# Introduction

These are the functional system requirements for the development of a new passenger motor vehicle as derived from the user requirements.

The car will have a world wide market.

# Functional Requirements

## Power car

### Move car

#### Move forwards

<The car shall be able to move forwards at all speeds from 0 to 200 kilometers per hour on the following flat roads with winds of 0 kilometers per hour, with 200 BHP:

* Cement
* Asphalt
* Gravel.>

#### Move backwards

The car shall be able to move backwards to a maximum speed of 20 Kilometers per hour on standard flat roads with winds of 0 kilometers per hour, with 200 BHP.

### Accelerate car

The car shall be able to accelerate from 0 to 100 Kilometers per hour in 10 seconds on standard flat roads with winds of 0 kilometers per hour.

The car shall be able to accelerate from 100 to 150 kilometers per hour at a rate of 5 kilometers per second on standard flat roads with winds of 0 kilometers per hour.

The car shall be able to accelerate from 150 to 200 kilometers per hour at a rate of 3 kilometers per second on standard flat roads with winds of 0 kilometers per hour.

The car shall be able to accelerate from 200 to 250 kilometers per hour at a rate of 3 kilometers per second on standard flat roads with winds of 0 kilometers per hour.Control car

### Switch on car

The car shall be able to discriminate which authorized people shall be able to switch on and operate the car.

### Control speed

The car shall have a foot mechanism to control the speed of the car.

The speed control shall be infinitely variable from zero to maximum speed.

The speed of the car shall be controllable by automatic means.

### Brake car

The car shall be able to stop from 10 kilometers per hour to 0 kph in 3 seconds.

The car shall be able to stop from 30 kilometers per hour to 0 kph in 7 seconds.

The car shall be able to stop from 100 kilometers per hour to 0 kph in 30 seconds.

The car shall be able to stop from 200 kilometers per hour to 0 kph in 45 seconds.

### Control direction

#### Straight line

The car shall have a mechanism to enable it to be moved forwards or backwards.

##### Direction mechanism

The direction control mechanism shall be hand operated and require no more than 2 inches of hand movement from the steering wheel for successful operation.

#### Directional

The car shall be controllable in any direction.

## Illuminate car

### Illuminate external

#### Illuminate ahead

##### Headlights

Headlights shall be fitted in accordance with statutory regulations abc dated 1 Jan 2003.

Headlight beam patterns shall be in accordance with statutory regulations abc dated 1 Jan 2003.

##### Side lights

Side lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 2003.

#### Illuminate behind

##### Tail lights

Tail lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 2003.

##### Reversing lights

Reversing lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 1993.

### Illuminate in adverse weather conditions

Fog lights shall switch on automatically in adverse weather conditions

### Warn of braking

Brake lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 2003.

### Warn of turning

Indicator lights shall be fitted in accordance with statutory regulations abc dated 1 Jan 1993.

### Switch on lights

All lights shall be able to be switched on without the need for the driver moving either of his hands more the 2.2 cms from the steering wheel.

## Control windows

All windows shall be able to be opened and closed by automatic means by the user.

## Control sun roof

A sun roof shall be able to be opened and closed by automatic means by the driver.

## Maintain visibility

Maximum visibility shall be maintained automatically.

## Stabilize occupants

The car shall be able to maintain stability of travel with maximum tilt from vertical of the car being no greater than 4 degrees for the speed/ turning circle curves at reference xyz.

## Protect passengers

### Protect passively

The car shall be able to protect passengers passively in the event of an accident.

### Protect actively

The car shall be able to protect passengers actively in the event of an accident.

## Protect environmental

### Control emission

The car should meet the necessary emission controls for each country in which it will be used.

### Control disposal

The vehicle shall meet the environmental conditions as agreed in the European treaty dated 1 Jan 1993 for the disposal of used cars.

## Modularity

The vehicle shall be as modular as possible.

The vehicle shall be assembled from pre-assembled parts with 24 hours of labor.

## Control entertainment

### Control radio

The system shall enable the user to control radio reception.

### Control CD

The system shall enable the user to control the CD player.

### Control tape player

The system shall enable the user to control the tape player.

## Communicate

The car shall transmit and receive voice communication by a standard commercial telephone system.

## Calculate

### Calculate fuel consumption

#### Calculate fuel consumption

The system shall be able to calculate the current fuel consumption.

#### Calculate fuel consumption

The system shall be able to calculate the fuel consumption for a specified journey as defined by the user.

### Calculate remaining fuel

The system shall be able to calculate the fuel remaining for guaranteed travel with zero risk running out of fuel.

### Calculate running costs

The system shall be able to calculate the current running costs for the car from data input by the user.

### Calculate direction-to-go

The system shall be able to calculate the next turning for a route specified by the user.

### Calculate miles-to-go

The system shall be able to calculate the number of miles-to-go on any route specified by the user.

### Calculate time-to-go

The system shall be able to calculate the time remaining to complete a journey specified by the user.

### Calculate journey length

The system shall be able to calculate the length of any journey as specified by the user.

### Display route map

The system shall be able to display a route map of any journey specified by the user.

## Accommodate

### Accommodate Occupants

The car shall be able to carry 4 average size adults in average comfort for a period of 3 hours.

### Accommodate Luggage

The car shall be able to carry 200 kilograms of luggage.

### Accommodate Fuel and fuel system

The car shall be able to accommodate the fuel.

The car shall be able to accommodate the fuel delivery system.

### Accommodate Power unit

The car shall be powered by a petrol engine if research proves this to be economical.

The car shall be powered by an electric engine if research proves this to be possible.

### Accommodate Steering system

The car shall be able to accommodate the steering system.

### Accommodate Braking system

The car shall be able to accommodate the braking system.

### Accommodate Lighting system

#### External

The car shall be able to accommodate the external lighting system.

#### Internal

The car shall be able to accommodate the internal lighting system

### Accommodate Telephone system

The car shall be able to accommodate the portable telephone system.

### Accommodate entertainment system

The car shall be able to accommodate the entertainment system.

### Accommodate drive system

The car shall be able to accommodate the power drive system.

### Accommodate accessories

The car shall accommodate the following accessories Number plates, Tax discs, warning triangle, first aid kit, emergency tools, engine identification.

# System constraints

## Reliability

The car shall have a reliability of 99.99% during operation.

## Modularity

The car shall be assembled from modules by 1 person in 1 working day.

## Failure modes

To be defined.

## Fuel efficiency

The car shall be able to travel at 80 kph with a passenger load of 90 kilograms and luggage of 0 kilograms on standard flat roads with a wind speed of 0 kph at a maximum fuel cost of 1.0 pence per kilometer at prices of 1 January 1994.

The car shall be able to travel at up to 200 kph with a passenger load of up to 260 kilograms and luggage of up to 200 kilograms on standard flat roads with a wind speed of 0 kph at a maximum fuel cost of 4 pence per kilometer at prices of 1 January 1994.

## Fuel input mechanism

The car should be compatible with all standard fuel supply mechanisms in the countries to which it will be sold.

## Braking

The car shall be fitted with ABS.

# Acronym List

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| Acronym | Explanation |
| ABS | Anti-lock brake system |
| BHP | Brake horsepower |
| CD | Compact disk |
| kph | Kilometers per hour |