent to all citizens mobile phones notifying them to move to open spaces and take cover in an orderly manner. The exercise is to abide by the existing evacuation plan that the center already has, and follow the instructions to get the team to the designated muster point of assembly as seen on the plan.

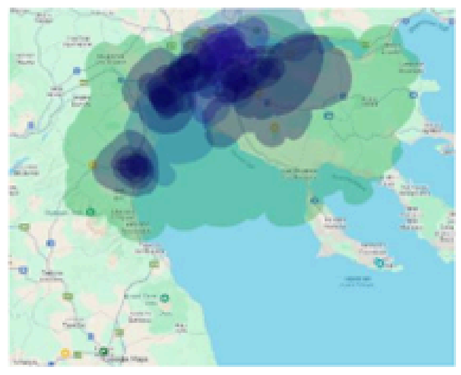


Once the team has been accounted for and is safe from falling debris and buildings, they are to send via their Emergency application a notification, requesting assistance from SolidarityNow's Emergency Response Coordinator. All 10 team members must send a complete send of their request through the application, to establish an initial communication with the Emergency Response Coordinator. The team leader of the group will await further instructions, and once confirmed the drill will be concluded and the team will head back to the office.

Total drill estimated time 40 minutes.

Scenario B:

Northern Greece has been facing some bad weather over the past week. Yesterday's forecast indicated severe rainfall and winds in the area of Central Macedonia, raising the Meteoalarm to RED but without any other bulletin from the prefecture. All staff was indicated that office hours will continue as usual, so they are in office as usual, whilst outside the storm is now raging. On 23/04/26 at 14:00 local time the Prefecture issues an urgent warning to all residents of Thessaloniki, Katerini and Chalkidiki, to stay indoors and avoid needless travel. Residents of Thessaloniki are warned that there is a risk of flooding in the areas of downtown and advises people to move to higher ground. At this time the Emergency Response Coordinator identifies the risk to staff and through the dashboard of the application, issues a check-in status of all the staff members affected by the storm.



The team is then requested to send individually a check-in status reply to the request issued to them. Once complete the team leader will receive instructions from the ERC and the drill will be concluded.

Total drill estimated time 20 minutes.