



# ICAS

intersection collision avoidance system



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# What is ICAS ?

Intersection Collision Avoidance System (ICAS) is an applications development for a series of technologies directly linking road vehicles to their physical surroundings. This is in order to improve road safety.





# Project Goal

The goal of ICAS is to provide a communication link between vehicles and the roadside infrastructure



# Simulation

## Intersection Collision Avoidance

Untitled Model 1.23.sim:2 - QUEUE ENTITIES

Location  Find Continue

Queue Entity	Entry Count
ROAD2	77
ROAD1	79
ACCIDENT	56

**Before**

Percentage of accidents  
=  
35.89%

Untitled Model 2.18.sim:2 - QUEUE ENTITIES

Location  Find Continue Halt

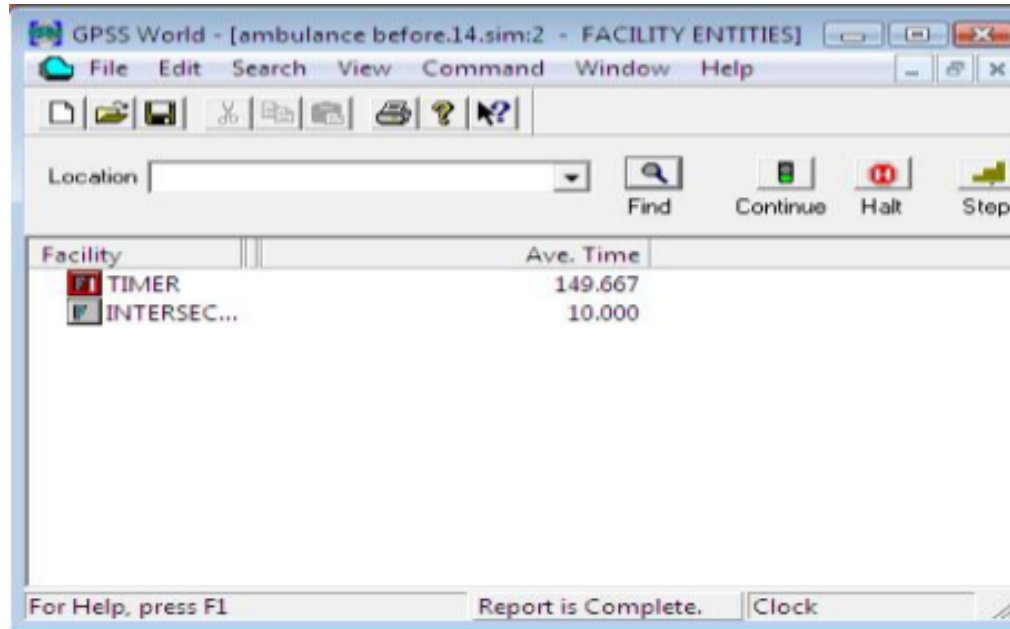
Queue Entity	Entry Count
ROAD2	51
ROAD1	51
ACCIDENT	2

**After**

Percentage of accidents  
=  
1.96%

# Simulation

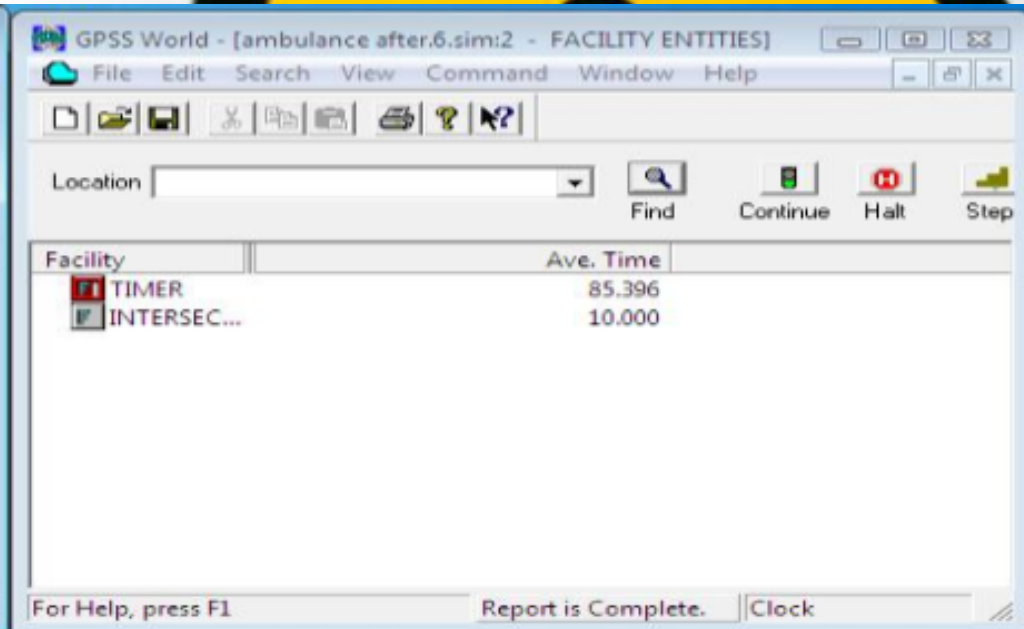
## Emergency Units

A screenshot of the GPSS World software interface. The title bar reads "GPSS World - [ambulance before.14.sim:2 - FACILITY ENTITIES]". The menu bar includes File, Edit, Search, View, Command, Window, and Help. The toolbar contains icons for file operations and simulation control. Below the toolbar is a "Location" dropdown menu and buttons for "Find", "Continue", "Halt", and "Step". A table displays simulation data for two facilities: "TIMER" and "INTERSEC...". The "Ave. Time" column shows values of 149.667 for the timer and 10.000 for the intersection. The status bar at the bottom indicates "For Help, press F1", "Report is Complete.", and a "Clock" button.

Facility	Ave. Time
TIMER	149.667
INTERSEC...	10.000

### Before

Average time taken ambulance =  
**149.666**

A screenshot of the GPSS World software interface, showing the results after a simulation. The title bar reads "GPSS World - [ambulance after.6.sim:2 - FACILITY ENTITIES]". The interface is identical to the "Before" screenshot, but the "Ave. Time" for the "TIMER" facility has changed to 85.396. The status bar at the bottom remains the same.

Facility	Ave. Time
TIMER	85.396
INTERSEC...	10.000

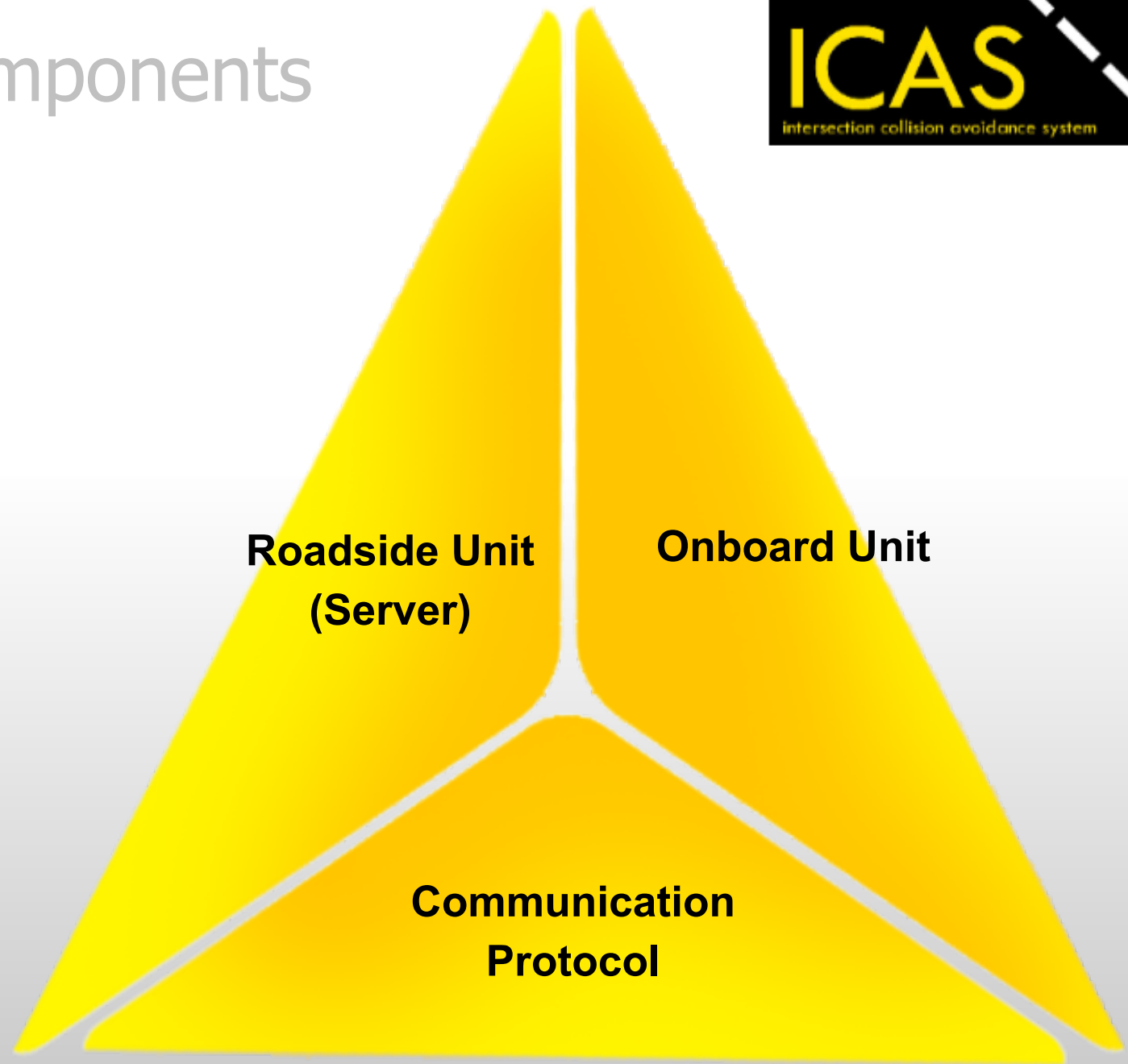
### After

Average time taken ambulance =  
**85.396**

# System Components

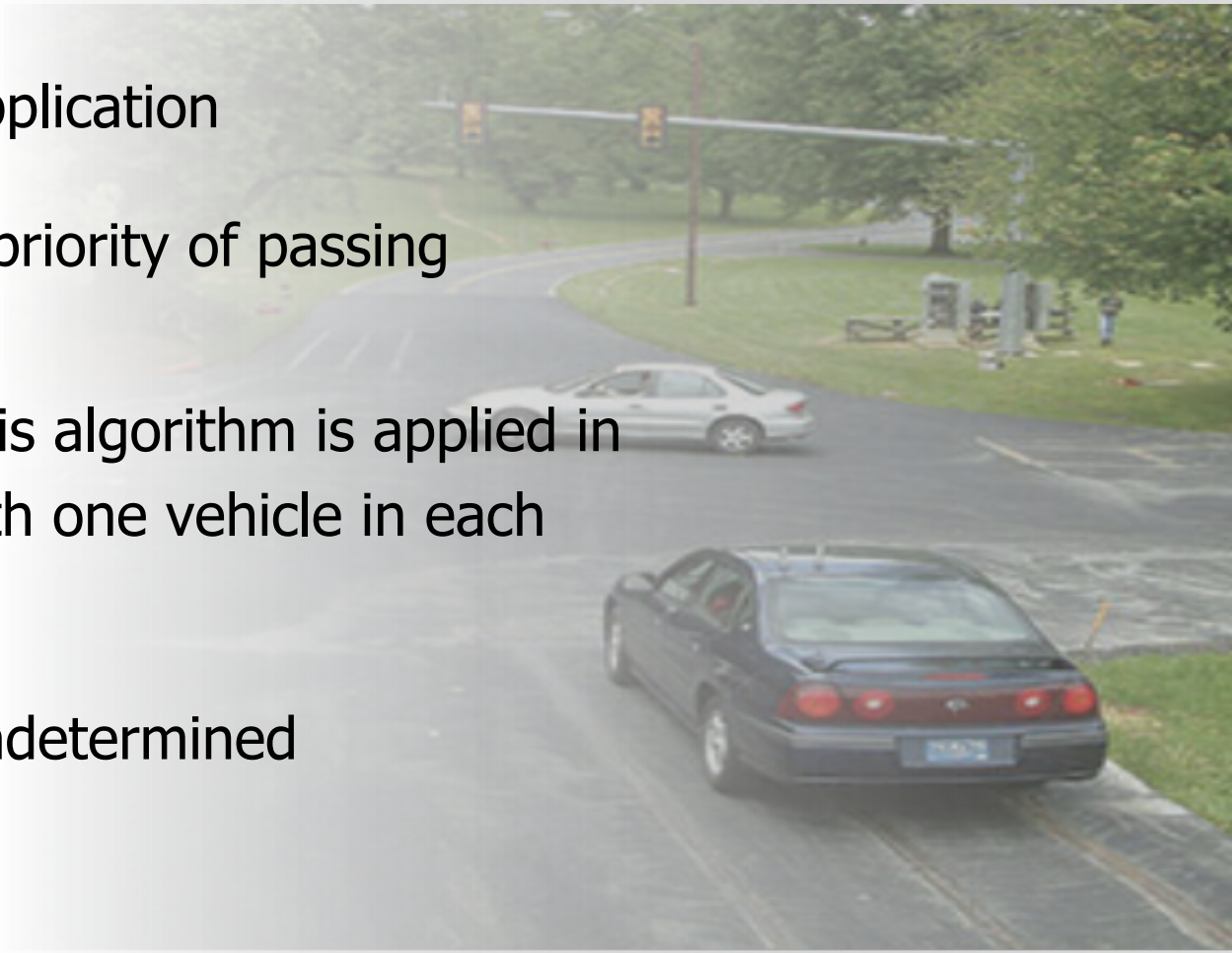


- Software
- Server



# RSU Software

- Java based server-client application
- Find the algorithm to give priority of passing for the write vehicle
- We are constrained that this algorithm is applied in small streets as it deals with one vehicle in each street
- Behavior of the driver is undetermined





Car arrived at sending point

Velocity, Position

PAS

S

Request

Velocity, Position

R  
S

- Fixed Server position

- Vehicles are also connected to the monitoring center

PAS position

S



Processing

# Monitoring

## System

- Goals

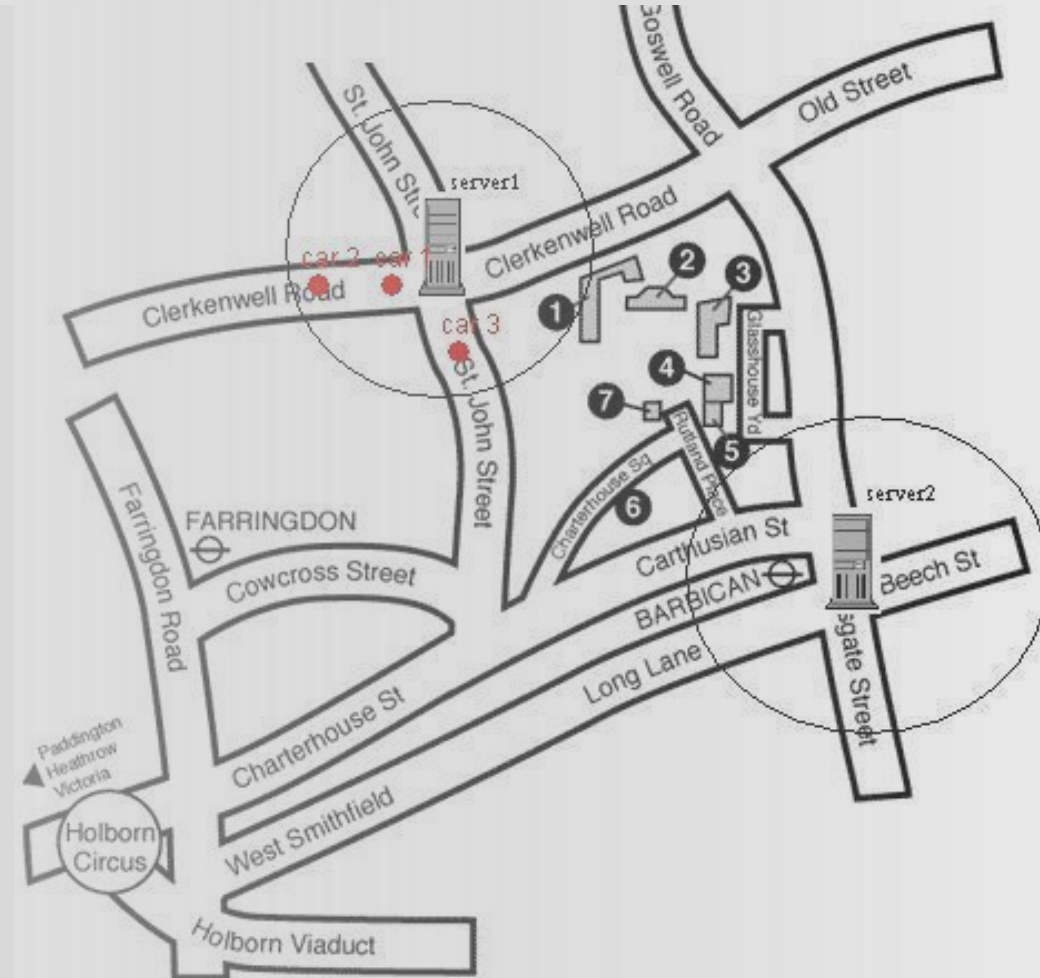
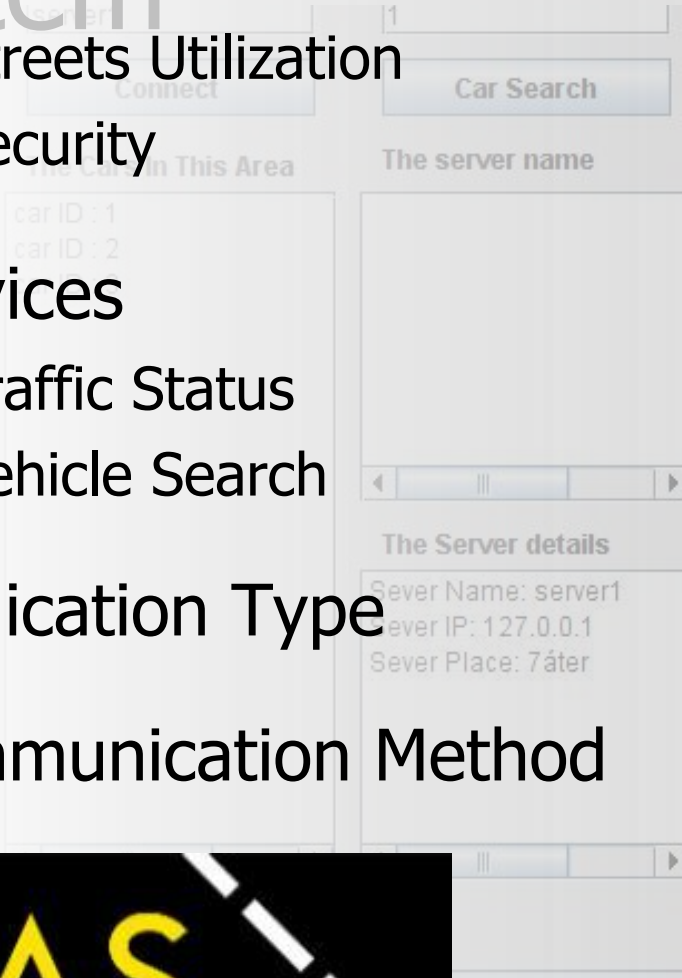
- Streets Utilization
- Security

- Services

- Traffic Status
- Vehicle Search

- Application Type

- Communication Method



## Applet

Server Name

server1

Car ID

1

Connect

Car Search

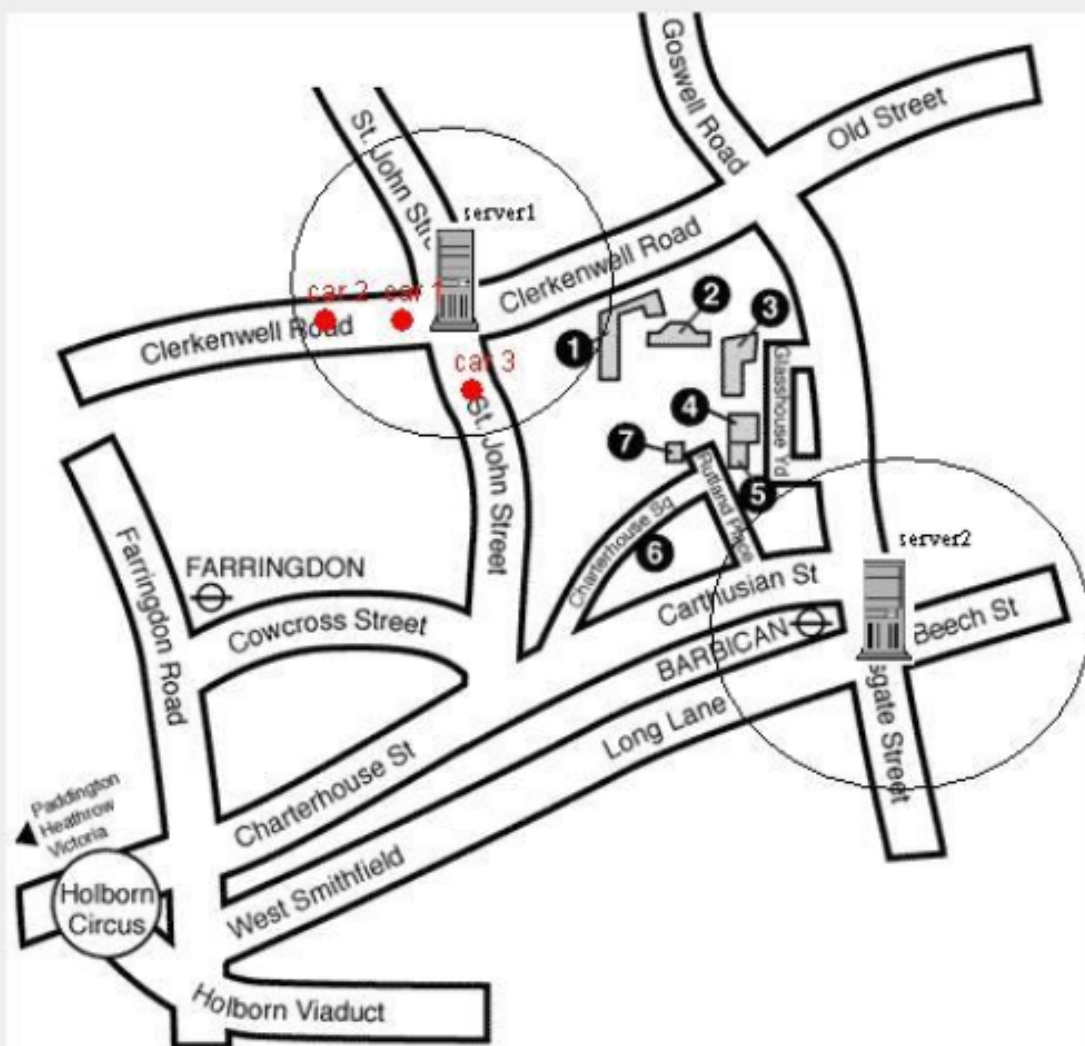
The Cars In This Area

car ID : 1  
car ID : 2  
car ID : 3

The server name

The Server details

Sever Name: server1  
Sever IP: 127.0.0.1  
Sever Place: 74ter

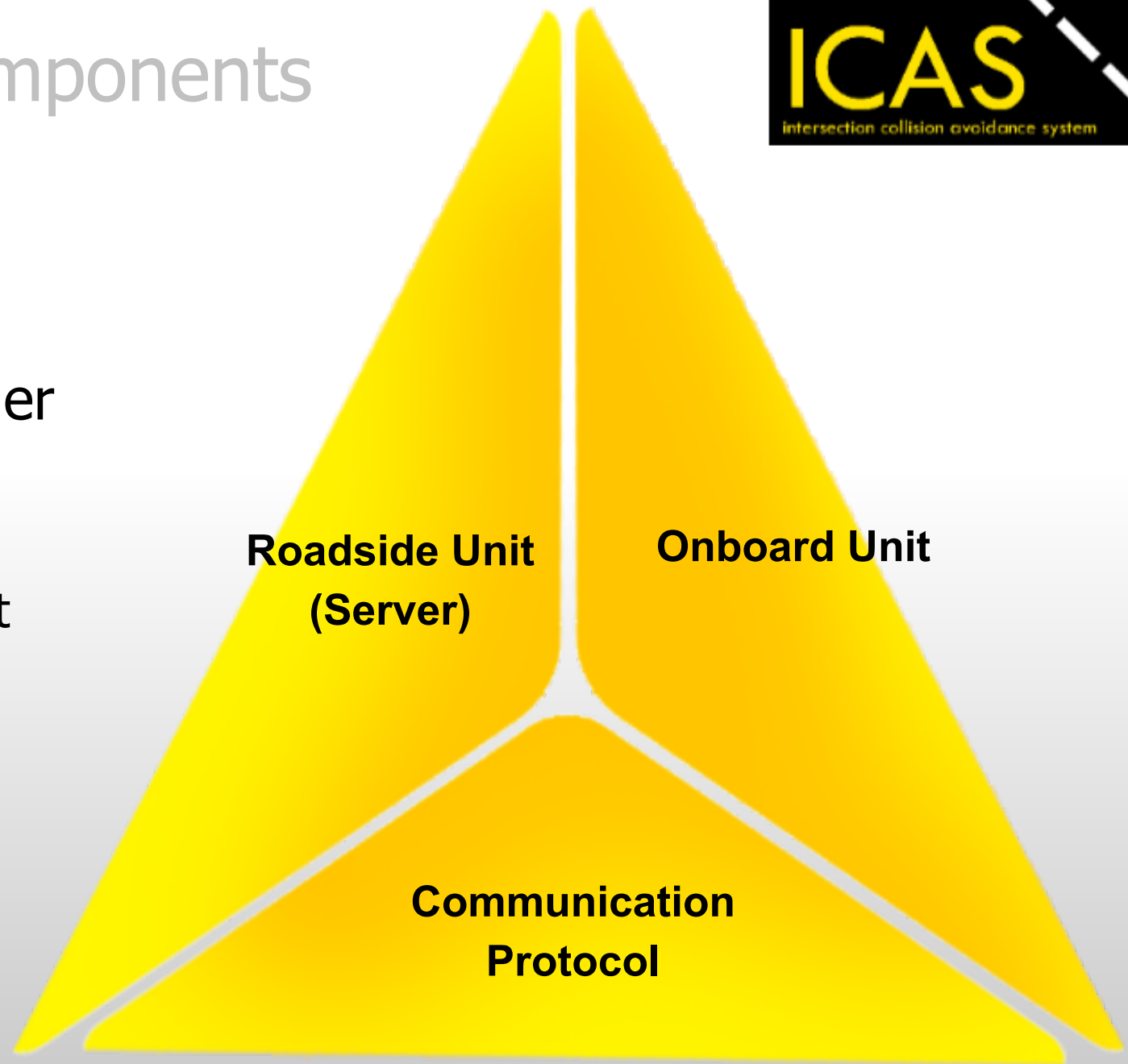


Applet started.

# System Components



- GPS
- Microcontroller
- LCD
- Seven Segment
- Wireless Kit





# GP

# S

- Types of GPS

- Data loggers
- Data pushers
- Data pullers

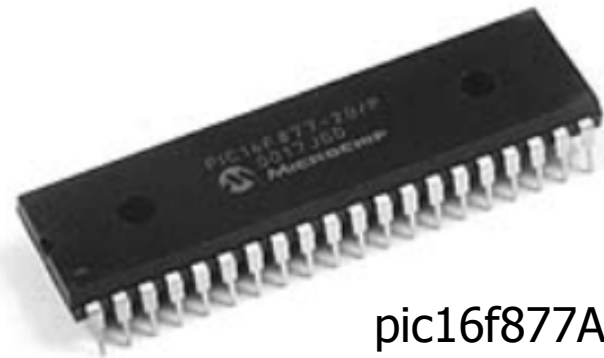
- GPS formats

- NEMEA
- Text



# Microcontrolle

- Receive data from GPS
- Process on coordinates
  - $X = \text{radius of word} * \cos(\text{longitude}) * \cos(\text{lattitude})$
  - $Y = \text{radius of word} * \sin(\text{longitude}) * \cos(\text{lattitude})$
- Send data
- Interface with peripherals
  - LCD
  - 7 segment

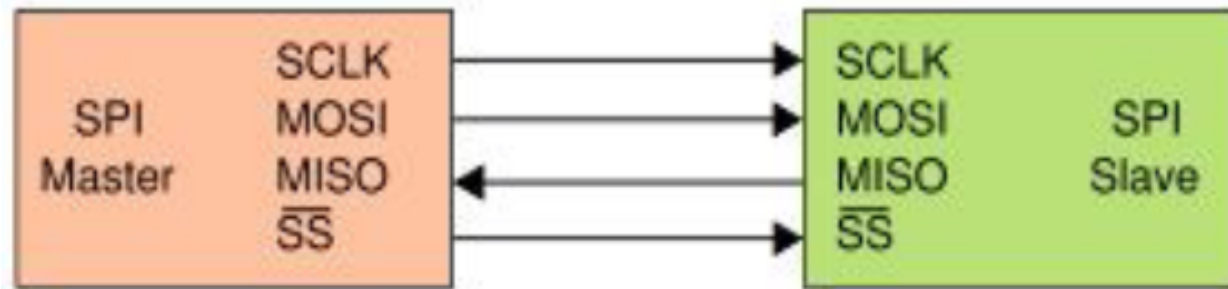


pic16f877A



# SP

# I



- SPI and UART
  - Serial Transmission Mode
  - Transmission Speed
- Why SPI ?



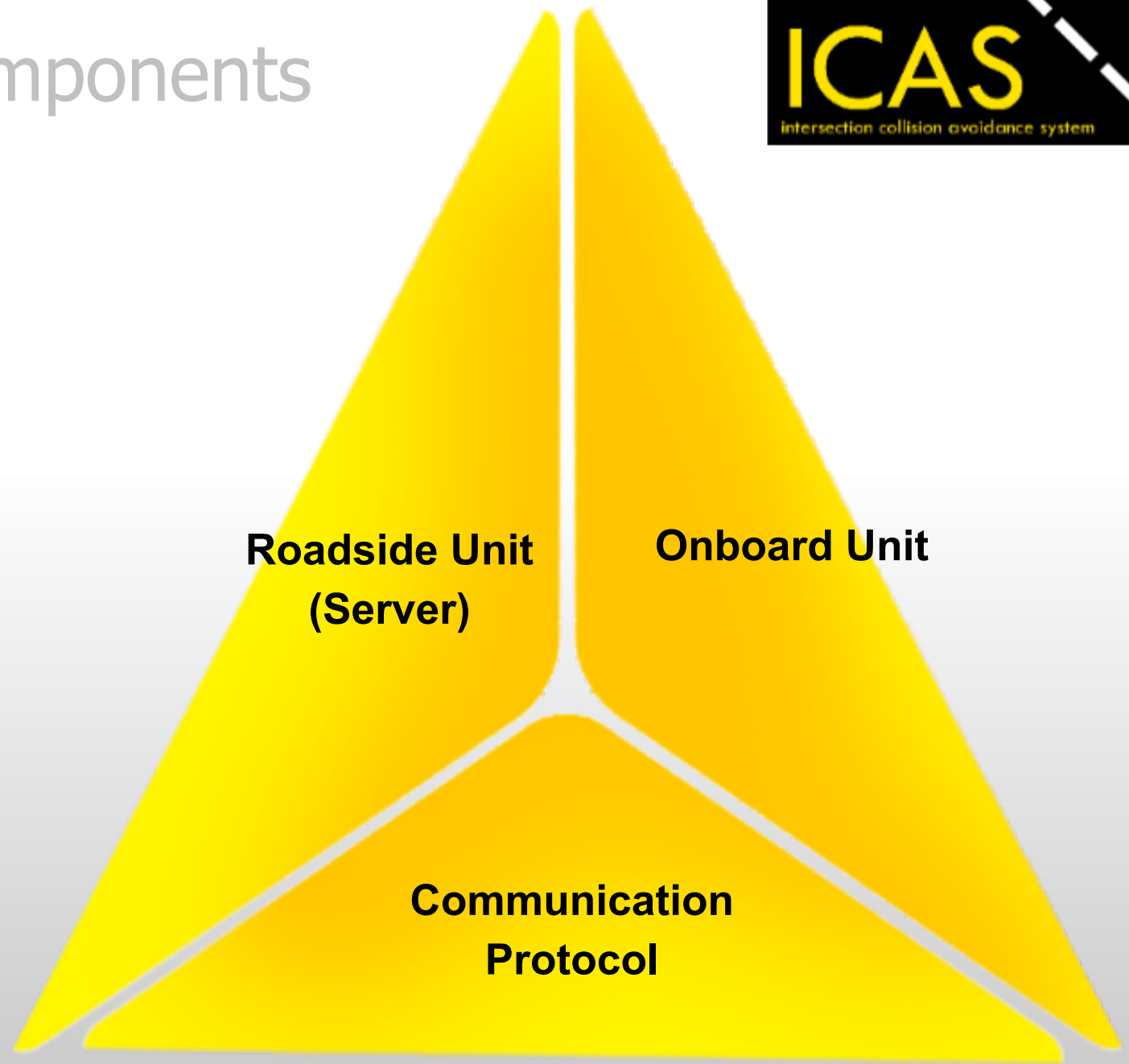
# Wireless Kit

- Purpose
- Choice





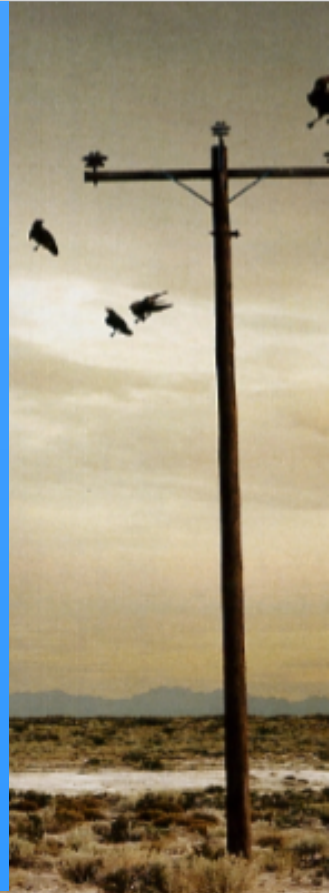
# System Components



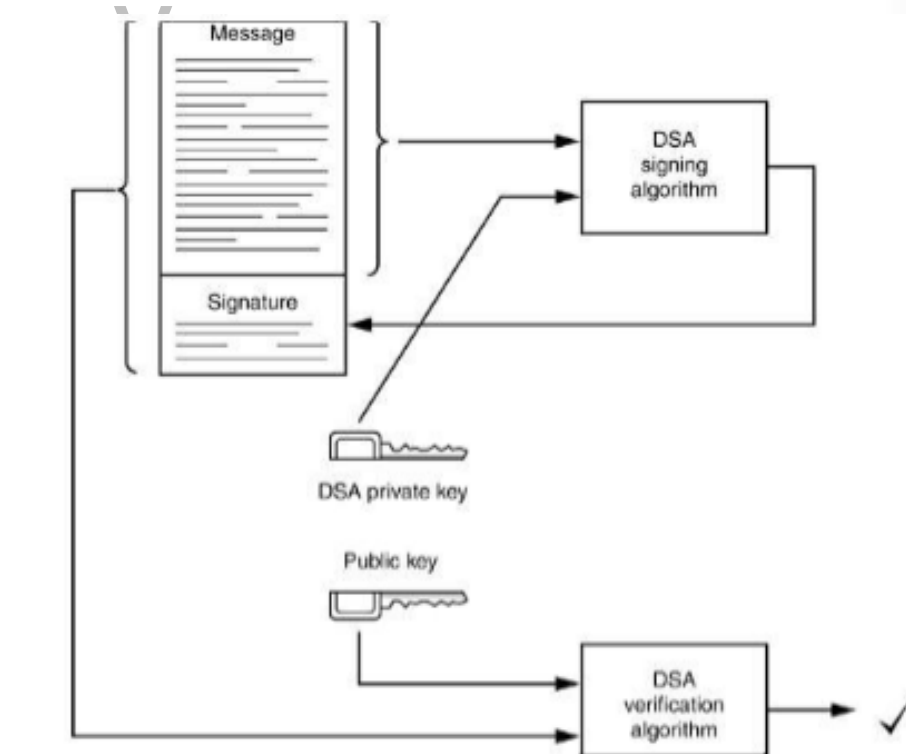
# Communication Methods

- Bluetooth
- RFID
- DSRC
- Wireless LAN

a short to medium  
Radio Frequency  
range wireless protocol  
Identification, Short Range  
Method for identifying vehicles  
covered in the road from  
frequency range (5.8GHz)  
for automotive use. It  
6GHz 802.114GHz 2.4GHz  
Short Range Communication  
offers communication  
Coverage 30 m  
between the vehicle  
and roadside server



# Securit



Overall

View

