

## Grid Alignment Assistant System (GAAS)

DEVELOPMENTS  
AREA

Visual assistant prototype for grid-alignment in wireless road-charging

### Introduction

GAAS is one of FABRIC's sub systems. It is devoted to the alignment of the vehicle with the charging grid, to maximize the energy transfer. A webcam estimates the vehicle's position relative to the charging grid, and provides a visual aid of the offset that needs to be eliminated by steering to the right position.

### Objectives

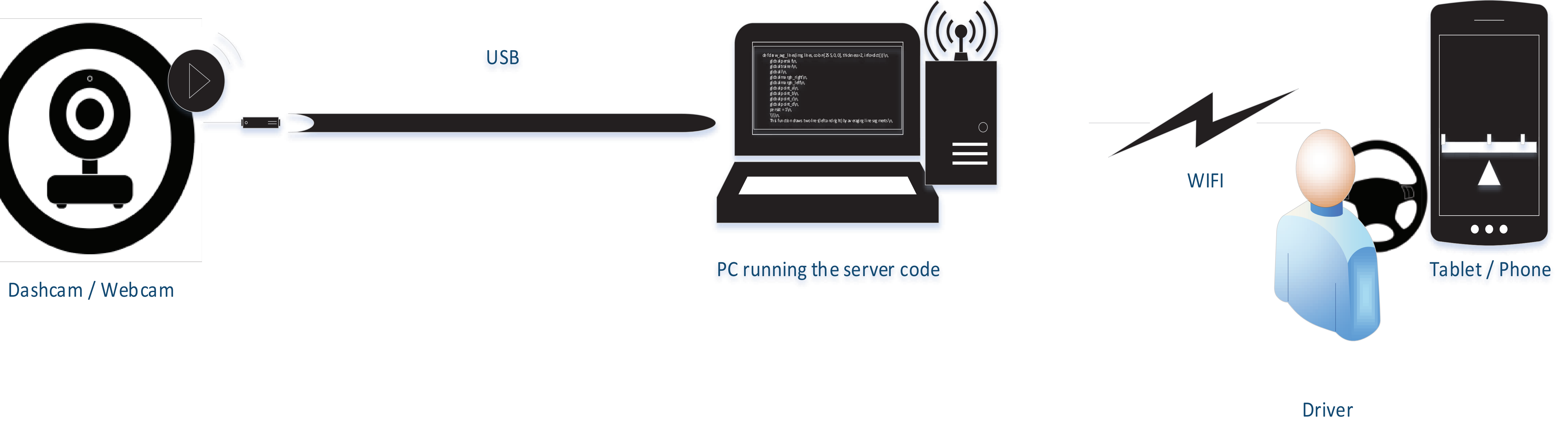
- Program a Python algorithm for grid alignment through lane-boundary detection using image processing.
- Develop a mobile app for visualising the grid alignment.
- Discover special situations and provide feasible and appropriate solutions.

### Setup

- Mount the camera on the middle-top side of the wind shield: tilt toward the road vertically, never horizontally.
- Connect the camera to the PC via USB and the pc and tablet to the same Wi-Fi network.
- Open GAAS app in tablet and connect to the PC via socket.
- Run the python code from PC.

### GAAS in action

The system uses the position of the grid within the lane to estimate the vehicle offset. This offset is the distance between the centre axis of the car and the assumed grid axis, both parallel to the road. The best offset for wireless charging is zero. So, the system's aim is to direct the driver, in the highest precision, towards steering the vehicle so that the offset is minimal. The camera captures 30 frames per second, processed in real time. The Python server program detects the two lane lines whether they are white or yellow. Then, according to the pre-set position of the grid within the lane, the offset between the grid centre and vehicle centre is computed (in pixels) then scaled with respect to the pre-set lane and grid relative widths. The offset is transmitted via WIFI to the GUI client on the driver's smart device. This offset is then displayed as pointer on a gauge within the GUI app. GAAS is aimed to provide the best assistance under changing conditions. The system can adapt to different light / glare and weather conditions. Moreover, if one of the two lane edges would disappear or be invisible for the camera for any reason, the system will still estimate the offset based on training of the latest true estimations.



### GAAS in Testing

Grid alignment image processing at the Italian test track site in Susa

#### Settings

- change server ip  
192.168.43.176
- change server port  
8888
- change grid size (pixels)  
60

Grid alignment app settings (above) and linear gauge driver display (right)

Linear gauge driver display showing the vehicle's offset from the charging grid. The gauge ranges from -60cm to 60cm, with a yellow bar indicating the current offset.

## Final Event & Demonstration | 21-22 June 2018 Italy

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### Consortium

### Project facts

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