

# D9.3 – THE EVACUATE INTEGRATED SYSTEM RELEASE 2 – READY FOR PILOT TESTING

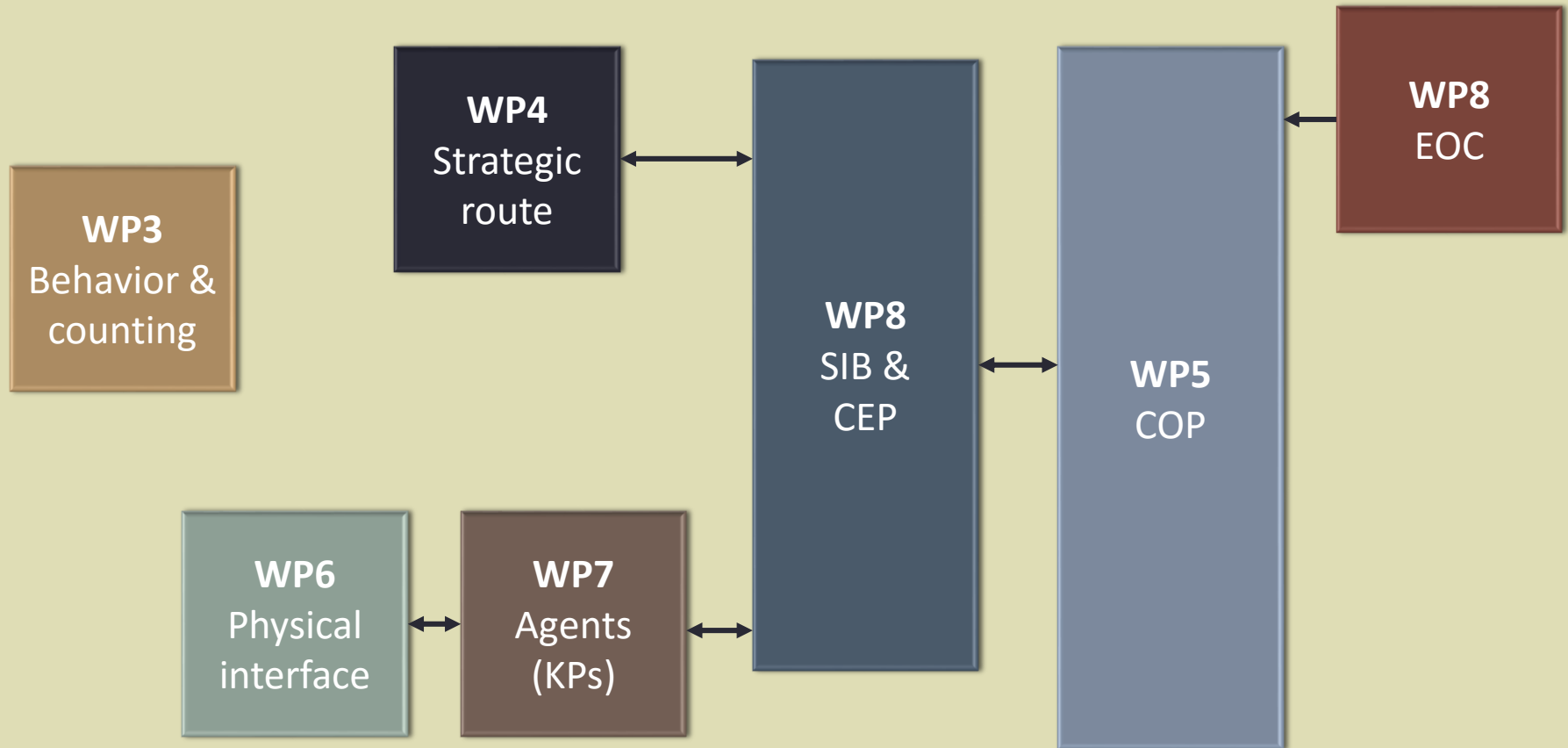
AUTHORS: JORGE RODRÍGUEZ VÁZQUEZ  
PEDRO GARIBI PÉREZ

- The **D9.3 the eVACUATE Integrated System release 2 - ready for Pilot Testing**
  - Prototype & Demonstrator – not textual
  - Dissemination Level : PU
  - *This deliverable describes the main building blocks as developed within each WP that constitute the eVACUATE platform.*
  - *Includes work from Tasks T.9.1, T.9.2, T9.3 and T9.4, along with work from all the other technical Work Packages.*
  - Scheduled for month 38 = May 2016
    - The San Sebastián integration meeting evaluating overall system's performance in real environment took place in month 39 = June 2016
    - Delivery of D9.3 postponed to month 40 = July 2016 to make use of that event.

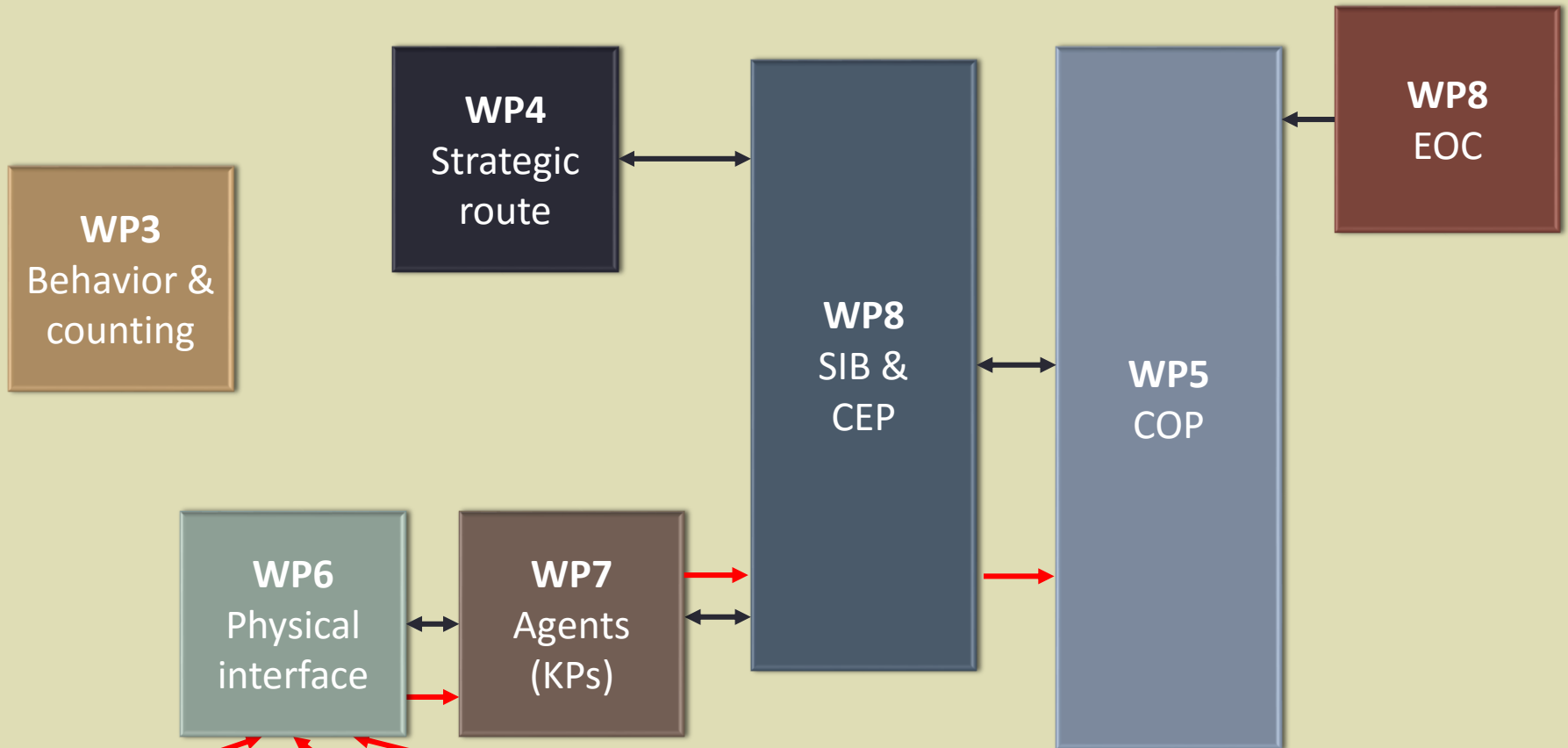
- What is done:
  - An implementation of the architecture of eVACUATE,
  - integrating the technical WP's including:
    - *Hardware*
    - *Software*
    - *Local Infrastructure customized to each pilot location*
    - *Cloud- and Fog-based software*

# INTEGRATED SYSTEM, FINAL RELEASE READY FOR PILOT ACTIVITIES

## eVACUATE system – individual building blocks



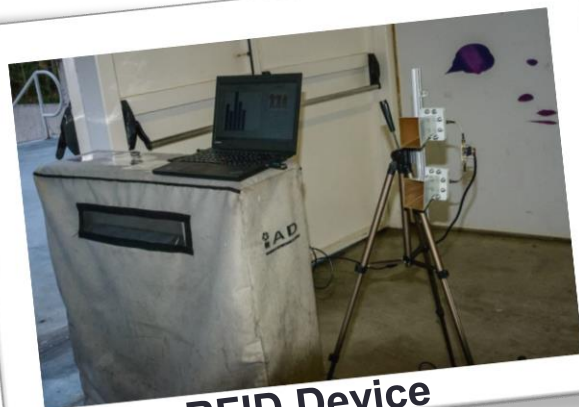
## eVACUATE system – individual building blocks



Environmental  
sensor

WSN  
Gateway

RFID  
device



**RFID Device**



**Environmental sensors**

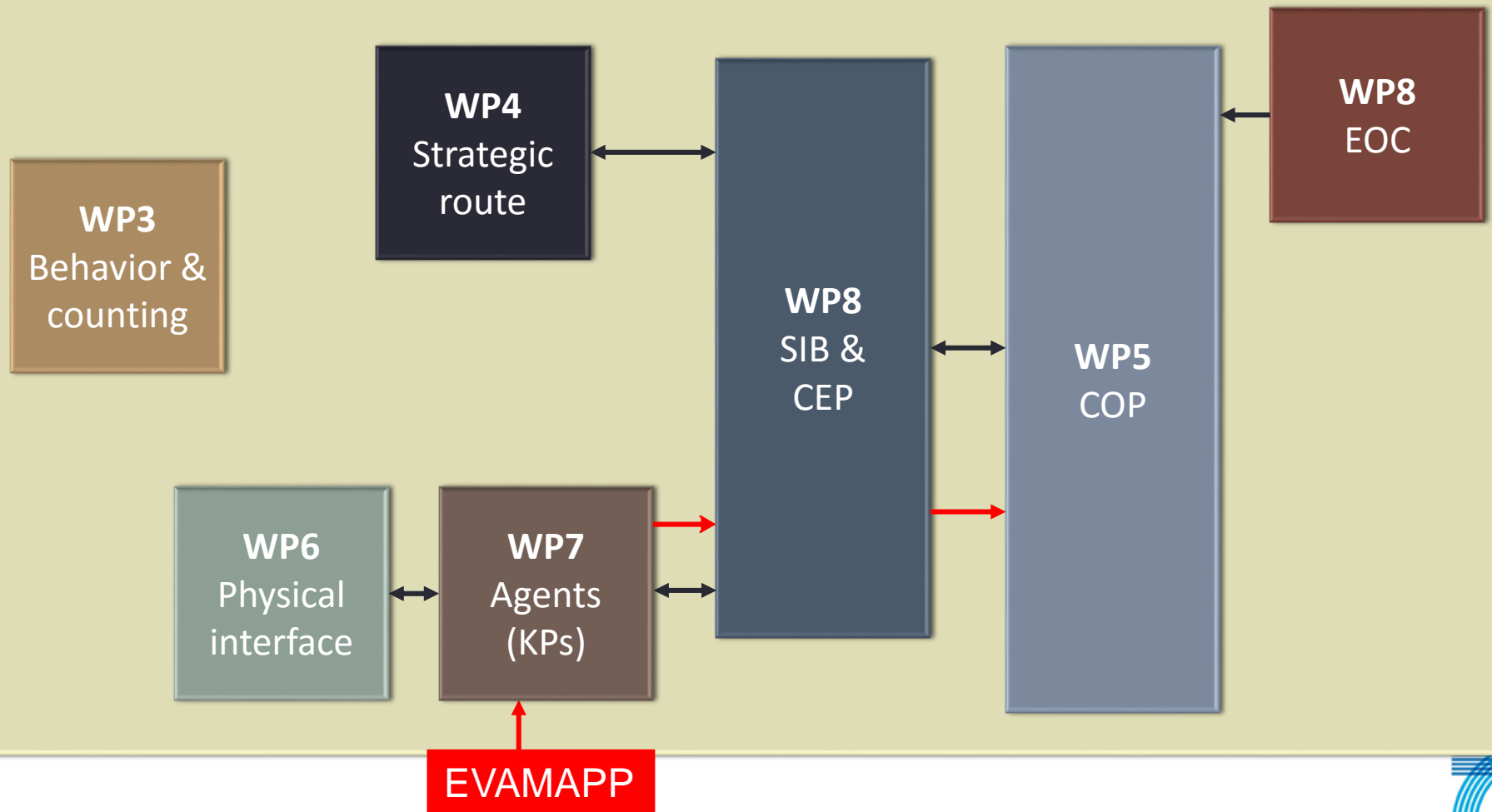


**WSN gateway**

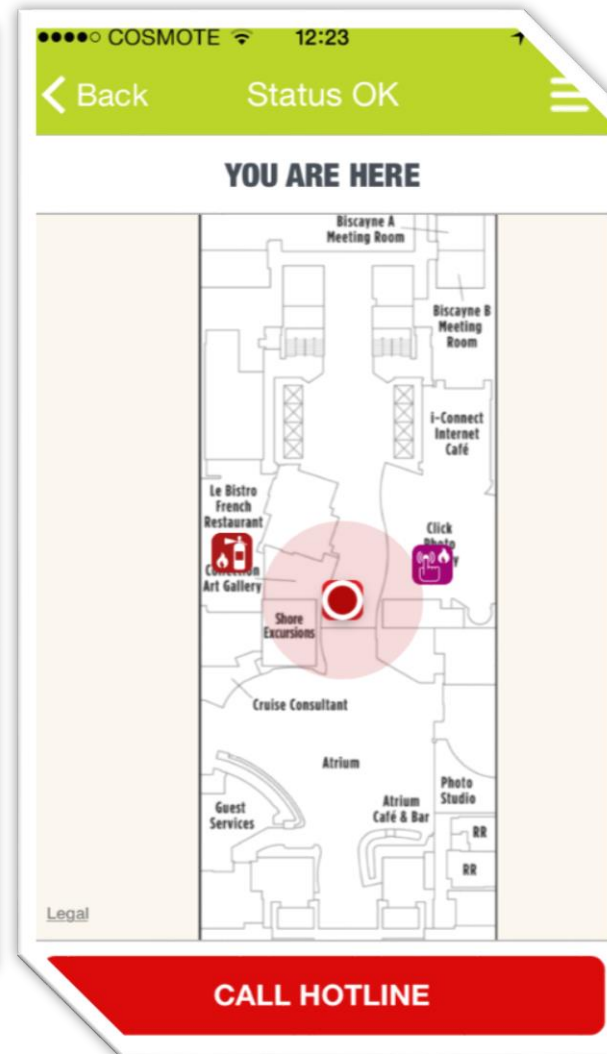
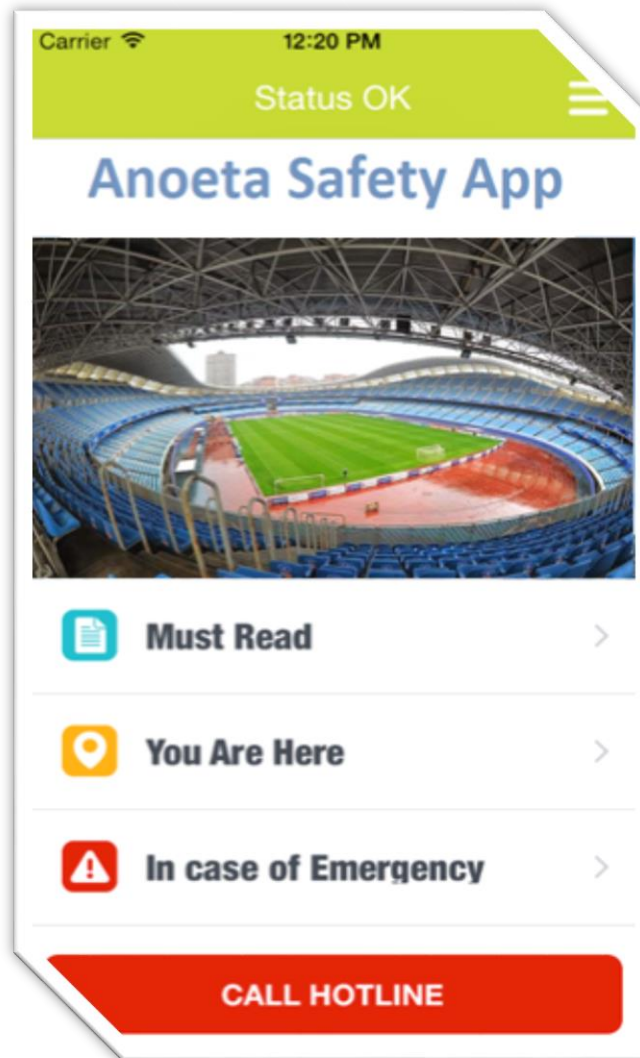


**COP display incl. hardware readings**

## eVACUATE system – individual building blocks

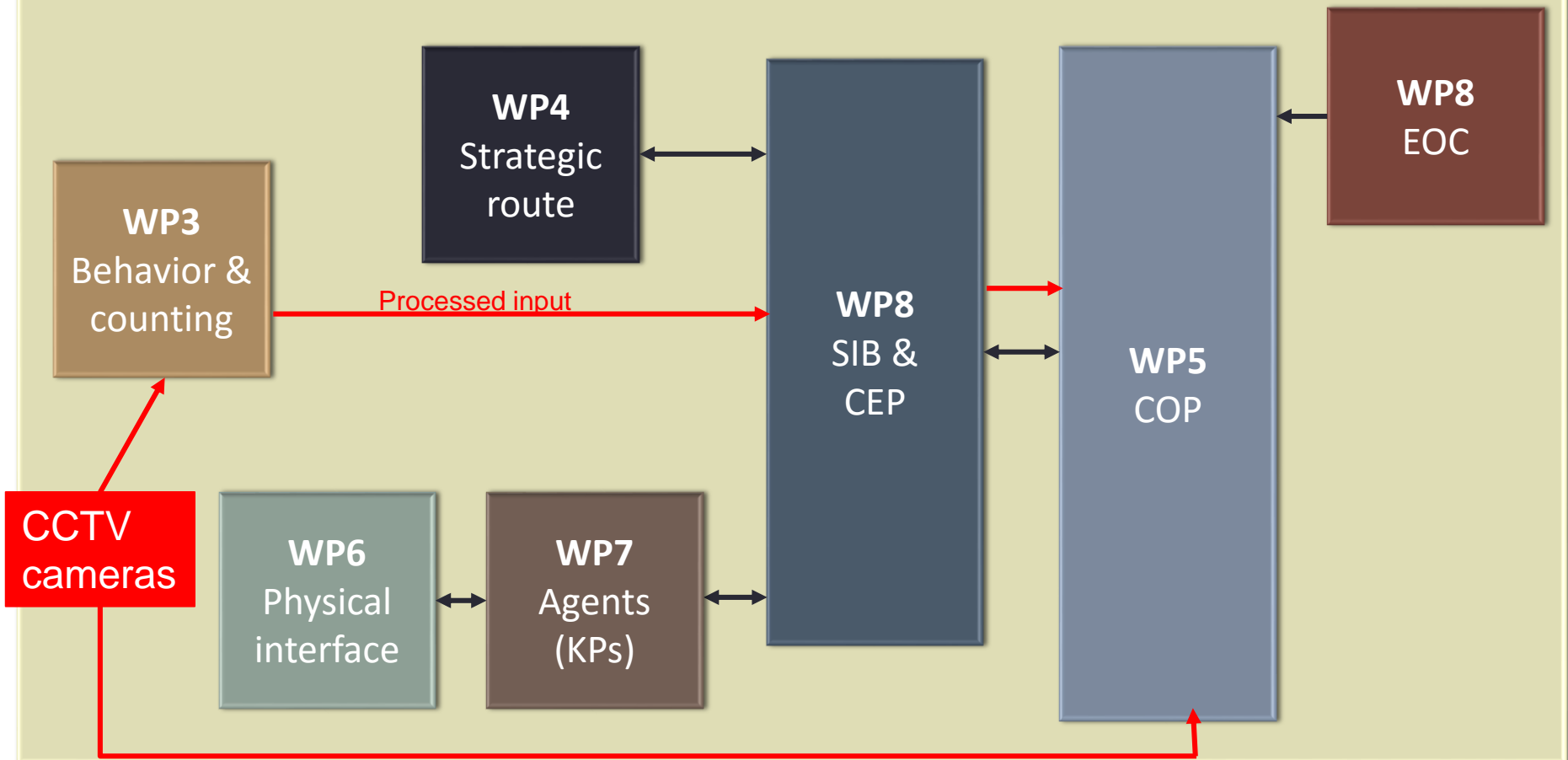


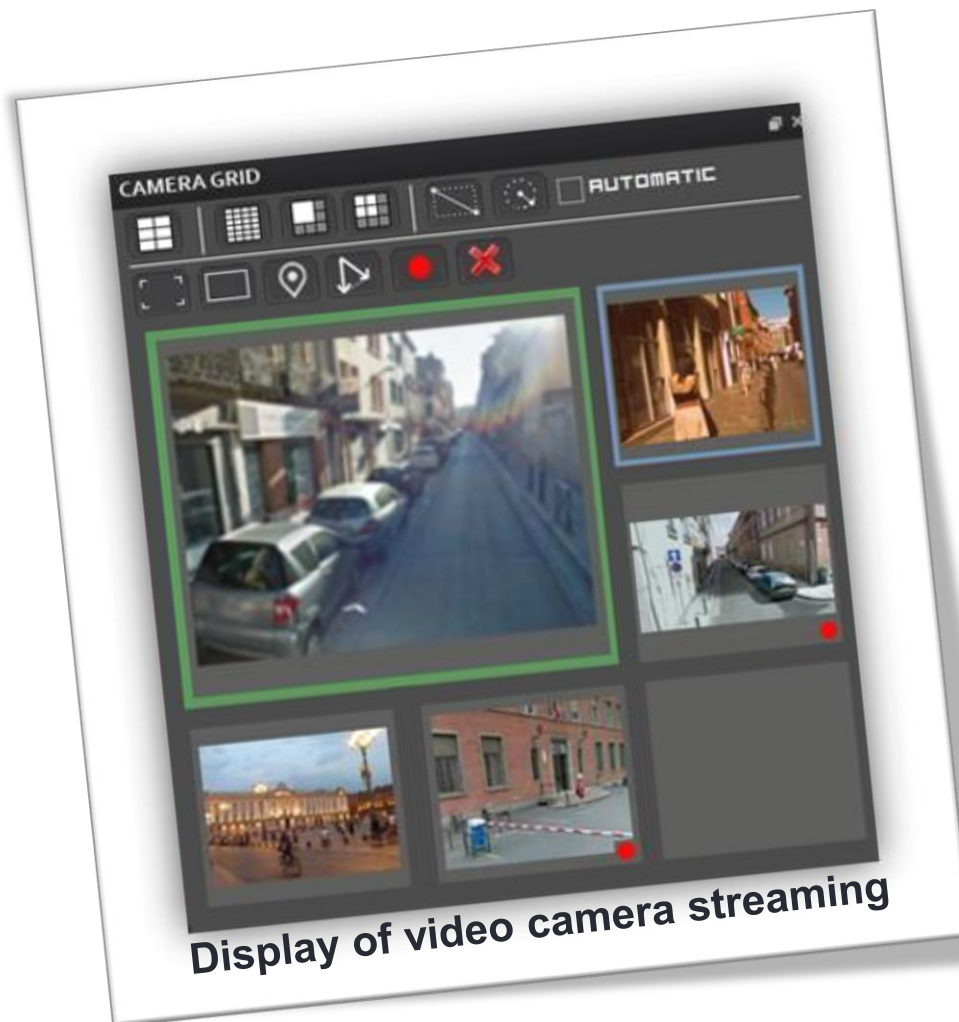




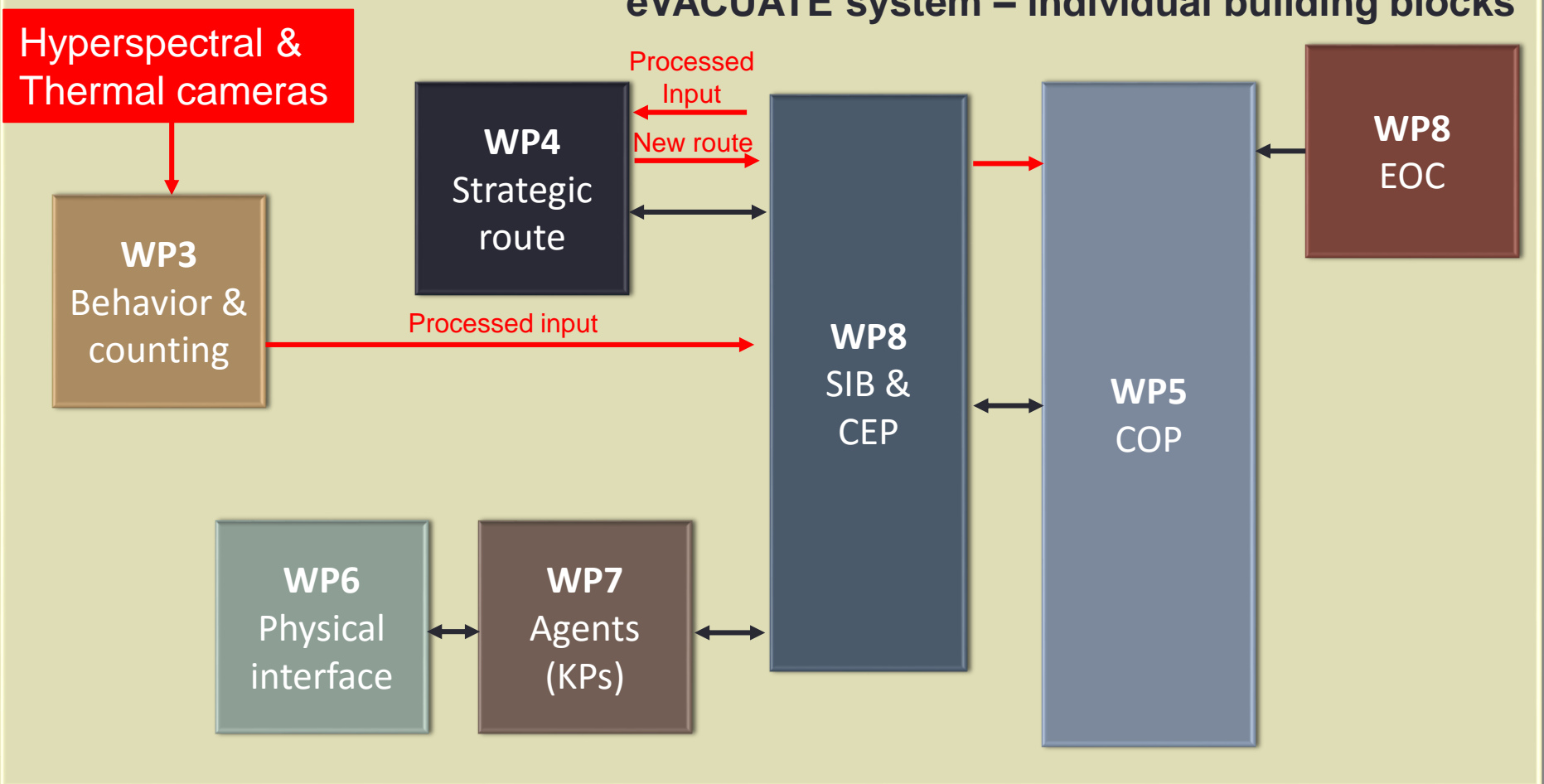
eVAMAPP smartphone application – (Screenshots)

## eVACUATE system – individual building blocks





## eVACUATE system – individual building blocks

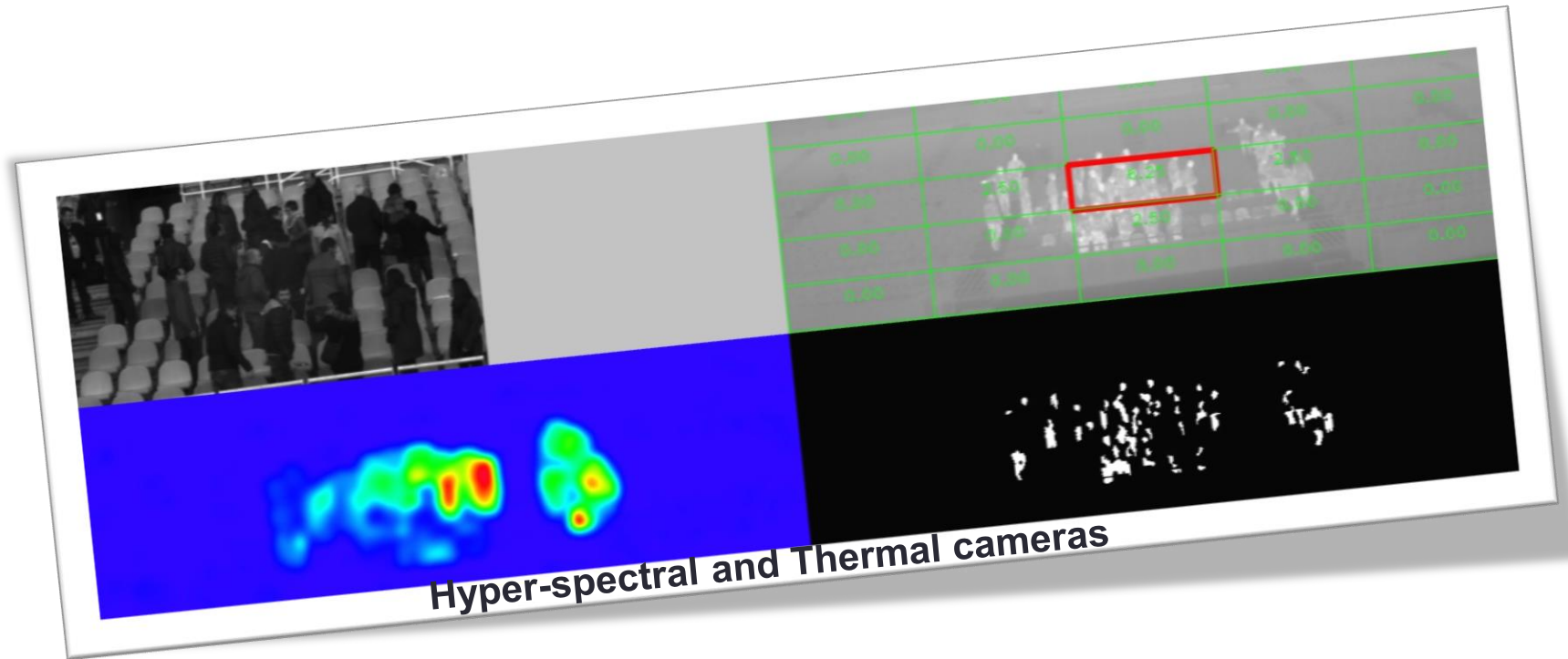


1. WP3 receives input from cameras, processes it, sends it to WP8

2. WP8 sends data to WP4; WP4 uses it to update evacuation route

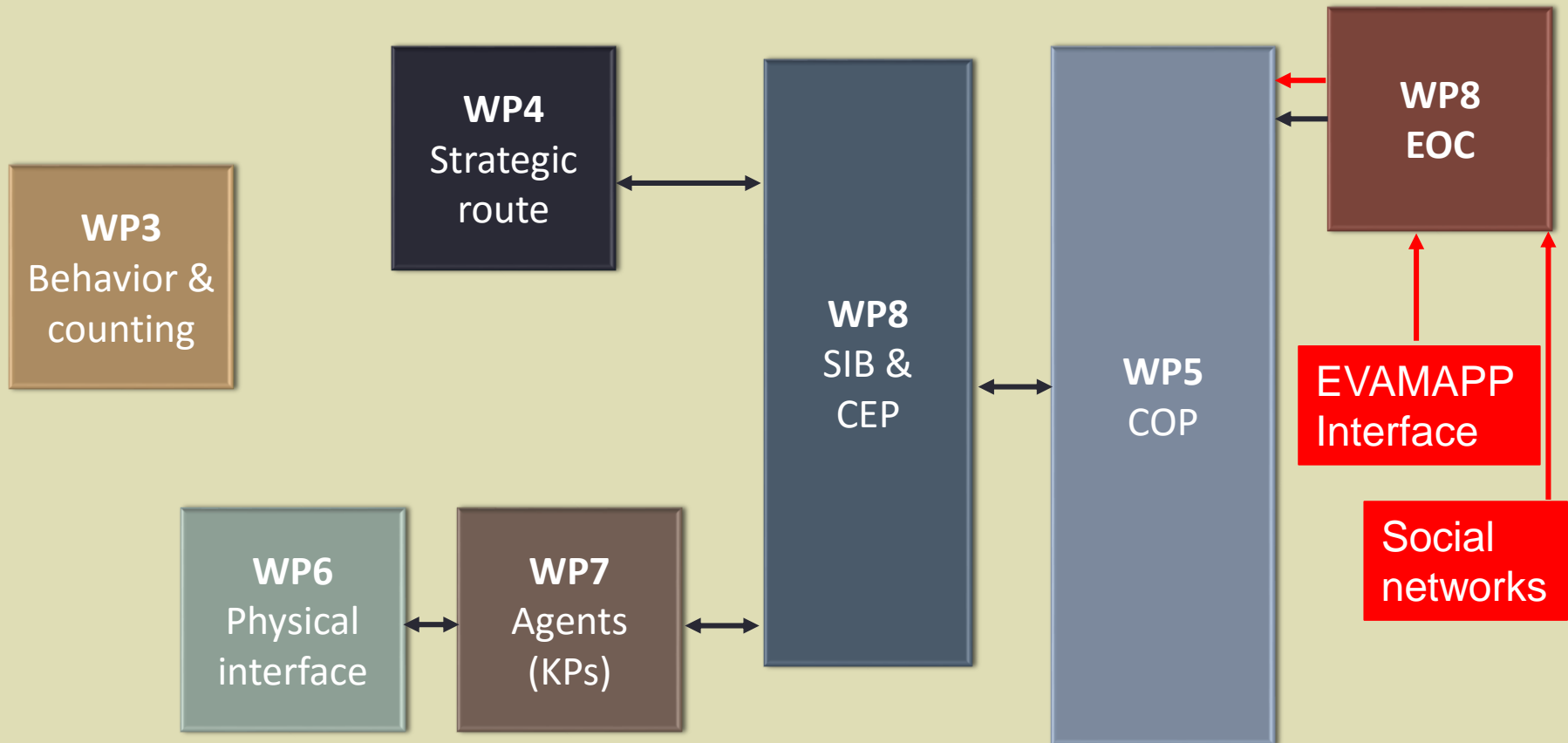
3. WP4 sends new route to WP8; WP8 sends all its information to WP5

# BASIC ENVIRONMENT- INPUT – SPECIALIZED CAMERAS

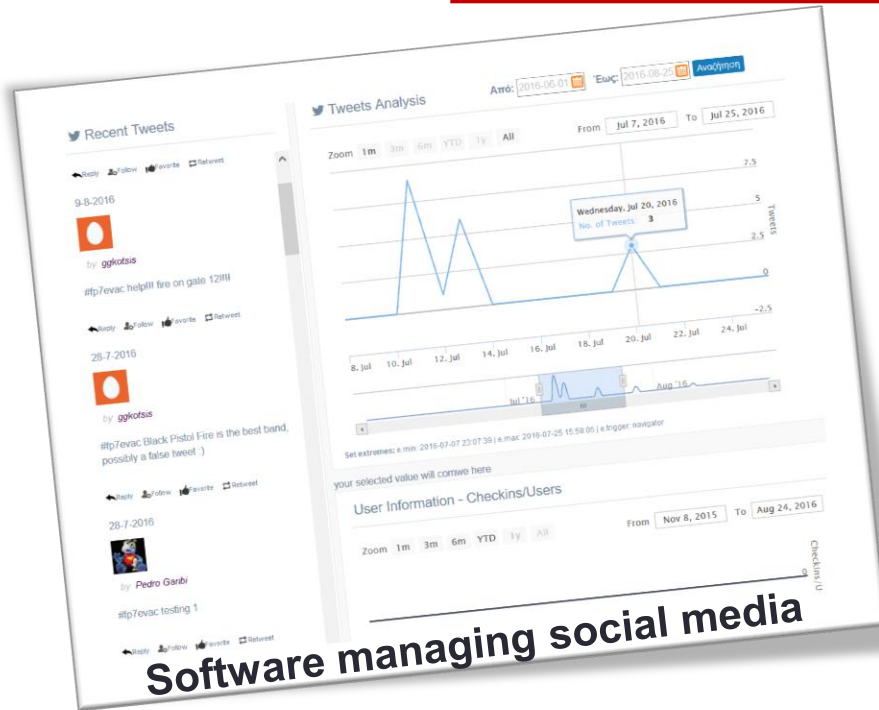


Hyper-spectral and Thermal cameras

## eVACUATE system – individual building blocks



EVAMAPP interface goes to EOC. EOC analyses input to check if an alert should be generated following rules (key words with hashtags, too many messages per time unit). If so, EOC sends an alert to COP (WP5).



Software managing social media

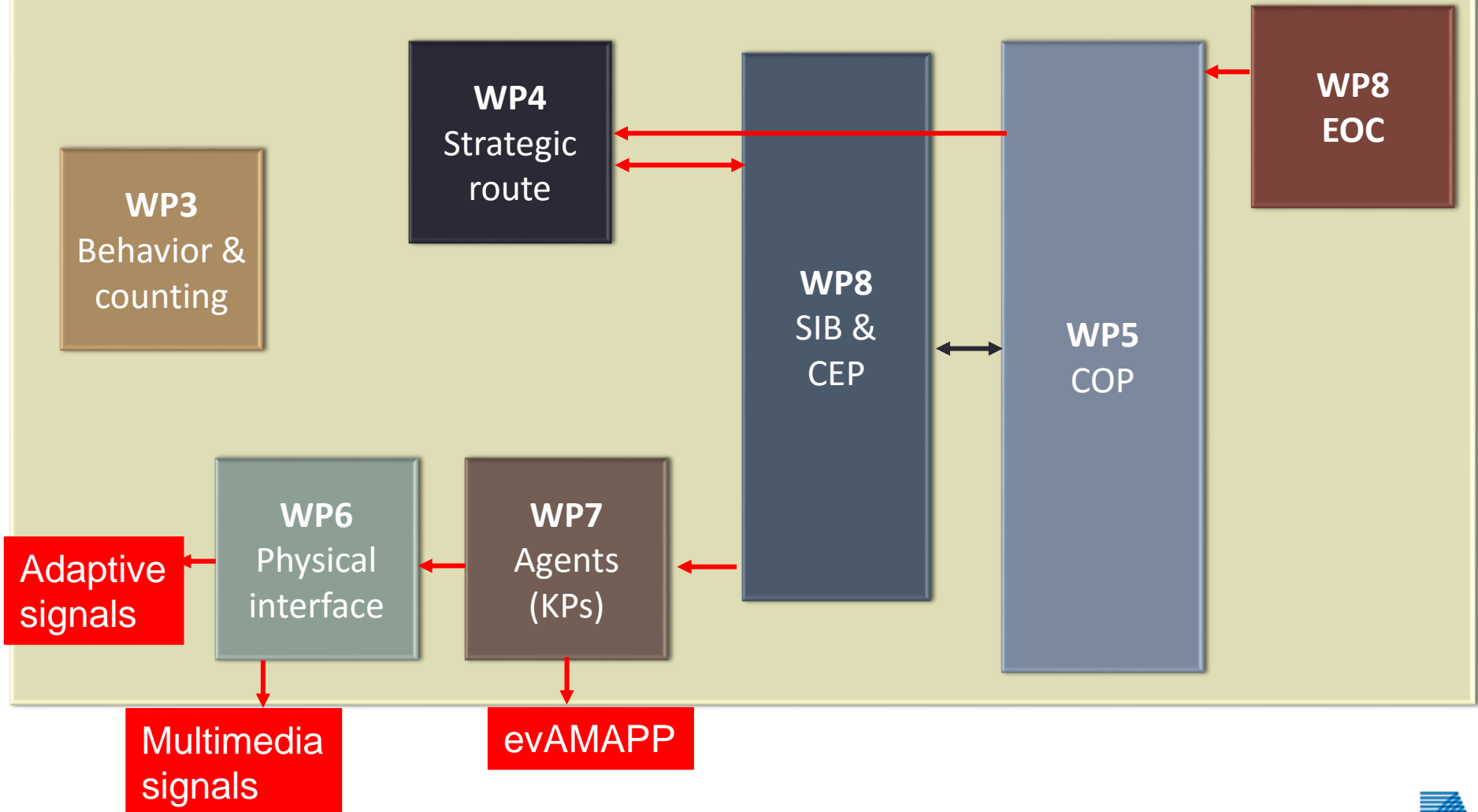
## EOC screenshots





# BASIC ENVIRONMENT OUTPUT - EVACUATION STRATEGY (I)

eVACUATE system – individual building blocks







# BASIC ENVIRONMENT OUTPUT - EVACUATION STRATEGY (I)

1. WP3 counts crowd, sends information to WP8

2. WP8 forwards this info to WP4 along with paths, open doors, etc.

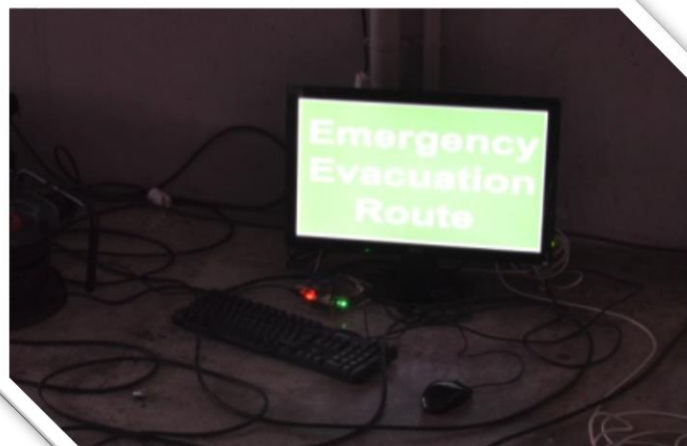
WP4 replies with optimal route at a given point. WP8 then calculates the needed signals to evacuate.

WP5 can check this info at any moment, through WP8.

3. If WP5 decides to start an evacuation, then WP8 knows the signals it must send.

Signals first sent to WP7 (agent), then to WP6 to send to output hardware signals.

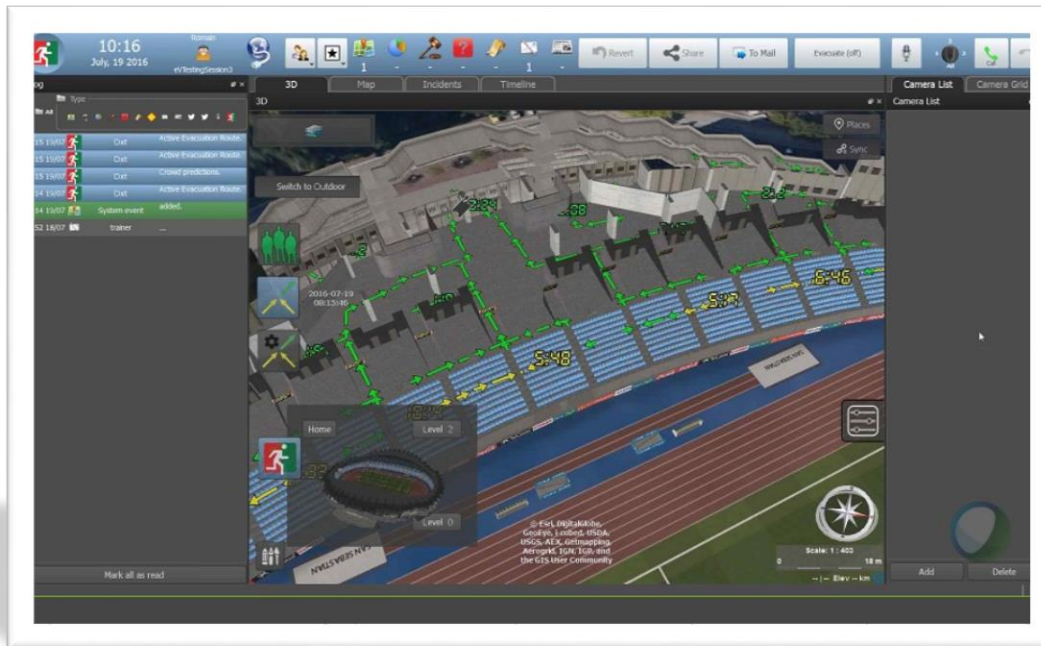
eVAMAPP, being a software app, does not require the WP6 step.



Multimedia signal



Adaptive Signals

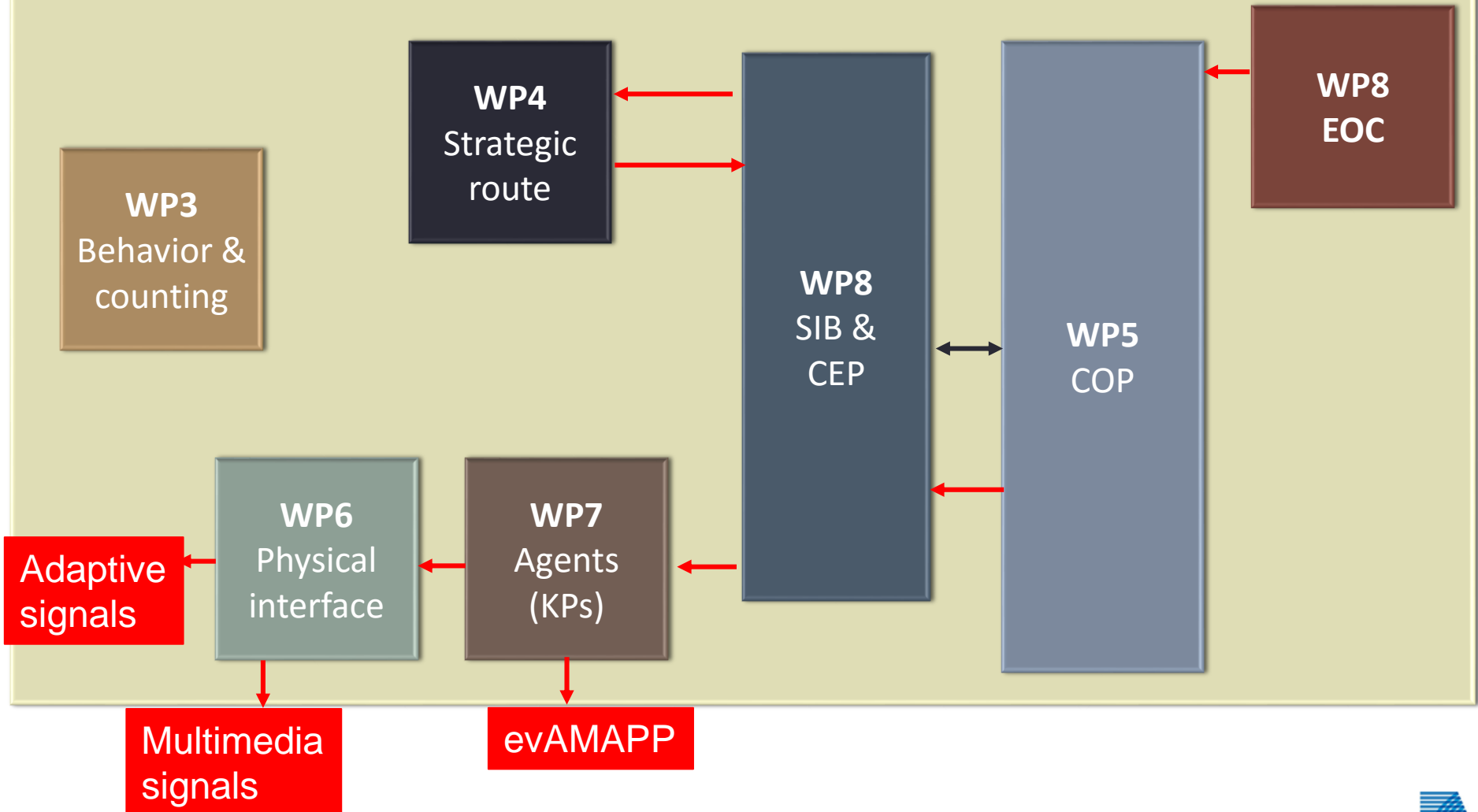


COP during evacuation  
Displaying AER



# BASIC ENVIRONMENT OUTPUT - EVACUATION STRATEGY (I)

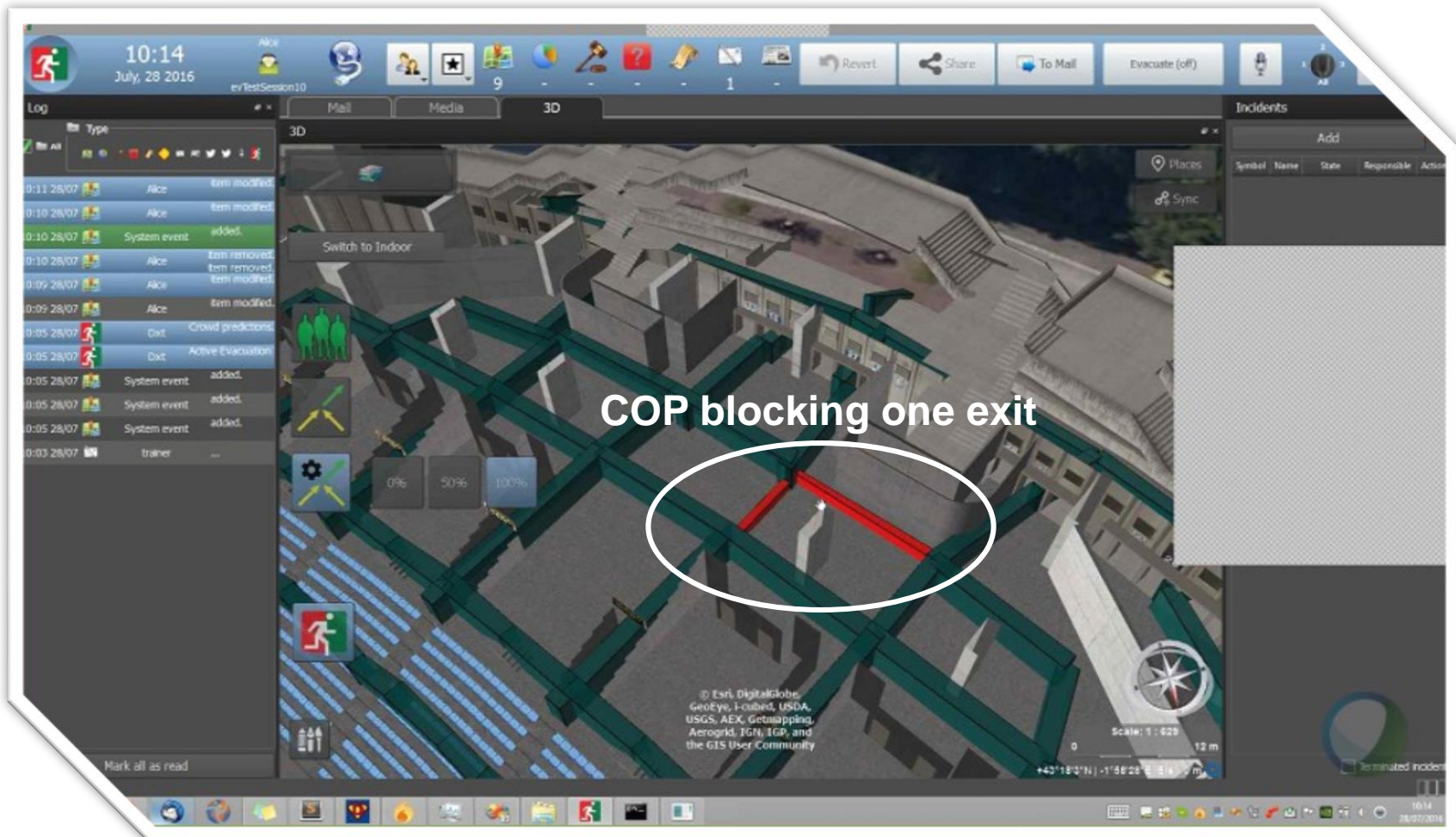
**eVACUATE system – individual building blocks**



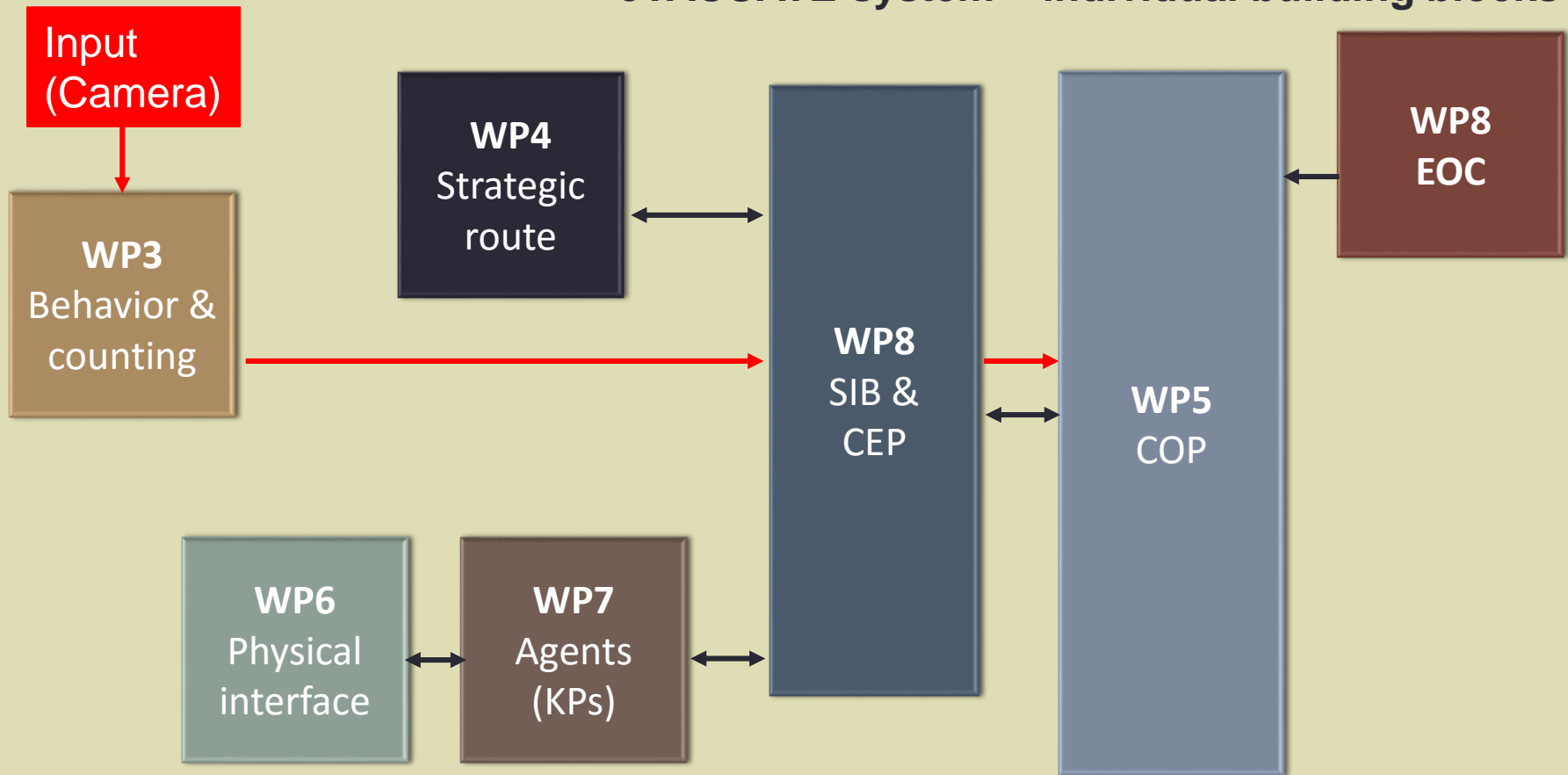
# eVACUATE SPECIAL – BLOCKING ONE EXIT

1. WP5 blocks one exit, then starts evacuation. Requests information to WP8 .  
WP8 asks WP5 for optimal route, defines specific needs (which doors must be open, etc.)

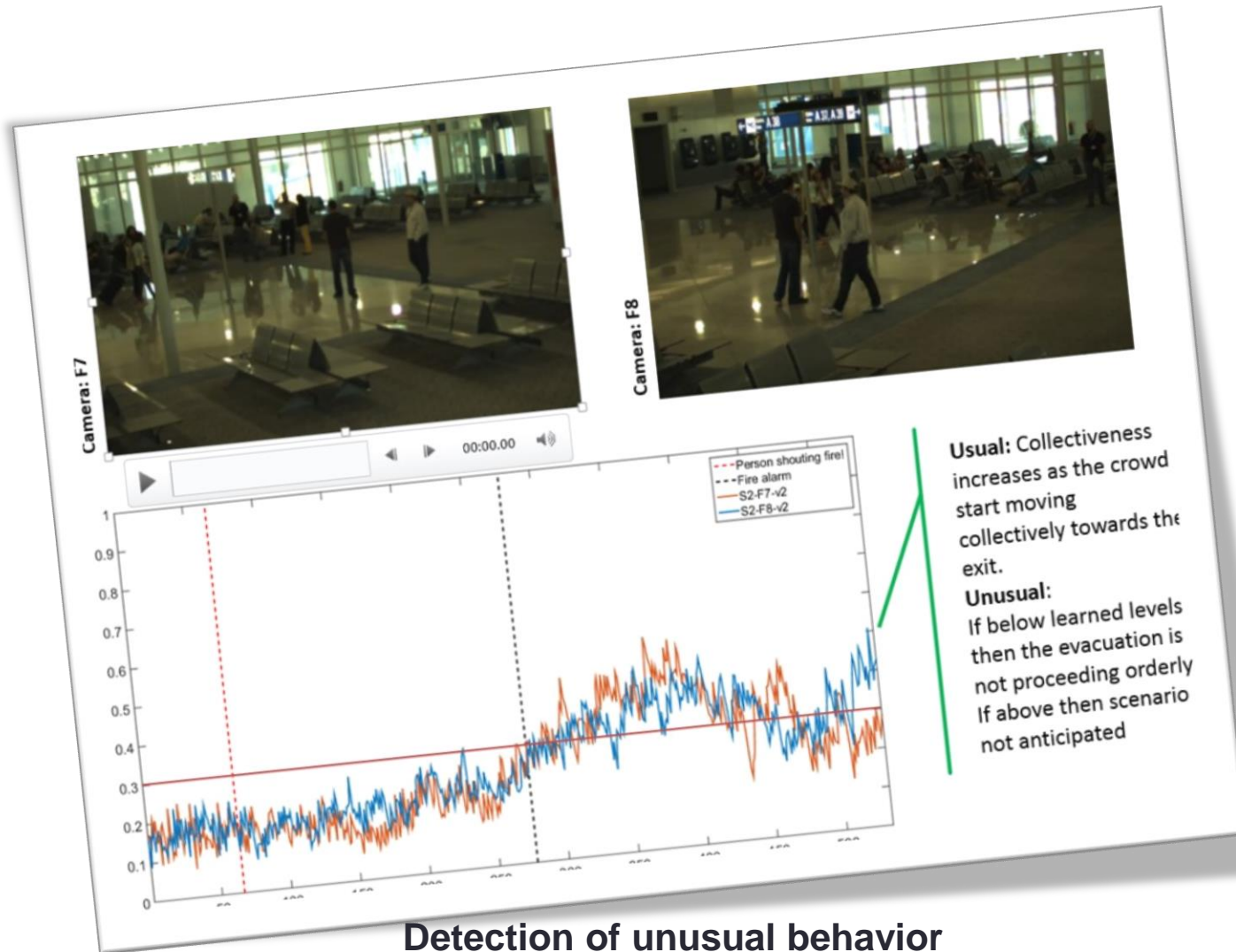
2. WP8 sends information to WP7, which manages what to send to what output device.  
Hardware devices require one more complexity level, managed by WP6. eVAMAPP doesn't because it's software.



## eVACUATE system – individual building blocks







Detection of unusual behavior

# PLATFORM IMPLEMENTATION DETAILS- REFERENCED SUBMITTED DELIVERABLES

WP3	WP4	WP5	WP6	WP7
ITINNOV	CDI	DXT	ICCS	TEK
Behavior recognition, cam-based	Optimal route prediction	COP (Common Operational Picture)	Sensors: Light, temperature, humidity, ...	Smart space & agents
D3.4	D4.4	D5.3	D6.3	D7.4
WP7	WP7	WP8	WP9	ICCS, TEK, ASRS, etc.
TELESTO	TUC/TUD	VITRO	INDRA	
Mobile phone application eVAMAPP	Chipless RFID tags in tickets	CEP rules	SOFIA2 interoperab. framework	Decision crew & comm; legacy systems
D7.4	D7.4	D8.4	D9.3	n/a

# ANNEX A

## ASRS SCENARIO IMPLEMENTATION



- ASRS infrastructure: Build and connect all components.
  - individual tests & checks.
- Gates open, volunteers enter & sit pretending to be audience.
- Scenario: Alarm sounds, crowd goes to nearest exit.
  - COP monitors crowd movement and alarms.
- Scenario: Alarm sounds, crowd can go to nearest exit or to field.
- Scenario: Crowd must follow indications, remain where cameras can follow.
- Scenario: Security staff blocks one exit (representing that the exit was blocked for other reasons).
  - Crowd must follow dynamic exit signs, digital signs and app.

- ITINNOV makes crowd **analysis on crowd density & speed**.
- COP receives info about incident, blocked exit. Decision maker get overview of specific activities, defines evacuation strategies
  - **COP** Counts visitors entering the stadium by receiving feedback from **RFIDs** and **Optical Cameras**.
  - **COP** counts visitor leaving the stadium
- One exit is suddenly obstructed!
  - Alternate evacuation routes (AER) are used
- **eVAMAPP** used for situation awareness, inc. visualizing position of smartphones, inform crew of situation.
- **COP** gets Simulated forecasts, accessing **historic data**
  - Several decision makers can operate COP simultaneously.
- **Exit** and **Multimedia signs** activated
- Monitor Communication on AER by all channels.
- Crowd leaving the stadium following the indications in all sensors.

- Use **eVAMAPP/ FR Application** to notify crew & service people outside stadium to redirect crew & people inside stadium to evacuate them per AER.
- **Thermal & hyperspectral sensors** to count people passing a line.
- **EOC** to send messages to eVAMAPP & change dynamic signs on demand
- **ITINNOV**: Detect **unusual behavior of people** not evacuating or following wrong route.
- **CEP** estimates crowd figures in blind spots for early issue detection.
- **EXUS/TEK**: Decision maker communications successful evacuation; evacuated people receive message “Safe” on eVAMAPP.

Please check Tekniker\_MOV\_0104.mp4:

1 min 24 sec video file available upon request.

(Video not included here due to document size, 229 MB)

Example image from the video:

