



AR for first responders

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FASTER consortium

- 23 partners
 - 3 Industry
 - 4 SME
 - 8 Research/Academic
 - 8 First responder
- 10 EU countries + Japan
- 3 major international pilots
- Additional local pilots



FASTER in a glimpse

Aims and Tools

FASTER aims to develop state-of-the-art technical solutions to protect first responders in complex environments while enabling them to operate in a seamless and efficient way in any environment.



Communication

5G network utilization,
Infrastructure-less
communication,
Body and Gesture based
User Interfaces,
Ad-Hoc relay networks,
Blockchain-based trusted
network



Mobiles & Wearables Situational Awareness

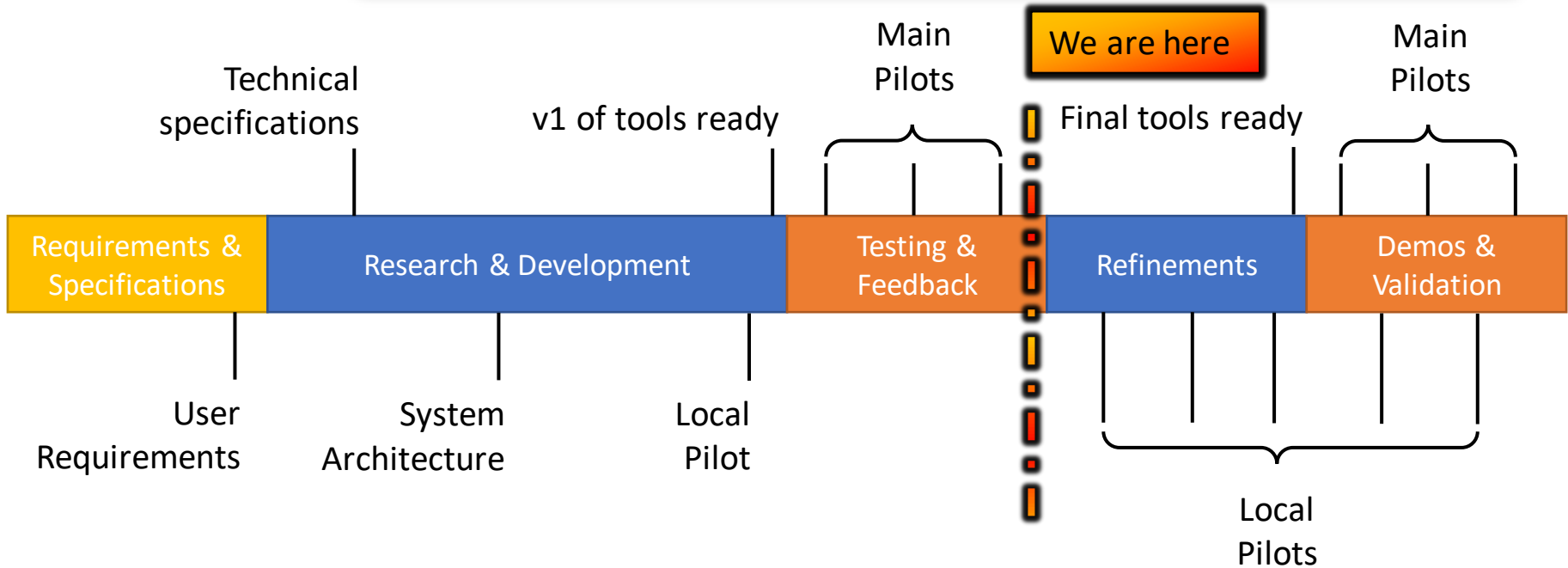
AR devices for improved
situational awareness,
Smart textiles for
bio-monitoring,
K9 wearables,
mobile mission
management



Portable Common
Operational Picture,
UAVs and UGVs for
inspection, mapping (but
also intervention),
Risk assessment utilizing
AI-based data processing



FASTER's status today

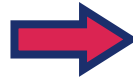


AR in FASTER

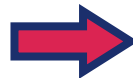
- On the field information
 - In context and up to date
 - Intuitive and non disruptive
- Situational awareness
 - Enhanced perception
 - In context
- Human-machine interface
 - Hand tracking
 - Gesture recognition



Real-time shared and geo-localized information



UAV-eXtended Vision

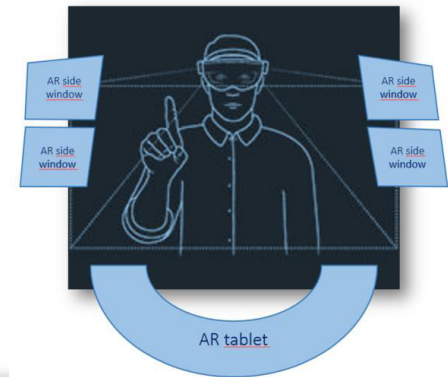
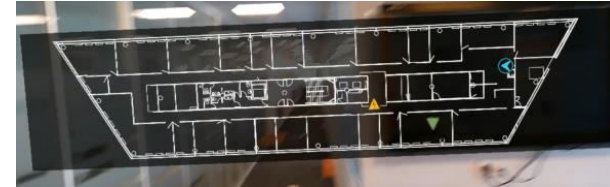


UAV Gesture Control



Real-time shared and geo-localized information

- Up to date and geo-localized information from the C2 to the AR device
 - FR and team members position
 - Identified victims
 - Usefull equipments
- Intuitive and non disruptive interaction/display study
 - Identify required/possible interactions
 - Voice – finger – physical button - Virtual Tablet
 - Define where to display the information, how long
 - In FoV, outside FoV
 - Test how to represent the information
 - Icons, colours
 - Type of map



Real-time shared and geo localized information

- Initial results: On demand map with FR position, identified risks & victims
- Aims
 - Improve situational awareness
 - Help FR to navigate
- Means
 - Real time information from C&C
 - Display information
 - On a map
 - As hologram



Real-time shared and geo localized information

• HoloLens 2 ENSOSP field tests

• AR visualisation

- Check the visibility and quality of 3D Objects
- Display colours scale
- Looking in different direction (eg: back/front to the sun)

• AR Manipulation

- Click on a AR button (different size 3*3cm // 5*5cm)
- Interaction with 3D Objects (moving, changing size ...)
- Display and menu interactions

• Voice command

- Use of simple command (open/close file, open menu, change of sound level, ...)
- Test in various noisy environments



UAV-eXtended vision

- Aims:
 - To improve situational awareness
 - To help user focus / minimize distractions
 - To allow a more versatile use of UAVs during missions
- Means:
 - To present the UAV's camera feed in AR
 - In real time
 - Optionally, in context
 - To track the UAV in AR
 - Out of direct line of sight
 - Too distant to see clearly



UAV-eXtended vision

- Contextualized video feed
 - Video feed registered with environment
 - Presented from user's point of view
- Use case
 - UAV can go look where the user can't
 - Video transform:
 - UAV POV → user POV
 - User gains X-ray-like vision in AR
- Requirements
 - UAV tracking
 - Low-latency streaming
 - Depth estimation



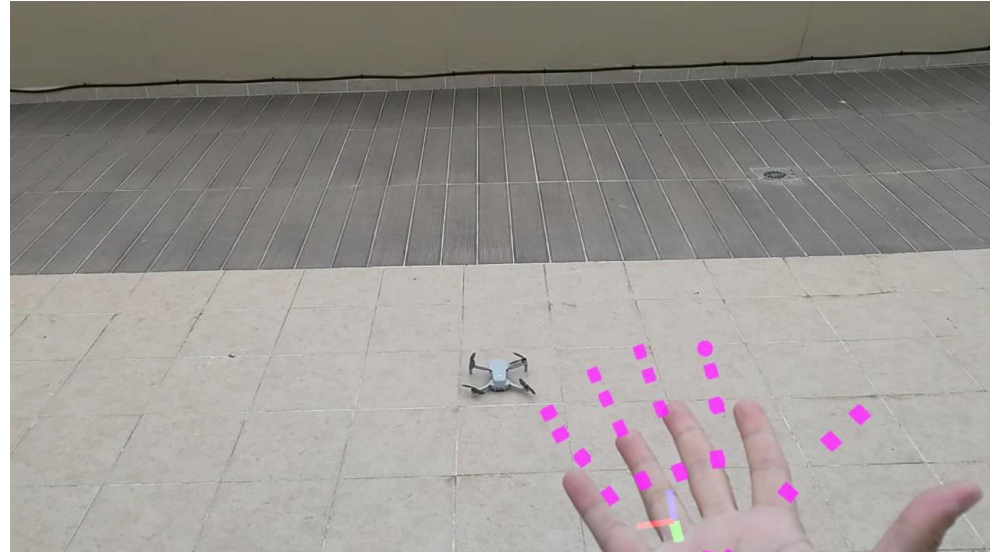
UAV tracking in AR

- Location relative to user
 - GPS
 - Only outdoors
 - IMU
 - Indoors and outdoors
 - Error accumulation, needs correction
- Orientation relative to user
 - Onboard compass reading
- Calibration
 1. Location
 2. Heading
- Tracking prediction
 - Error compensation
 - Improved latency



UAV gesture control

- Aims
 - More intuitive control
 - Easier learning curve
 - Single-handed control
 - Full range of motions
- Gesture control
 - Hand tracking from HoloLens 2
 - Hand-state correspondence to command
 - 10 commands + stop
 - Throttle up / down
 - Yaw left / right
 - Pitch forward / back
 - Roll left / right
 - Take off / land
 - Two modes:
 - Finger-based
 - Palm-based



eXtended vision + gesture control

Future steps:

- Integrate all 3 subsystems in 1
- Address performance issues
- Improve gesture control robustness
- Improve tracking latency
- Compensate for tracking errors
- Automate calibration process
- Utilize depth estimation for improved video feed placement
- Expand user interface





Website: www.faster-project.eu

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Thank You

