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D6.9

Communications kit Final

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PP	Restricted to other programme participants	
RE	Restricted to a group specified by the consortium	
CO	Confidential, only for members of the consortium	



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0.1	20/05/2020	Third update of the communications kit description – draft	ICCS
0.2	25/05/2020	Feedback received from ATE	ATE
1.0	04/06/2020	Final version	ICCS

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Abbreviations and Acronyms

Acronym	Definition
EC	European Commission
PO	Project officer
GA	Grant Agreement
WP	Work Package
ITS	Intelligent Transport Systems
Dx.x	Deliverable



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Executive Summary

This document is the description of the third and final version of the D6.2 Communication kit, which is prepared within WP6 Communication, Dissemination and Exploitation of INFRAMIX project.

INFRAMIX helped to prepare road infrastructure to support the coexistence of conventional and automated vehicles. More specifically, INFRAMIX designed, upgraded, adapted and tested both physical and digital elements of the road infrastructure. The key outcome is a “hybrid” road infrastructure, able to handle the transition period and become the basis for future automated transport systems. The project development were assessed via both simulation and real stretches of advanced highways. this resulted on safeguarding that the proposed adaptations do not jeopardize safety, efficiency and quality and also ensure users’ appreciation.

The Communication kit has been developed to support the effective dissemination of results and findings that came out within the project. This deliverable, D6.9, has been prepared as an update of D6.8 Communication material - second version, enriched with new material, so as to target all different types of audiences in this third project’s phase. In particular, D6.9 Communications kit _ Final consists of the brand identity, the leaflet, the poster, the roll-up banner, the general presentation, the e-newsletters, the videos, the brochure as well as technical posters that were presented during the second workshop and the final event as well. D6.9 resulted after periodic updates on the produced material and this is the final report.



1. Introduction

During the third year of the INFRAMIX project, the communication kit continues informing the public, as well as the relevant search, academic and industrial community on the project's general concept, including the outcomes and present the results of the project. The INFRAMIX outcomes are the basis for the development of the communication kit and the communication and dissemination strategy in general. In this final phase, the communication kit on a large scale has been developed, however in this version the main materials have been updated so as to effectively reflect the INFRAMIX results in future dissemination and exploitation opportunities.

The communication kit content was designed carefully to be flexible and adaptable to a wide range of dissemination requirements. During the project's lifetime, the consortium partners were encouraged to make recommendations for improvements as well as suggestions for new ideas arising from the kit elements' use. More specifically, the communication kit, as has been configured, includes the project brochure, banner, general presentation, e-newsletters and finally promotional videos. This kit was yearly updated (M12, M24, M36).

In this third version, is presented the communication kit is presented as is shaped and developed to the end of the project (M36). The updated communication kit is available in both the online repository the consortium uses and the official INFRAMIX website as well, in the Dissemination material webpage [here](#).

1.1 Intended readership

This Deliverable is disseminated internally, within the consortium, and also externally, to any interested parties out of the project. The intended readership primarily comprises the members of the INFRAMIX consortium, the European Commission (EC) as well as the INFRAMIX Project Officer (PO). The specific document could be used as a point of reference by all partners in order to use the appropriate material, safeguard the INFRAMIX brand identity and disseminate effectively the project even after its end.

1.2 Relationship with other INFRAMIX deliverables

This Deliverable lies in D6.2 Communications kit, while is closely related to D6.6 Communication Strategy and Plan, as well as to its updates, D6.8, D6.7 respectively.

2. Communication kit

2.1 INFRAMIX Brand Identity

From the beginning of the project, an INFRAMIX brand identity (Annex 1) was designed to communicate the project in a consistent way, safeguarding the homogeneity. The brand identity, consisted of the project logo, a tagline, as well as the relevant fonts and colors created a clear and recognizable brand. Relevant templates, as Word and PowerPoint template, were designed to be used by all consortium partners in presentations, deliverables and other INFRAMIX activities. The brand identity, the logo manual as well as all the INFRAMIX templates are stored in the online repository to be available to all partners.

2.2 INFRAMIX leaflet

The INFRAMIX leaflet (Annex 1) was designed and published for first time within TRA Conference 2018 in Vienna where INFRAMIX had a strong presence. More specifically, the leaflet included the objectives and the expected impact of the project, the traffic scenarios that



will be investigated as well as images from the two test sites in Spain and in Austria (including pictures of its equipment). The main contact points (the project coordinator and the dissemination manager) of the project, the partners, the website and the INFRAMIX social media were also included in the leaflet. A first update of the leaflet took place in the framework of ITS World Congress 2018 so as to include new pictures and elements which resulted from the project's evolution. A second update was made for the 1st INFRAMIX Stakeholders Workshop, in order to include new partners' logos. A final update of the leaflet was prepared in order to highlight the INFRAMIX results and outcomes. In particular, the final version of the leaflet included the main concept of the project, the INFRAMIX use cases, as well as the key achievements. Furthermore, the leaflet's images on tests, in this third version, were collected from the two real tests that took place in Spain and Austria.

The INFRAMIX leaflet has been selected as one of the most effective materials to disseminate the project after the end of its lifetime. The general idea of the leaflet is to present the project briefly and in a comprehensible way, so as to inform all targeted audiences about INFRAMIX. The leaflet has been updated according to the projects' need and included in the online repository.

2.3 INFRAMIX poster

INFRAMIX poster has as objective to promote the project mainly in the scientific community and secondly in the general public. To reach this objective, the poster has been adjusted to the project's site in terms of language, text and visual elements. It is used at conferences, exhibitions and public meetings. Due to its low weight in transfer and its wide variety in sizes, it is often preferable from partners.

The first version of the INFRAMIX poster was developed and published in the TRA Conference 2018 in Vienna. It was designed in line with the INFRAMIX brand identity and the communication guideline. It has been updated in the framework of ITS World Congress and stored in the online repository.

The poster (Annex 1) includes information such as the INFRAMIX's general idea, the objectives, the expected impact and the interim major results as well as the partners, the main contact points, the website and the social media of INFRAMIX project. A second update of the INFRAMIX poster was updated for the EUCAD Conference.

In order to get aligned to the INFRAMIX presence on specific events, such as the INFRAMIX workshops and the final event, further posters were developed during the third year of the project, focusing on specific aspects and results and in particular on the three INFRAMIX scenarios.

2.4 INFRAMIX roll-up banner

The roll-up banner aims to present the project, its objectives and results mainly in conferences, addressing a more scientific audience. To reach this objective effectively, a roll-up banner (Annex 1) was designed in the second version of the communication kit in accordance with the INFRAMIX visual identity as well as with the already developed dissemination material.

The roll-up banner was firstly used within the 1st INFRAMIX Stakeholders' Workshop, providing more details about the project's concept, focusing on the three scenarios to be followed and also giving the opportunity to all attendees to find out more about INFRAMIX by providing all available INFRAMIX channels and also the contact details.

The roll-up banner in this third version has been updated, expanded with key results as the projects is coming to end. In particular, we combined the INFRAMIX outcomes with simple icons, to summarize effectively the project's results and in parallel to be catchy and comprehensible to all audiences. The updated banner (Annex 1) is available in the online repository the consortium uses as well as in the official INFRAMIX website.



2.5 INFRAMIX general presentation

In order to provide a homogenous image of the project to the external actors and the public, a standard presentation of the project (Annex 1) has been prepared. The presentation may be used integral by partners, or take some basic slides in order to prepare their individual presentations when participating in external events.

The presentation follows the INFRAMIX format and includes the following information: the project's objectives and facts, the consortium, the main activities and the expected impact. It also provides all the information to access the project's website and social media as well as to contact the project's representatives. The presentation has been updated regularly depending on the project's progress and the achieved results and is stored in the online repository and website.

2.6 INFRAMIX e-newsletters

The project published periodic e-newsletters on important milestones of INFRAMIX in order to support the ongoing needs of the project after launching all the project's activities. The newsletter's objective is to summarize the project's activities and outcomes and to proactively initiate conversations with multiple stakeholders about on-going research topics. The e-newsletters (Annex 1) include information about the project's process and will address both scientific community as well as SMEs and Industry. A mailing list has been created, including all the people that expressed their interest about INFRAMIX project and specifically its newsletter according to the recent GDPR rules. INFRAMIX has already issued four e-newsletters, available at the INFRAMIX website [here](#), as well as in the online repository the consortium uses. In addition, several e-blasts have been prepared and sent to the INFRAMIX list in order to announce events such as the INFRAMIX Stakeholders' Workshops and the Final Event, and encourage receivers to register.

2.7 INFRAMIX promotional videos

The INFRAMIX project within its duration provided two videos so as to communicate the INFRAMIX messages in an easy and impactful way. The videos are available on the project's website and social media, as well as on other available channels and platforms, such as YouTube, forums supporting the project's realization, the partners' websites e.t.c. The videos have also been displayed in relevant events and conferences where INFRAMIX participates or organizes.

More specifically, during the first year of the project's lifetime, the first version of the video was prepared. Taking into consideration the lack of results at that time, the video focused more on the promotion of partners participating in INFRAMIX and their affiliation to the project's activities, as well as the general information of the project.

The first INFRAMIX video (Annex 1) was realized and presented in various events in the English language. It is stored in the INFRAMIX account on YouTube in order to be available for all partners and visitors. It was also broadcasted in the [ITS World Congress](#) 2018 at the project stand and the EUCAD Conference 2019 and on other prominent events so as to disseminate the project.

Within the third year of the project the video was updated so as to reflect the INFRAMIX results and solutions as well as to disseminate the project's effectiveness. More specifically, the new version, presents in almost 5 minutes the whole INFRAMIX story, including the tests, the scenarios that were tested, as well as the results that came out and the contribution of INFRAMIX in road infrastructure for mixed traffic flows. The final INFRAMIX video was broadcasted during the INFRAMIX Final Webinar and is stored in the INFRAMIX official website [here](#) and [YouTube channel](#) as well.



2.8 INFRAMIX brochure

In addition to the project's leaflet, a more informative brochure (Annex 1) was provided. The INFRAMIX brochure has been developed and uploaded in the online repository as well as in the official INFRAMIX website [here](#). It is a 12 page booklet which contains extensive information of the project and its activities.

The INFRAMIX brochure was distributed in different occasions and exhibitions so as to provide more specific information of the project in interested parties. The INFRAMIX brochure was distributed within the 1st Stakeholders' Workshop, as well as in the EUCAD Conference 2019 and other external events that INFRAMIX partners participated.

As INFRAMIX is coming to an end and given that we already have a project's leaflet, we concluded that the leaflet is more simple, easy-to-share and provides all the information compiled. For this, the brochure will not be further updated in this third version of the communication kit.

2.9 INFRAMIX paper description

According to the partners' needs specific dissemination material is prepared and added in the INFRAMIX communication kit. The INFRAMIX paper description (Annex 1) was developed and used to cover the needs of the INFRAMIX representation in Maven conference.

The INFRAMIX paper description is an A4 document, consisted of 4 pages, which briefly presented main information about the project, such as the concept, the objectives and expected results as well as presented the two test-sites and also the three scenarios for vehicle traffic flows.

The INFRAMIX paper description is available in the online repository the consortium uses and in the INFRAMIX website [here](#).

3. Conclusion

In order to summarize, INFRAMIX project has developed a communication kit so as to support all the communication and dissemination activities of the project. The main aim of the kit is to communicate the project, its activities and results in an effective way and make the results and deliverables of the project available to all potential audiences.

The present deliverable presents all the material consisting the final communication kit. All material follows a coherent visual scheme, based on INFRAMIX visualization, that allows INFRAMIX to promote its brand identity.

The communication kit is a live kit, which was carried on evolving alongside the project as has been indicated in the Grant Agreement. While moving to the "after the project's end" period, the kit was mainly content-wised updated in order to strongly reflect the project's evolution and results and also to be adjusted to the specific INFRAMIX audiences and occasions.



Annex 1 – Communication kit

Brand Identity

INFRAMIX Logo



Logo manual (indicative pages)






INFRAMIX

LOGO MANUAL
CONTENTS

1. INFRAMIX logo
2. Color palette
3. Logo variations
4. Brand typography
5. Right logo usage



INFRAMIX

This guide is designed to help us use correctly the **INFRAMIX** logo. It will also be useful aid when instructing typographers and others employed to produce branded items, to design and create INFRAMIX communications material.

In order to maintain the integrity of our identity and what it represents it is important to apply all the elements of the toolkit properly and consistently.




1 INFRAMIX LOGO
LOGO ELEMENTS

LOGOTYPE




The **INFRAMIX** logo is composed by the symbol design and the logotype in a vertical orientation. Lines represent different elements on road infrastructure, mixed in a straight line in order to communicate everything together.

2 INFRAMIX LOGO
COLOR PALLETTE




main colors



C 100, M 90, Y 25, K 11 C 66, M 10, Y 16, K 0
R 35, G 57, B 117 R 66, G 160, B 204

additional colors



C 67, M 45, Y 6, K 0 C 31, M 20, Y 8, K 0 C 21, M 18, Y 18, K 0 C 7, M 3, Y 28, K 0
R 94, G 129, B 185 R 172, G 188, B 211 R 202, G 198, B 197 R 237, G 237, B 195

MAIN and ADDITIONAL COLORS

CMYK COLOR PALLETTE IS USED IN **PRINTING** MATERIAL

RGB COLOR PALLETTE IS USED ON **WEB** APLLICATIONS

Additional color palette can be used for layouts and artworks such as website/posters/leaflets e.t.c. These colors can not replace logotype official colors.



<p>HEADING 1 Century Gothic, 18pt, black colors</p> <p>HEADING 2 Century Gothic Bold, 16pt, blue colors (R35-G57-B117)</p> <p>HEADING 3 Century Gothic Bold, 14pt, blue colors (R35-G57-B117)</p> <p>HEADING 4 Century Gothic Bold, 12pt, blue colors (R35-G57-B117)</p> <p>Body text Century Gothic Regular, 11pt, black colors</p>	<p>3 INFRAMIX LOGO BRAND TYPOGRAPHY</p> <p>For leaflets and other communication material</p>
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INFRAMIX leaflet

  INFRAMIX project
 @INFRAMIX  INFRAMIX project

Partners

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INFRAMIX

Preparing road infrastructure for mixed vehicle traffic flows

 This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 72301A.

www.inframix.eu



INFRAMIX is preparing the road infrastructure to support the coexistence of conventional and automated vehicles. The key outcome is a hybrid road infrastructure able to handle the transition period and become the basis for future automated transport systems. To achieve this goal INFRAMIX employed new advanced microscopic traffic flow models, advanced simulation techniques, innovative control strategies, as well as appropriate new and adapted existing physical and digital infrastructure elements. All were cross validated against user appreciation and safety performance leading among others to a novel road infrastructure classification scheme.

INFRAMIX ACHIEVEMENTS

- Designed new and upgraded existing physical & digital road infrastructure elements;
- Developed a co-simulation environment;
- Designed and implemented novel traffic estimation, monitoring and control strategies;
- Developed hybrid testing system;
- Designed novel signaling and visualization elements;
- Evaluated users' appreciation and acceptance;
- Evaluated traffic safety;
- Created a Road Infrastructure Classification Scheme;

8 DIFFERENT USE CASES

Scenario 1: Dynamic Lane

Assignment (incl. speed recommendations)

1. Real time lane assignment under dynamic penetration rate of automated vehicles
2. Exceptional circumstances e.g. adverse weather conditions
3. A conventional vehicle drives on a dedicated lane for automated vehicles

Scenario 2: Roadworks zones

4. Single lane closure (e.g. short term constructions)
5. New lane design (e.g. long term constructions)

Scenario 3: Bottlenecks

6. Automated vehicles driving behaviour adaptation in real time at sags
7. Lane change advice to connected vehicles at bottlenecks
8. Lane change advice combined with flow control at bottlenecks for all vehicles

Real tests on modern highways



autopistas
an Abertis company

Girona
(Spain)




ASFiNAG

Graz
(Austria)




INFRAMIX poster



INFRAMIX

<https://www.inframix.eu>


@inframix INFRAMIX project



INFRAMIX will help prepare road infrastructure to support the coexistence of conventional and automated vehicles.

Its main objective is to design, upgrade, adapt and test both physical and digital elements of the road infrastructure. The key outcome will be a "hybrid" road infrastructure able to handle the transition period and become the basis for future automated transport systems. The project developments will be assessed via simulation and on real stretches of advanced highways. This will help to ensure that the proposed adaptations will not jeopardize safety, quality of service, efficiency and will be appreciated by the users.

INFRAMIX builds on three traffic scenarios: **dynamic lane assignment, roadworks zones and bottlenecks**. INFRAMIX addresses mainly highways, as they are expected to be the initial hosts of mixed traffic, but the key results can also be transferred to urban roads.



Cases, expected impacts and interim major results

- Adaptation and development of simulation environments for mixed traffic scenarios
- Linking simulation environments to real traffic test sites (hybrid testing)
- Development, implementation and validation of traffic state estimation and traffic control algorithms for mixed vehicle traffic
- Specification of digital and physical elements (e.g. new visual signs) of the road infrastructure
- Evaluation of users' appreciation
- Evaluation of proposed INFRAMIX infrastructure measures with regards to traffic safety and efficiency
- Development of safety performance criteria for road infrastructure in mixed traffic
- Development of an infrastructure classification scheme for automated transport (similarly to the SAE levels of automation)
- Roadmap towards the long term vision of automated transport


Simulation framework


Model interaction


Traffic situation modelling					Vehicle behaviour modelling				
Microscopic traffic models	Traffic simulation	ADMs	CDM	Signal control	Vehicle control	Vehicle control	Vehicle control	Vehicle control	Vehicle control
INTEGRATED TRAFFIC CONTROL					INTEGRATED TRAFFIC CONTROL				


INFRAMIX Management Center


Partners


























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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 720014.

INFRAMIX scientific posters

Inframix is preparing road infrastructure to support the coexistence of conventional and automated devices with enhanced traffic flow efficiency, safety and user appreciation.

INFRAMIX 3 traffic scenarios

1

- Real-time lane assignment under dynamic penetration rate of automated vehicles
- Exceptional traffic situations, adverse weather conditions
- A conventional vehicle drives on a dedicated lane for automated vehicles.

2

- Single Lane Closure (short-term constructions)
- New Lane Design (long-term constructions)

3

- Automated vehicles driving behavior adaptation in real time at sags
- Lane-Change Advice to connected vehicles at bottlenecks
- Lane-Change Advice combined with Flow Control at Bottlenecks for all vehicles.

INFRAMIX solutions

Inframix designed, upgraded, adapted and tested both physical and digital elements of the road infrastructure.

Traffic management solutions

Bidirectional Communication V2X

Digital infrastructure

Physical infrastructure

Infrastructure classification scheme

Safety performance (SIPa)

Use cases & scenario models

Roadmap

INFRAMIX consortium

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 723016.

INFRAMIX 3 traffic scenarios

1

DYNAMIC LANE ASSIGNMENT



- Real-time lane assignment under dynamic penetration rate of automated vehicles
- Exceptional traffic situations, adverse weather conditions
- A conventional vehicle drives on a dedicated lane for automated vehicles.



MORE ABOUT INFRAMIX

VISION

Prepare road infrastructure to support the coexistence of conventional and automated devices with enhanced traffic flow efficiency, safety and user appreciation

MISSION

Design, upgrade, adapt and test both physical and digital elements of the road infrastructure.



Join INFRAMIX

www.inframix.eu [@inframix](https://twitter.com/inframix) [INFRAMIX project](https://www.linkedin.com/company/inframix-project) info@inframix.eu



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INFRAMIX 3 traffic scenarios

2**ROADWORK ZONES**

- Single Lane Closure (short-term constructions)
- New Lane Design (long-term constructions)



MORE ABOUT INFRAMIX

VISION

Prepare road infrastructure to support the coexistence of conventional and automated devices with enhanced traffic flow efficiency, safety and user appreciation

MISSION

Design, upgrade, adapt and test both physical and digital elements of the road infrastructure.



Join INFRAMIX

www.inframix.eu [@inframix](https://twitter.com/inframix) [INFRAMIX project](https://www.linkedin.com/company/inframix-project) info@inframix.eu



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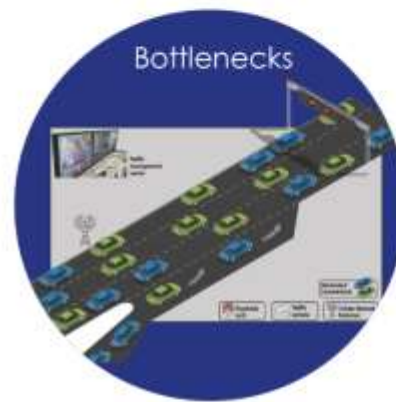
INFRAMIX 3 traffic scenarios

3

BOTTLENECKS



- Automated vehicles driving behavior adaptation in real time at sags
- Lane-Change Advice to connected vehicles at bottlenecks
- Lane-Change Advice combined with Flow Control at bottlenecks for all vehicles.



MORE ABOUT INFRAMIX

VISION

Prepare road infrastructure to support the coexistence of conventional and automated devices with enhanced traffic flow efficiency, safety and user appreciation

MISSION

Design, upgrade, adapt and test both physical and digital elements of the road infrastructure.

**Join INFRAMIX**

www.inframix.eu [@inframix](https://twitter.com/inframix) [INFRAMIX project](https://www.linkedin.com/company/inframix-project) info@inframix.eu



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INFRAMIX roll-up banner

INFRAMIX

Road infrastructure ready for mixed vehicle traffic flows

Traffic management systems
 New users & business models
 Bidirectional communication (V2X)
 Roadworks
 Safety performance metrics
 Digital infrastructure
 Infrastructure adaptation solutions
 Physical infrastructure

To help prepare road infrastructure to support the coexistence of conventional and automated devices with enhanced traffic flow efficiency, safety and user appreciation.

At a Glance

www.inframix.eu | info@inframix.eu
[INFRAMIX project](#) | [@inframix](#) | [INFRAMIX project](#)

Coordinator:
 austriatech – Federal Agency for Technological Measures
 Martin Dümmler
 Dissemination Manager:
 INIDE SOLUTIONS S.L.
 David Quevedo

Work programme:
 Horizon 2020
 Starting date:
 01/06/2017
 Duration: 36 Months
 Budget/EEI contribution:
 4.899.403,75 euro

Partners

austriatech | Fraunhofer IISG | AISI/FINAIG
 virtual vehicle | TomTom | autopistas
 enjde | TECHNISCHE UNIVERSITÄT DUISBURG ESSEN | SIEMENS
 Siemens logo: *Empowering the world*

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 733016.



INFRAMIX general presentation (indicative slides)

Road Infrastructure ready for mixed vehicle traffic flows

Speaker's name / affiliation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723514.

INFRAMIX project facts

Duration: 7 June 2017-31 May 2020
 EC Funding: 5M €
 Coordinator: Austriatech
 Consortium: Austriatech, ICCI, ASFINAG, Fraunhofer, Siemens, Virtual Vehicle, Aberfer, Enide, Technical University of Crete, TomTom, BMW

Website: <https://www.inframix.eu/>
 Social media: [@inframix](#), [inframix project](#)

Real tests

2 modern highways for real tests

Girona (Spain) | Graz (Austria)

Traffic situation	Spain	Austria	Hybrid testing	Co-simulation environment
Dynamic Lane Assignment	X			X
Prognosis		X	X	X
Emergency	X	X	X	X

Keep track on INFRAMIX

- Website: <https://www.inframix.eu/>
- Twitter: [@inframix](#)
- LinkedIn: [inframix project](#)
- Sign up to our newsletter: <https://lists.inframix.eu/www/subscribe/news>
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INFRAMIX video

Final version

https://www.youtube.com/watch?time_continue=1&v=80KOzWcn2SE&feature=emb_logo



First version

<https://www.youtube.com/watch?v=fbU1FujU9u4>





INFRAMIX brochure






Which are the INFRAMIX objectives?

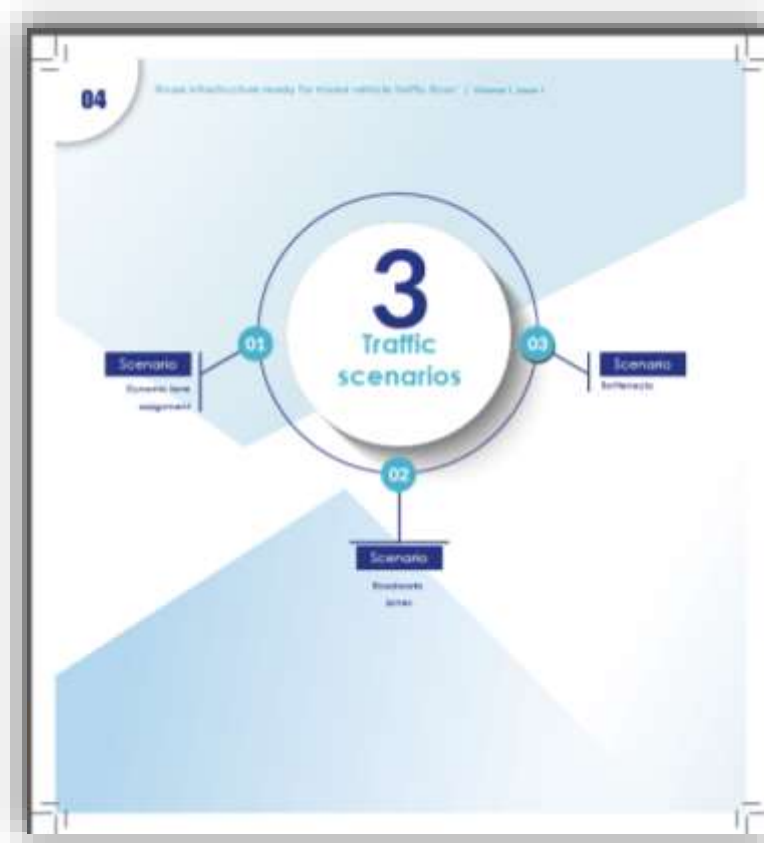

03

- Design new and update existing physical & digital road infrastructure elements.
- Develop a co-simulation environment combining the modeling of the vehicle behaviour with the traffic simulation to examine mixed traffic scenarios under various penetration rates of automated vehicles.
- Design and implement novel traffic automation, monitoring and control strategies.
- Develop hybrid testing system: coupling infrastructure elements and vehicles on real roads with virtual traffic environment including representative mixed traffic situations.
- Design novel signaling and visualization elements.
- Evaluate traffic safety and user's appreciation.
- Create a Road Infrastructure Classification Scheme.

Short-term vision



Long-term vision






05

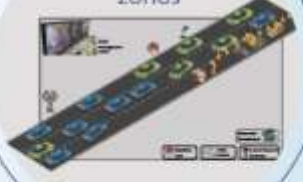
- Real-time lane assignment under dynamic penetration rate of automated vehicles
- Exceptional traffic situations-adverse-weather conditions
- A conventional vehicle drives on a dedicated lane for automated vehicles

Dynamic lane assignment



- Single Lane Closure (e.g. short term constructions)
- New Lane Design (e.g. long term constructions)


Roadworks zones



06

Road infrastructure ready for mixed vehicle traffic flow (Source: [link])

Bottlenecks



- Automated vehicles driving behaviour adaptation in real time at sags
- Lane-Change Advice to connected vehicles at bottlenecks
- Lane-Change Advice combined with Flow Control at bottlenecks for all vehicles

07

Real tests in modern highways

Co-simulation environment
combines the modeling of the behavior with the traffic simulation

IC+S

Hybrid testing: coupling infrastructure elements and vehicles on real roads with virtual traffic environment

08

Fixed infrastructure nodes for mixed vehicle traffic (Spain) | Antonio J. Aguilar

The Spanish test site is located within the Mediterranean Corridor between Barcelona and the French border. The specific highway segment is over 20km of four-lane carriageway. Each lane is 3.5m wide. The internal hard shoulder is 1m and the external hard shoulder is 2.5m. The highway median is 5m wide (on average). The test site includes four intersections and a 180m tunnel. The Average Daily Traffic (ADT) in this section was around 30,000 vehicles per day in 2016, and the speed limit is 120km/h.

The currently available ITS equipment includes different types of VMSs, video cameras, Bluetooth antennas, and magnetic sensors for measuring occupancy and 1 Weather station. ITS-G5 short range communication and cellular communication are available at the test site, and a proprietary Fibre Optic ring network with 10 Gb bandwidth connects all the equipment from the test site to the IMC in real-time.



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The **Austrian test site** includes 20km of A2 motorway between Laßnitzhöhe and City of Graz. The test site is equipped with gantries, mobile VMS, roadworks warning equipment, ITS-G5 RSUs, video cameras (traffic management, single vehicle detection), single-vehicle counters, environmental sensors and radar detection. It enables testing of newly developed visual information, ITS-G5 short-range communication, cellular communication and real-time communication with the traffic control center. The infrastructure is based on a fibre-optic network that provides IP-based network connectivity to gantries.

The additional intention of the Austrian test site is to provide for each test run the complete precise trajectories of the tested vehicle as well as all vehicles in the surrounding traffic for the testing party to analyse. The data can be played back via a 3-D simulation tool.

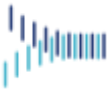
10 Road infrastructure ready for mixed vehicle traffic flow | INFRAMIX | 2018

**INFRAMIX
expected
impact**

As the construction of new roads is an expensive and time consuming project while Europe has already a quite mature road network, and considering the fact that roads have a quite long lifecycle (especially compared with vehicles), the only way to prepare our existing road network for automation is through targeted interventions both physical and digital. This is even more important for the long transition period where we expect a step by step introduction of automation and mixed traffic on roads with different capabilities and installed equipment. In this respect, INFRAMIX is expected to have an important impact as it will deliver specific solutions with tangible integrated interventions, both physical and digital. These will be tested and validated beforehand through the use of innovative modeling technologies (new traffic flow models and advanced simulation tools) guaranteeing this way their efficiency, traffic safety but also users' appreciation and acceptance.

This set of interventions will be adaptable and incremental to cope with a variety of existing infrastructure (old, new, etc.) and diverse traffic scenarios (percentage of automated vehicles, of connected vehicles etc.). The fact that they will also be tested in quite demanding scenarios on the actual road networks of the consortium partners will ensure that the proposed scenarios will be realistic and aligned with modern road design and engineering principles.

Moreover, INFRAMIX will propose a scheme for classifying road infrastructure into "automation-appropriate" levels by listing connectivity and automation capabilities of each road segment, while informing road users about its capability to host automated



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Key expected results

Road infrastructure for mixed traffic	<ul style="list-style-type: none"> New traffic signs for mixed traffic Novel traffic monitoring recommendations (wireless message extension)
Infrastructure Classification Scheme	<ul style="list-style-type: none"> Assessment of the infrastructure connectivity, automation capabilities, capability to host vehicles of different levels of automation and connectivity A guide of how to incrementally upgrade levels of infrastructure to avoid stranded investments
Simulation platform	<ul style="list-style-type: none"> Investigation of several cases with safety critical impact Testing of innovative traffic control algorithms With increased traffic densities in ecological conditions With different rates of conventional and automated vehicles
Hybrid testing system	<ul style="list-style-type: none"> Testing of new developments of connected and automated driving Simulation of critical traffic situation in a safe artificial environment

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PARTNERS

PROJECT FACTS

Project title: Road infrastructure ready for mixed vehicle traffic, flexion

Starting Date: 01/06/2017

Duration: 36 Months

Budget (EU funding): 5.000.000 €

We are on the Web!

www.inframix.eu

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INFRAMIX project

@inframix

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INFRAMIX paper description (A4)

“Road infrastructure ready for mixed vehicle traffic flows”

What is INFRAMIX ?

INFRAMIX is an EU funded project in the framework of ART-05-2016 ‘Road infrastructure to support the transition to automation and the coexistence of conventional and automated vehicles on the same network’. Its full title is ‘Road infrastructure ready for mixed vehicle traffic flows’ and its duration is 36 Months (June 2017–May 2019).

Within the project, 11 partners collaborate targeting to design, upgrade, adapt and test both physical and digital elements of the road infrastructure, ensuring an uninterrupted, predictable, safe and efficient traffic.

To meet this high-level objective INFRAMIX is working on different technologies, combining simulation, traffic flow modelling, traffic estimation and control algorithms e.t.c. This work includes ways of informing all types of vehicles about the control commands issued by the road operator and the proposal of new kind of visual and electronic signals for the needs of mixed scenarios.

The outcomes will be assessed via simulation and in real stretches of advanced highways. Key aspects considered throughout the project will be to ensure that the proposed adaptations will not jeopardize safety, quality of service, efficiency and will be appreciated by the users.

To achieve its objectives INFRAMIX selects a bottom-up approach. Instead of working in generic solutions with questionable impact, it builds on three specific high value (in terms of importance for traffic efficiency and safety) traffic scenarios, namely “dynamic lane assignment”, “roadworks zones” and “bottlenecks”.

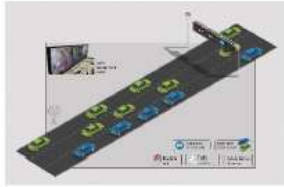

INFRAMIX objectives

- Design new and update existing physical & digital road infrastructure elements;
- Develop a co-simulation environment; combining the modelling of the vehicle behaviour with the traffic simulation to examine mixed traffic scenarios under various penetration rates of automated vehicles
- Design and implement novel traffic estimation, monitoring and control strategies;
- Develop hybrid testing system; coupling infrastructure elements and vehicles on real roads with virtual traffic environment including representative mixed traffic situations
- Design novel signaling and visualization elements;
- Evaluate traffic safety and user’s appreciation;
- Create a Road Infrastructure Classification Scheme

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement no 723016.

“Road infrastructure ready for mixed vehicle traffic flows”

	<p>Dynamic lane assignment (incl. speed recommendations)</p> <ul style="list-style-type: none"> • Real-time lane assignment under dynamic penetration rate of automated vehicles • Exceptional traffic situations-adverse weather conditions • A conventional vehicle drives on a dedicated lane for automated vehicles
<p>Roadworks zones</p> <ul style="list-style-type: none"> • Automated vehicles driving behaviour adaptation in real time at sags • Lane-Change Advice to connected vehicles at Bottlenecks • Lane-Change Advice combined with Flow Control at Bottlenecks for all vehicles 	
	<p>Bottlenecks</p> <ul style="list-style-type: none"> • Single Lane Closure (e.g. short term constructions) • New Lane Design (e.g. long term constructions)

Real tests in modern highways



Co-simulation environment: combines the modeling of the behavior with the traffic simulation

Hybrid testing: coupling infrastructure elements and vehicles on real roads with virtual traffic environment



“Road infrastructure ready for mixed vehicle traffic flows”

The Spanish test site is located within the Mediterranean Corridor between Barcelona and the French border. The specific highway segment is over 20km of four-lane carriageway. Each lane is 3.5m wide. The internal hard shoulder is 1m and the external hard shoulder is 2.5m. The highway median is 5m wide (in average). The test site includes four intersections and a 180m tunnel. The Average Daily Traffic (ADT) in this section was around 30.000 vehicles per day in 2016, and the speed limit is 120km/h.

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The Austrian Test Site includes 20km of A2 motorway between Laßnitzhöhe and City of Graz. The test site is equipped with gantries, mobile VMS, roadworks warning equipment, ITS-G5 RSUs, video cameras (traffic management, single vehicle detection), single-vehicle counters, environmental sensors and radar detection. It enables testing of newly developed visual information, ITS-G5 short-range communication, cellular communication and real-time communication with the traffic control center. The infrastructure is based on a fibre-optic network that provides IP-based network connectivity to gantries.

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“Road infrastructure ready for mixed vehicle traffic flows”

INFRAMIX expected impact

As the construction of new roads is an expensive and time consuming project while Europe has already a quite mature road network, and considering the fact that roads have a quite long lifecycle (especially compared with vehicles), the only way to prepare our existing road network for automation is through targeted interventions both physical and digital. This is even more important for the long transition period where we expect a step by step introduction of automation and mixed traffic on roads with different capabilities and installed equipment. In this respect, INFRAMIX is expected to have an important impact as it will deliver specific solutions with tangible integrated interventions, both physical and digital. These will be tested and validated beforehand through the use of innovative modelling technologies (new traffic flow models and advanced simulation tools) guaranteeing this way their efficiency, traffic safety but also users' appreciation and acceptance.

This set of interventions will be adaptable and incremental to cope with a variety of existing infrastructure (old, new, etc.) and diverse traffic scenarios (percentage of automated vehicles, of connected vehicles etc.). The fact that they will also be tested in quite demanding scenarios on the actual road networks of the consortium partners will ensure that the proposed scenarios will be realistic and aligned with modern road design and engineering principles.

Moreover, INFRAMIX will propose a scheme for classifying road infrastructure into “automation-appropriate” levels by listing connectivity and automation capabilities of each road segment, while informing road users about its capability to host automated vehicles of different levels of automation and connectivity.

At the same time provide a roadmap and guidelines both for the short and for the long term (towards automated transport systems) to support infrastructure owners, road operators and relevant authorities.

Key expected results

Road infrastructure for mixed traffic	<ul style="list-style-type: none"> • New traffic signs for mixed traffic • Novel traffic monitoring recommendations (wireless messages extensions)
Infrastructure Classification Scheme	<ul style="list-style-type: none"> • Indication of the infrastructure connectivity, automation capabilities, capability to host vehicles of different levels of automation and connectivity • A guide of how to incrementally upgrade levels of infrastructure to avoid stranded investments
Simulation platform: combines the modelling of the vehicle behavior with the traffic simulation	<ul style="list-style-type: none"> • Investigation of several cases with safety critical impact • Testing of innovative traffic control algorithms <ul style="list-style-type: none"> > With increased traffic densities in exceptional conditions > With different rates of conventional and automated vehicles
Hybrid testing system: coupling infrastructure elements and vehicles on real roads with virtual traffic environment	<ul style="list-style-type: none"> • Testing of new developments of connected and automated driving • Emulation of critical traffic situation in a safe artificial environment



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INFRAMIX newsletters (indicative parts)



Dear INFRAMIX follower,

We're thrilled to present to you our first INFRAMIX Newsletter, which includes:

- An overview of the successful participation of INFRAMIX at the TRA'2018 conference:

- INFRAMIX participation highlights
- INFRAMIX presentation at the session "Connected and Automated Transport – Automated transport: enabling methods and technologies" by Dr. Angelos Amditis
- Dissemination material used during conference

- The latest updates from the project official deliverables:

- D2.1 Requirements catalogue from the status quo analysis (*)
- D2.2 Architecture and interface specification of the co-simulation environment (*)

- A video of the state-of-the-art technology and equipment of the test site in Austria.

() This document has not yet been approved by the EC services*

INFRAMIX is preparing the road infrastructure to support the transition period and the coexistence of conventional and automated vehicles. INFRAMIX main target is to design,

INFRAMIX Project

Within the INFRAMIX Project, three public deliverables have been provided until now. These documents reflect the project and its results and are written and reviewed by the project experts.

- [D.2.1 Requirements Catalogue from the Status Quo Analysis](#)
- [D.2.2 Architecture and Interface Specification of the Co-Simulation Environment](#)
- [D.5.1 Communication strategy and Plan](#)

Dissemination Material of INFRAMIX

[Here](#), you can find the dissemination material of INFRAMIX, that was developed for the TRA conference.

Austrian Test Site Video



ICCS presented the INFRAMIX project at European Road Conference



Institute of Communication and Computer Systems (ICCS) team leader Panagiotis Lytrivis presented the INFRAMIX project at the European Road Conference held in Dubrovnik from 22th – 24th October. Organized by key representative organizations of the roads & mobility sector, the European Road Conference "Corridors for Shared Prosperity & Sustainable Mobility" is an essential platform to deepen the understanding of regional mobility challenges, and achieve consensus on key policy, investment and planning measures.

Save the Date for the second stakeholders workshop!

Save the Date for the joint stakeholder workshop of [INFRAMIX](#) and [TransAID](#), about infrastructure requirements and traffic control strategies for automated driving, to be held in Graz, Austria on 8th of October 2019.



[Register here](#)



1. [ARCADE & ERTRAC Joint Stakeholder Workshop](#) February 13, 2020, Brussels, Belgium
2. [Interactive Symposium on Research & Innovation for Connected and Automated Driving in Europe](#), April 28-29, 2019, Messukeskus Helsinki
3. [HEADSTART Workshop](#), May 12, 2020, Athens, Greece
4. [L3Pilot Summer School](#), May 13-14, 2020, Athens, Greece
5. [ITS European Congress](#), May 18-20, 2020, Lisbon, Portugal

For more events relevant to INFRAMIX project, visit our [calendar](#) in the INFRAMIX website.