

D1.10 - Toolkit's Specs and Architecture

v2.00 - 31.01.2023



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101021957

The material presented and views expressed here are the responsibility of the author(s) only. The EU Commission takes no responsibility for any use made of the information set out.

DOCUMENT SUMMARY INFORMATION

Grant Agreement No	101021957	Acronym	NIGHTINGALE
Full Title	Novel InteGrated toolkit for enhanced pre-Hospital life support and Triage IN challenGing And Large Emergencies		
Start Date	01/10/2021	Duration	36 months
Project URL	https://www.nightingale-triage.eu		
Deliverable	D1.10 – Toolkit’s Specs and Architecture		
Work Package	WP1 - Practitioners Needs & Toolkit Architecture and Design		
Deliverable type	Report	Dissemination Level	Confidential
Due Date of Deliverable	31/07/2022	Actual Submission Date	31/01/2023
Deliverable Identifier	D1.10	Deliverable Version	v2.00
Lead Beneficiary	ASTRIAL		
Authors	Evangelos Sdongos (ASTRIAL)		
Co-authors	Dimitra Dionysiou (ICCS), Giorgos Hadjipavlis (ICCS), Kostantinos Stavrou (ICCS), Nikos Mitro (ICCS), Eleftherios Ouzounoglou (ICCS), Gustav Tolt (FOI), Marianela García Lozano (FOI), Claudio Poretti (LDO), Filopoimin Lykokanellos (INTRA), Konstantinos Nikolopoulos (INTRA), Kostis Gerakos (INTRA), Louai Tayyar (INTRA), Sofia Tsekeridou (INTRA), Tiago R. Silva (INOV), Joana Rosa (INOV), Paulo Chaves (INOV), Fernando Piedade (INOV), Nuno Antunes (INOV), Maria Plakia (EXUS), Vasilis Papadopoulos (EXUS), Alberto Garcia (UPV), Francisco Jose Perez Carrasco (UPV), Federico Jesus Carvajal Rodrigo (UPV), Zoe Vasileiou (CERTH), Stefanos Vrochidis (CERTH), Jorge Forcada (DW), Paco Martínez (DW), Marco Manso (PARTICLE), Barbara Guerra (PARTICLE), Pedro Miguel (PARTICLE), Alfonso Álamo (TREE), Roberto Díaz (TREE), Cristina Luengo (TREE), Marta Caviglia (UPO), Antonis Kostaridis (ASTRIAL), Dimitris Goumas (ASTRIAL), Dimitris Diagourtas (ASTRIAL), Akhil Kumar (ASTRIAL), Muhammad Ali (ASTRIAL), Raahim Bukhari (ASTRIAL)		
Reviewers	Diana Santos (INOV), Tiago Rocha da Silva (INOV), Gustav Tolt (FOI), Konstantinos Nikolopoulos (INTRA), Maurizio Martignano (UCSC), Georgios Kolionis (EXUS)		
Security Assessment	<input type="checkbox"/> Passed	<input type="checkbox"/> Rejected	<input checked="" type="checkbox"/> Not Required
Status	<input type="checkbox"/> Draft	<input checked="" type="checkbox"/> Peer Reviewed	<input checked="" type="checkbox"/> Coordinator Accepted

DISCLAIMER

NIGHTINGALE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101021957. The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the European Union. The European Commission is not responsible for any use that may be made of the information contained herein.

HISTORY OF CHANGES

Version	Date	Changes
-	15/12/2021	Technical info collectors requested for all tools
-	11/05/2022	Technical info collectors gathered
0.01	22/08/2022	First version of ToC to be discussed among tech partners
0.02	15/09/2022	ToC finalisation and request for inputs
0.03	30/09/2022	1 st version of inputs received by technical partners
0.04	10/10/2022	Consolidation and request for inputs to tech partners
0.05	02/11/2022	2 nd version of inputs received by technical partners
0.06	17/11/2022	Consolidation and request for inputs to tech partners
0.07	30/11/2022	3 rd version of inputs received by technical partners
0.08	05/12/2022	Consolidation and request for inputs to tech partners
0.09	21/12/2022	4 th version of inputs received by technical partners
1.00	16/01/2022	Pre-final version to be peer reviewed (appointed reviewers and Executive Board)
2.00	31/01/2023	Final version delivered for submission

PROJECT PARTNERS

No.	Logo	Partner	Short name	Country
1		INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	ICCS	Greece
2		TOTALFORSVARETS FORSKNING SINSTITUT	FOI	Sweden
3		LEONARDO – SOCIETA PER AZIONI	LDO	Italy
4		C4CONTROLS LTD [TERMINATED]	C4C [TERMINATED]	UK [TERMINATED]
5		NETCOMPANY-INTRASOFT	INTRA	Luxembourg
6		INOV INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES, INOVACAO	INOV	Portugal
7		EXUS SOFTWARE MONOPROSOPI ETAIRIA PERIORISMENIS EVTHINIS	EXUS	Greece
8		UNIVERSITAT POLITÈCNICA DE VALÈNCIA	UPV	Spain
9		ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	CERTH	Greece
10		DEVERYWARE	DW	France
11		PARTICLE SUMMARY	PARTICLE	Portugal
12		TREE TECHNOLOGY SA	TREE	Spain
13		EUROPAISCHE GESENLLSCHAFT FUR TRAUMA -UND AKUTCHIRURGIE - ESTES	ESTES	Austria
14		INTERNATIONAL MRMID ASSOCIATION	MRMID	Sweden
15		UNIVERSITA DEGLI STUDI DEL PIEMONTE ORIENTALE AMEDEO AVOGADRO	UPO	Italy
16		ASSISTANCE PUBLIQUE HOPITAUX DE PARIS	APHP-SAMU	France
17		UNIVERSITA CATTOLICA DEL SACRO CUORE	UCSC	Italy
18		MINISTERO DELL' INTERNO	MININT	Italy
19		AZIENDA SANITARIA LOCALE N 2 SAVONESE	ASL2	Italy
20		MAGEN DAVID ADOM IN ISRAEL	MDA	Israel
21		CARR COMMUNICATIONS LIMITED	CCL	Ireland
22		ASSOCIAZIONE CITTADINANZATTIVA ONLUS	CA	Italy
23		INTERDISCIPLINARY CENTER (IDC) HERZLIYA	IDC	Israel
24		ASTRIAL GmbH	ASTRIAL	Germany

LIST OF ACRONYMS

Acronym	Definition
3D	3-Dimensional
AI	Artificial Intelligence
AP	Application Provider
API	Application Programming Interface
AR	Augmented Reality
BT	Bluetooth
C3I	Command, Control, Coordination, and Intelligence
CAD	Computer-aided Dispatch
CAP	Common Alerting Protocol
CC	Control Centre
CI/CD	Continuous Integration Continuous Development
CNN	Convolutional Neural Networks
COP	Common Operating Picture
CPU	Central Processing Unit
DIKE	Resources and Assets Optimisation Service
DTT	Digital Triage Tag
ED	Emergency Department
EDRA	Emergency Department Resource Allocation
EHR	Electronic Health Record
FRW	First Responder Wearable
FSX	Full Scale Exercise
FTP	File Transfer Protocol
GCS	Ground Control Station

GCS	Glasgow Coma Score
GIS	Geographical Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GUI	Graphical User Interface
HD	High definition
HMI	Human Machin Interface
HQ	Headquarters
HTTPS	Hypertext Transfer Protocol Secure
HUD	Head Up Display
ID	Identity Document
IMS	Incident Management System
IMU	Inertial Measurement Unit
IS	Information System
JWT	JSON Web Token
KPI	Key Perfomance Indicator
LED	Light Emitting Diode
LIT	Laboratory Integration Test
MCI	Mass Casualty Incident
MCU	Multipoint control unit
MQTT	Message Queuing Telemetry Transport
MSISDN	Mobile Station Integrated Services Digital Network
NFC	Near Field Communication
NG-PSAP	Next Generation - Public Safety Answering Point
NIT-MR	Novel Integrated Toolkit for Medical Response

PEMEA	Pan-European Mobile Emergency Application
PIM	PSAP Interface Module
PPG	Photoplethysmography
PSP	PSAP Service Provider
QR	Quick Response
RBAC	Role-based access control system
REST	REpresentational State Transfer
RTT	Real-Time-Text
SoS	System of Systems
SSD	Solid State Drive
SSL	Secure Sockets Layer
SSX	Small Scale Exercise
TLS	Transport Layer Security
TSS	Thermographic Scanning System
TTX	Tabletop Exercises
TVSA	Triage and Vital Signs App
TVSD	Triage and Vital Signs Dashboard
UAR-SAS	Unmanned Aerial Rapid Scene Assessment System
UAR-TIS	Unmanned Aerial Remote Triage Indicator and vital parameter estimation System
UC	Use Case
UML	Unified Modelling Language
VMS	Video Management Server
VSE	Vital Signs Earplug

Executive Summary

The NIGHTINGALE Research and Innovation Action – *Novel InteGrated toolkit for enhanced pre-Hospital life support and Triage IN challenGing And Large Emergencies* – as its title indicates, addresses the Preparedness and the Response phase of Mass Casualty Incidents (MCI). The primary objectives of the project are to enhance triage of patients, to optimise resource utilisation, to facilitate decision making and to increase multi-agency communication, collaboration, coordination, and information sharing. Furthermore, the project aspires to deliver a novel paradigm for MCI handling which on one hand considers newly developed common denominators in the triage and pre-hospital care processes and on the other hand exploits the merits of a beyond the state-of-the-art technological Toolkit, all previous at the service of the entirety of civil protection agencies across the command chain, who participate in such major incidents.

The present deliverable builds the fundamental building blocks for the delivery of such technological Toolkit. In other words, all design aspects are addressed herein, namely the definition and the functionalities of the information systems, devices and applications constituting the NIGHTINGALE Toolkit, its functional architecture and the interdependencies/interactions among tools being part of such a system of systems, the positioning of the entirety of NIGHTINGALE tools with respect to its operators (i.e., actors) and the discrete phases of the MCI in which are used and, last but not least, the tools’ system requirements.

Additionally, the present deliverable, provides the methodological framework for the technical work to follow in the project. As such we define the development steps, the design loops and the integration, testing and validation activities that the project shall implement within its rich programme of table-top and field exercises towards delivering a next generation toolkit to enhance MCI handling.

The overall goal of this document is to set the basis for the development and integration stages of the NIGHTINGALE Toolkit whilst allowing users to have a detailed view of the technology that can support life-saving interventions and decision making in an incident setting where resources will always be less than those needed.