

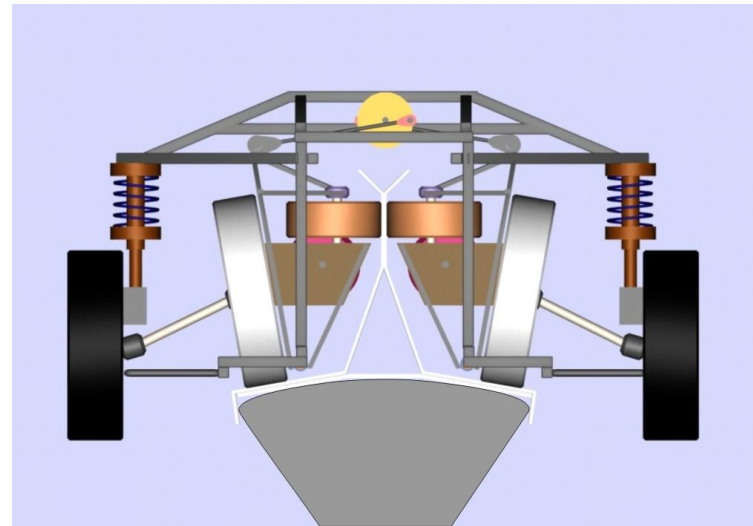
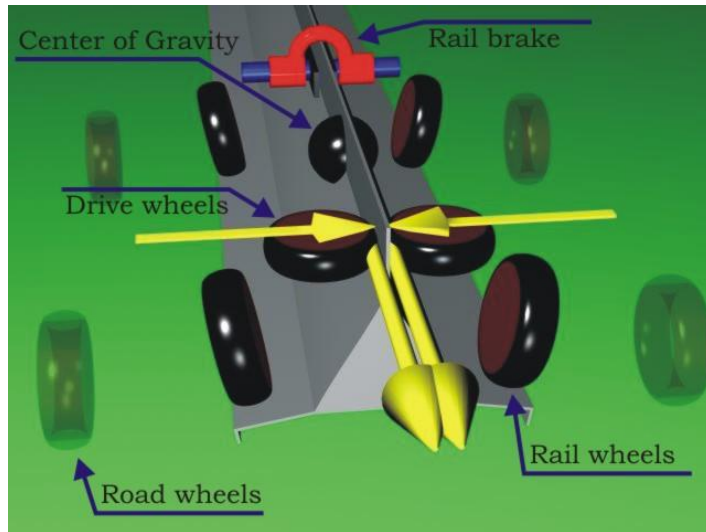
# Claim no. 1

# Drive system

The drive system will enable the vehicles to have **3 times lower rolling resistance** on the monorail than if they were using a normal road at the same speed.

This is caused by the way the drive system is able to **adjust the pressure** against the top of the monorail.

Cars are not able to adjust the pressure against the road. It is defined by gravity.



Is it credible? -100 to 100

Is it improving traffic function? -100 to 100

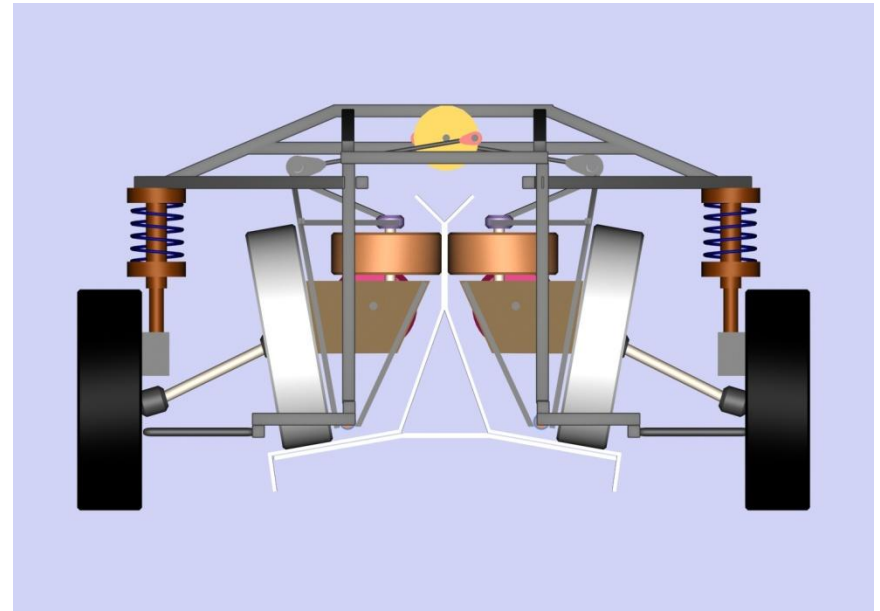
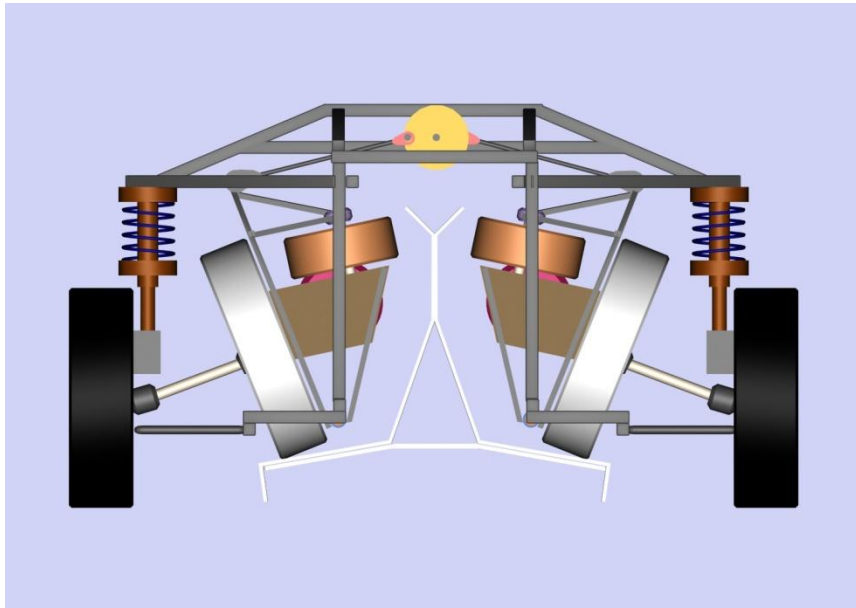
Is it beneficial for the climate? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 2      Open / Close system

The drive system can open and close controlled by a disc, which turns 180 degrees, and softly but firmly applies pressure against the top of the monorail.



Is it credible? -100 to 100

Is it improving traffic function? -100 to 100

Comments:

Is it beneficial for the climate? -100 to 100

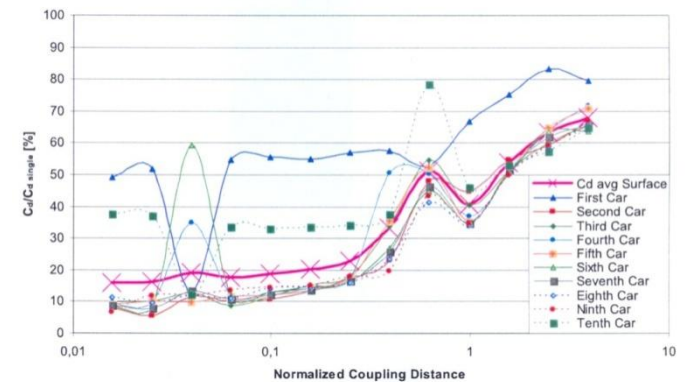
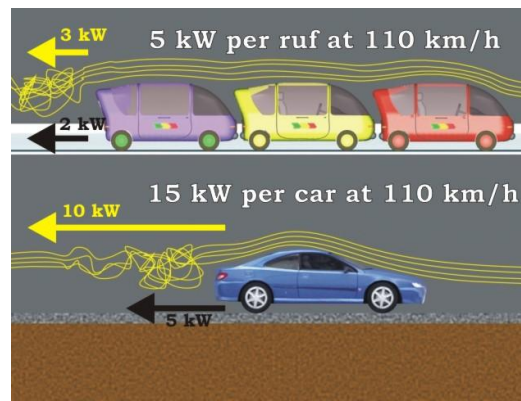
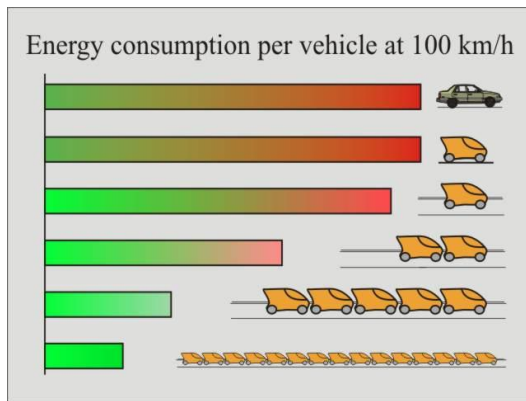
Does it come at a reasonable cost? -100 to 100

# Claim no. 3

# Platooning

Platooning can **reduce the air resistance per vehicle by a factor of more than 3**

Ideal vehicle design will allow for a 10 times reduction.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

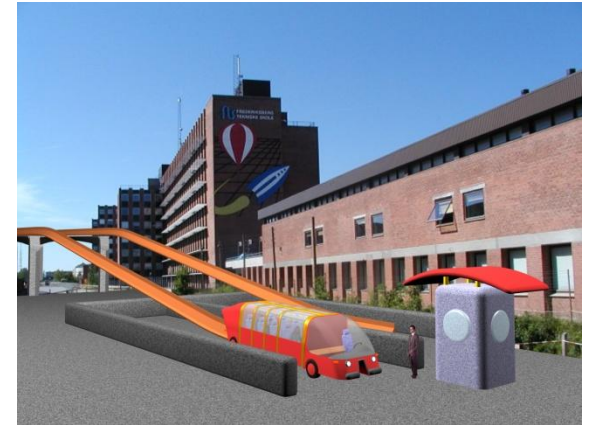
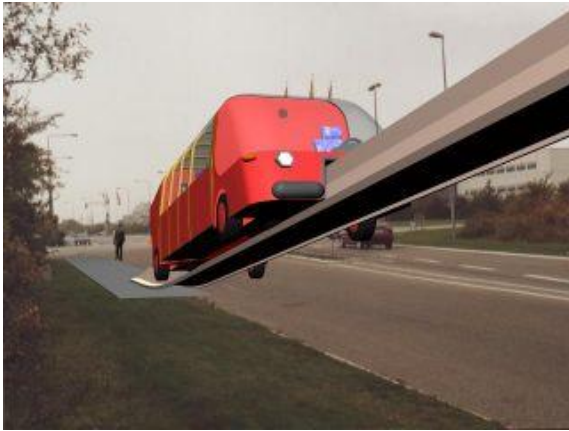
Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 4 Road to Rail to Road

It is possible for the RUF vehicles to change from road driving to rail "riding" at 30 km/h  
The vehicles are guided by magnetic fields from wires under the road surface.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 5      Wheelchair access

Access to the seats will be perfect for all passengers. Direct access from street to seat.  
A wheelchair user can use the wheelchair lift to access the two opposing seats in the front.  
No standing at any time.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

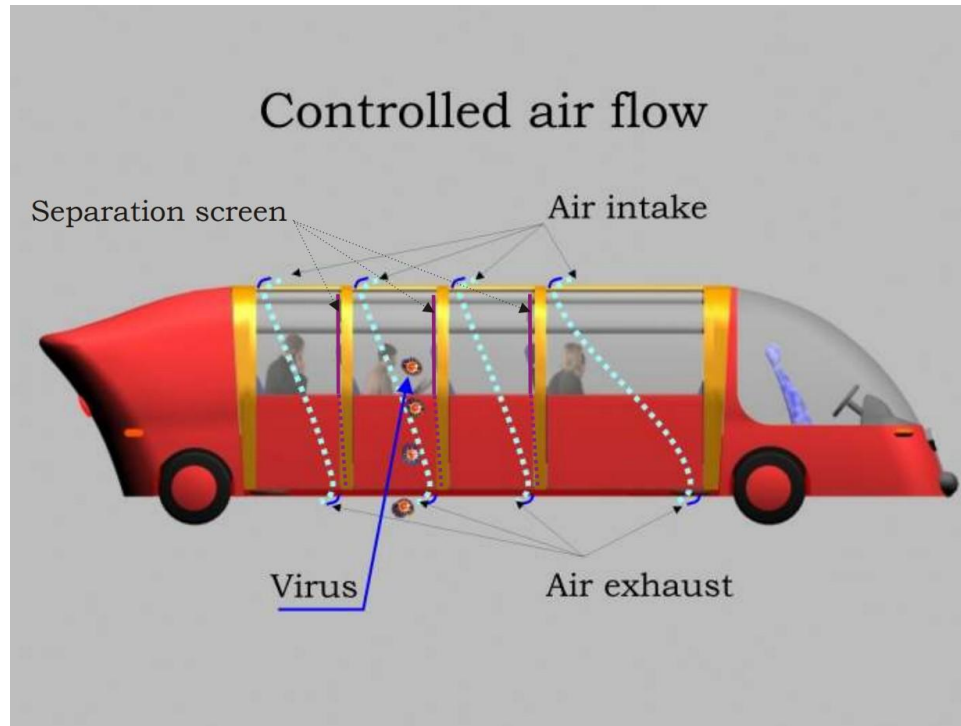
Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 6      Anti Virus protection

In a maxi-ruf, it is possible to ventilate every seat individually, so the virus spread can be prevented.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

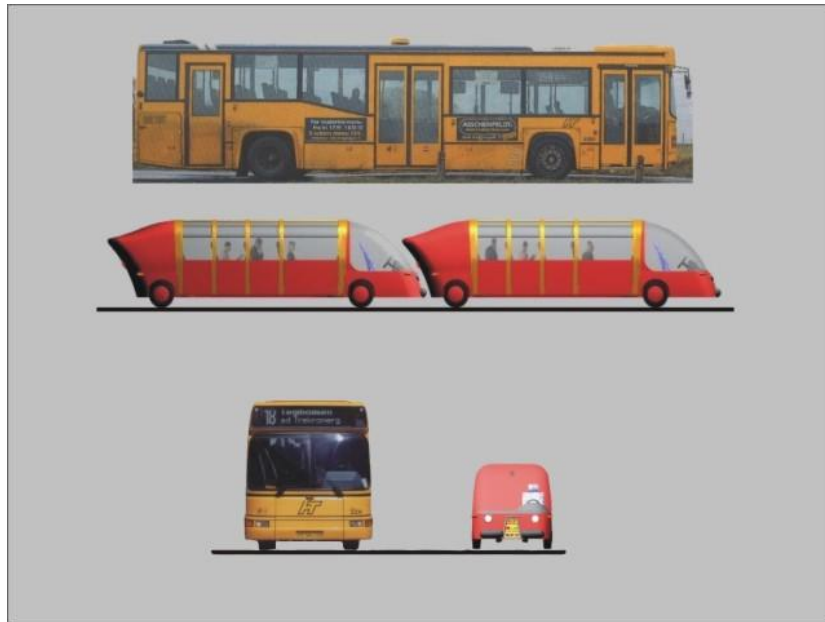
Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 7 Small size. No standing

Compared to normal busses and metro systems, RUF is a very slender system. This makes it easy to implement in a city and avoids fall accidents.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

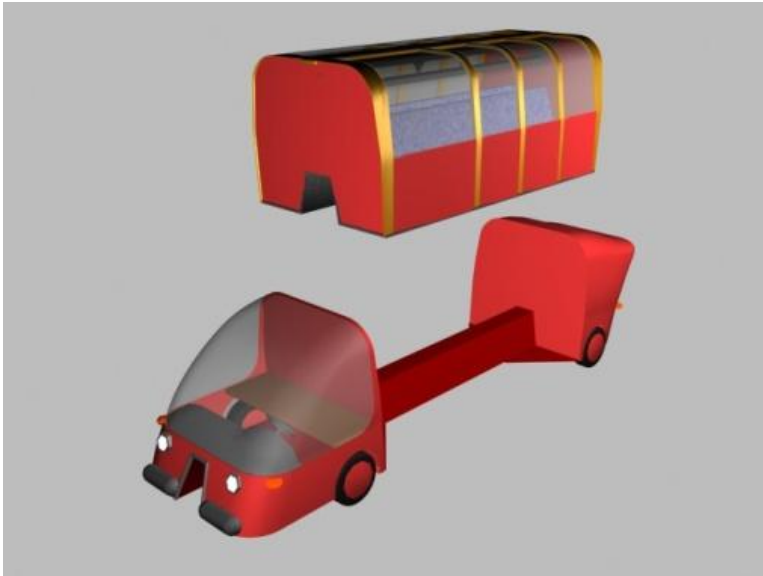
Comments:

# Claim no. 8

# Modular design

The maxi-ruf passenger cabine can be exchanged with other types of cabins.

The 7 m long maxi-ruf vehicle will need to have a channel which is wider in the middle in order to allow for a curvature of the monorail with a radius of curvature of 25 m corresponding to a lateral acceleration of 0.2 G at 25 km/h. This is possible without severely limiting the passenger space.



Is it credible? -100 to 100

Is it improving traffic function? -100 to 100

Comments:

Is it beneficial for the climate? -100 to 100

Does it come at a reasonable cost? -100 to 100

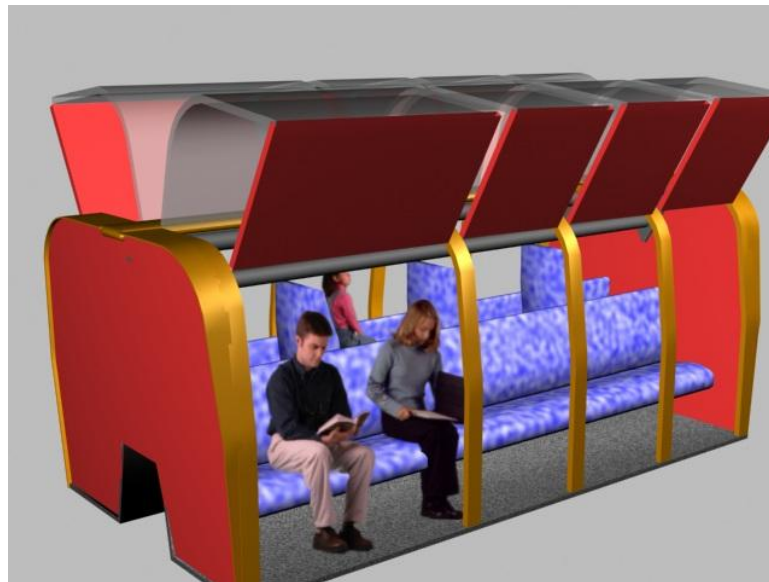


# Claim no. 9

# MEGA RUF

The 10 seats can be exchanged with two benches. This version is called MEGA RUF. This will allow for 20 seated passengers per vehicle.

Above the middle channel, there can be room for small children or luggage.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

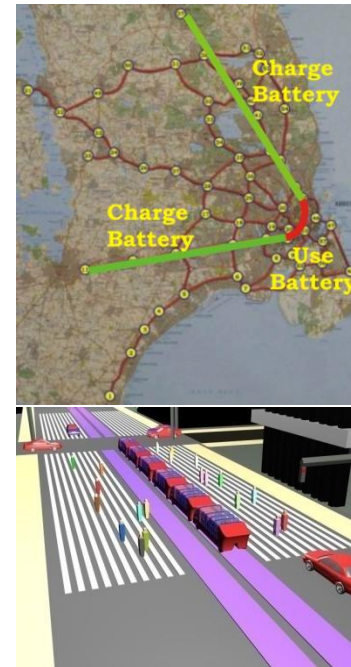
Comments:

# Claim no. 10

# RUF Tram

The maxi-ruf can perform as a "tram" without overhead wires and rails in the pavement. In combination with a RUF monorail network, it is very easy and inexpensive to offer tram service. Combined with longer monorail trips out of the city, the batteries can be recharged.

An extenden pedestrian field can make it possible to enter and leave the tram safely.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

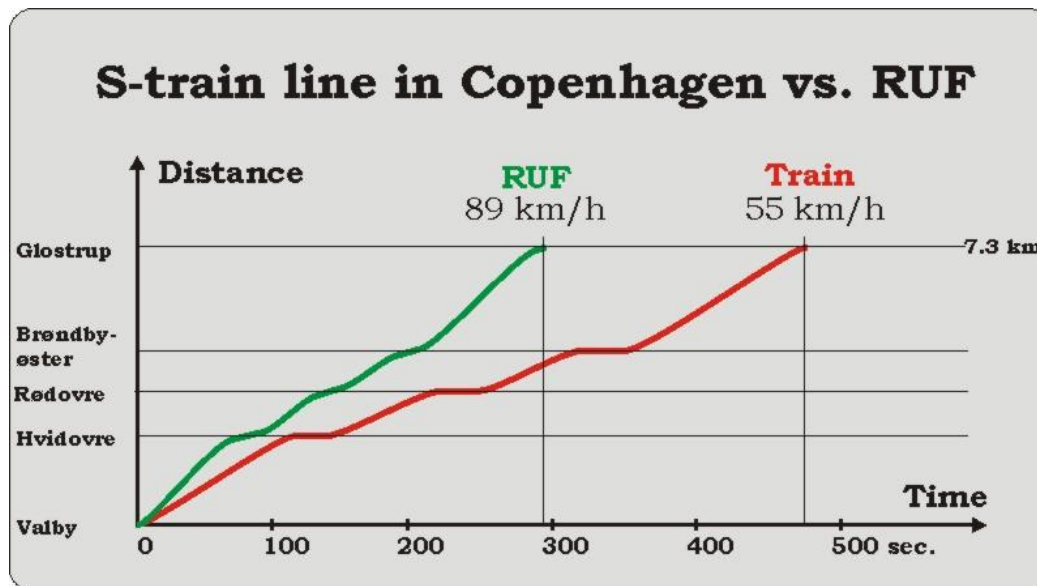
Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 11 High travel speed

The travel speed along a line is higher than for a train, that stops at all stations. The platforms are Off-line.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

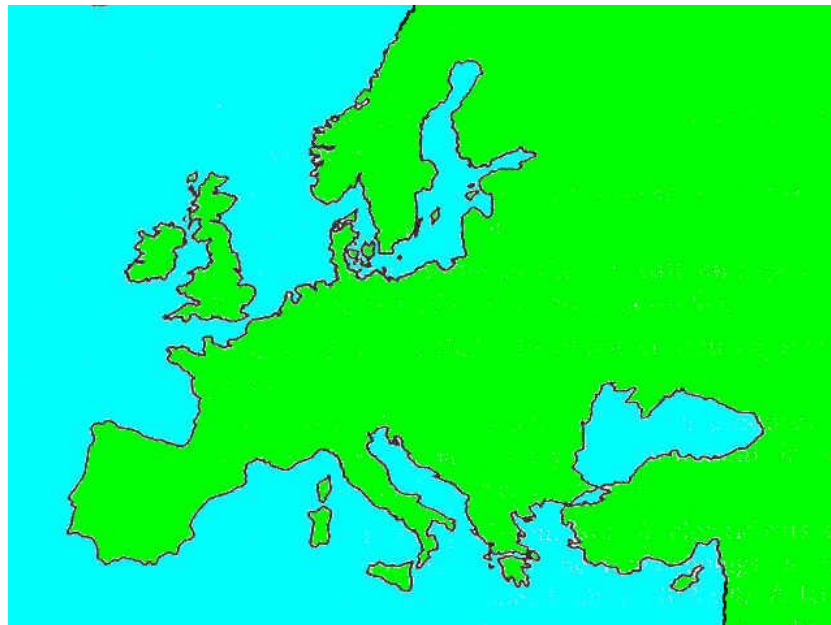
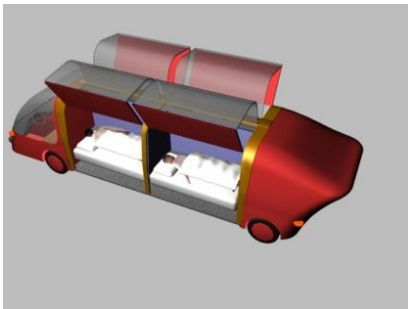
Comments:

# Claim no. 12

# RUF Night Train

Creating a RUF network across Europe will make it possible to avoid a lot of short distance flights. During night you can easily reach most capitals in EU from Copenhagen. You also do not need to pay for a hotel. Small goods can be distributed in a special module.

The expensive parts of a maxi-ruf will be used day and night, which is good for the economy.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 13

# Cabine Space

It is possible to have space enough for the monorail in a car sized vehicle.

It may have to be a little wider than normal.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 14

# Car Design

It is possible to design the RUF car in such a way that it will be attractive to own



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

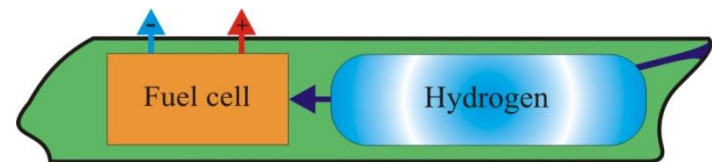
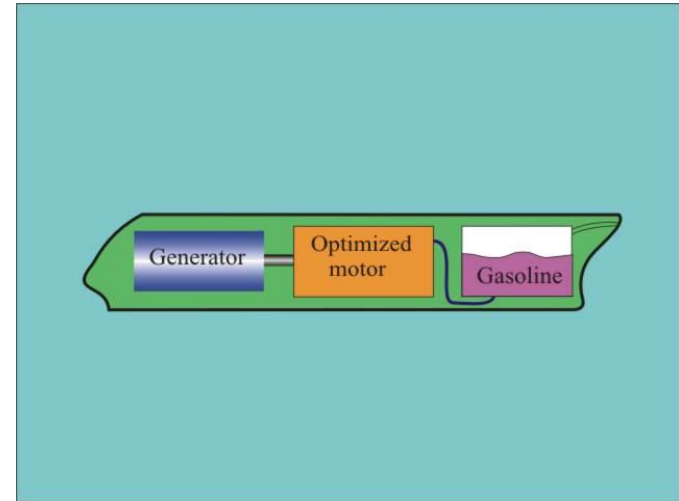
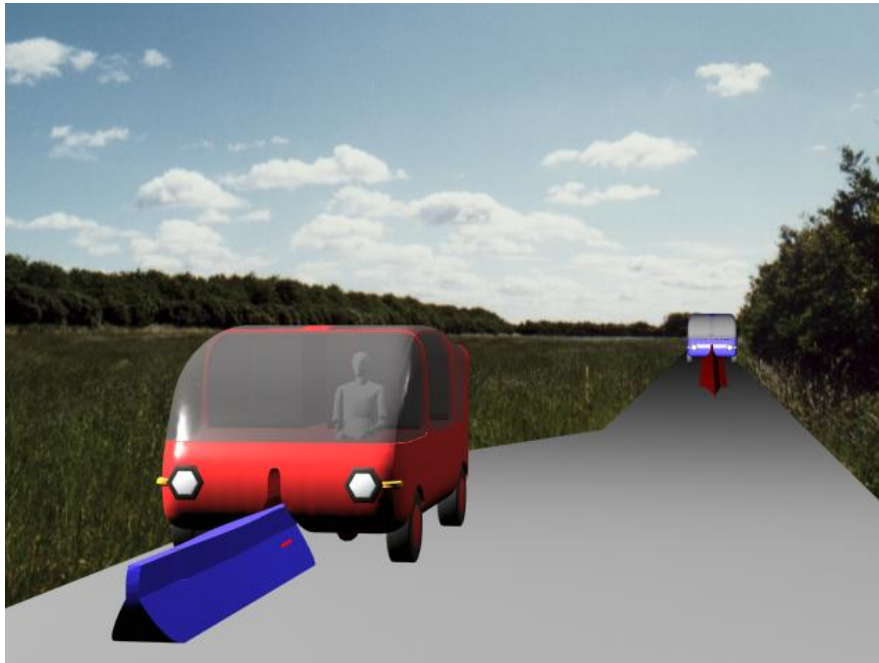
Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 15

# Hybrid Unit

A RUF car can be equipped with a "hybrid unit" in order to expand the range outside the monorail network.



Is it credible? -100 to 100

Is it improving traffic function? -100 to 100

Comments:

Is it beneficial for the climate? -100 to 100

Does it come at a reasonable cost? -100 to 100

# Claim no. 16 Parking rails

Public RUF cars can be parked very efficiently on a parking rail.

The temperature can be held at a pleasant level and the battery can be recharged.



Is it credible? -100 to 100

Is it improving traffic function? -100 to 100

Comments:

Is it beneficial for the climate? -100 to 100

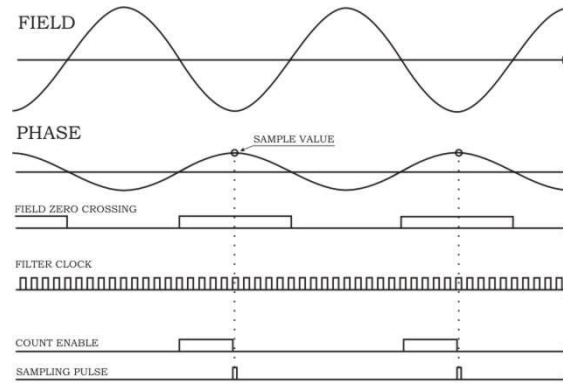
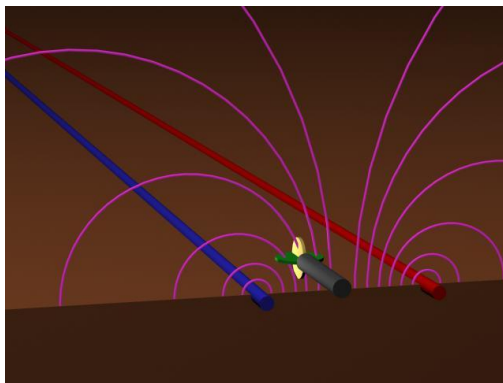
Does it come at a reasonable cost? -100 to 100



# Claim no. 17 Magnetic guidance

It is possible to construct a switch using magnetic guidance at 30 km/h

Service vehicles have been running for many years in the english channel guided by magnetic fields at 50 km/h or more



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

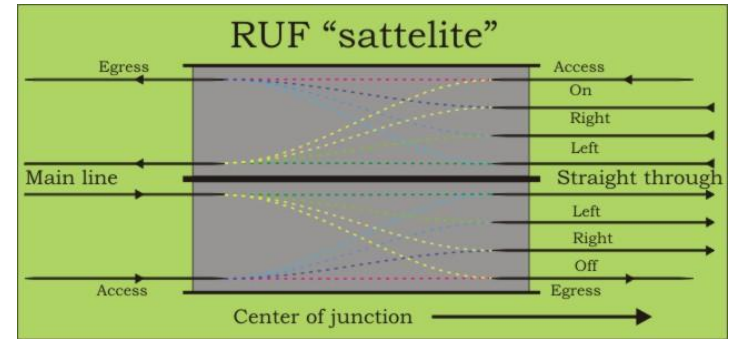
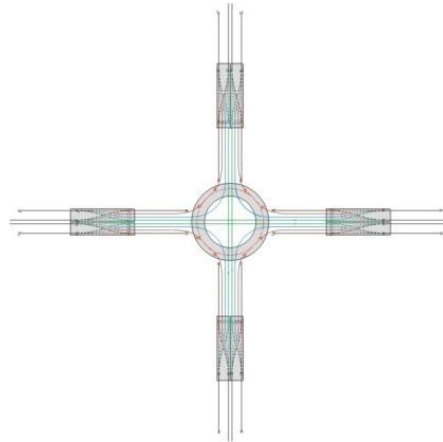
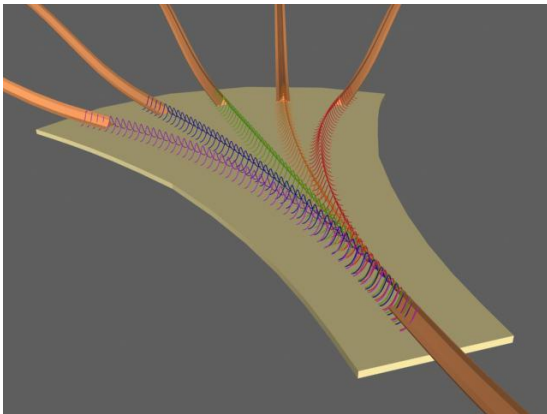
Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 18 Multiple directions

It is possible to have more directions in a switch using different frequencies for the guidance.

It has been tested with 2 directions and 4 is needed for a complex junction.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

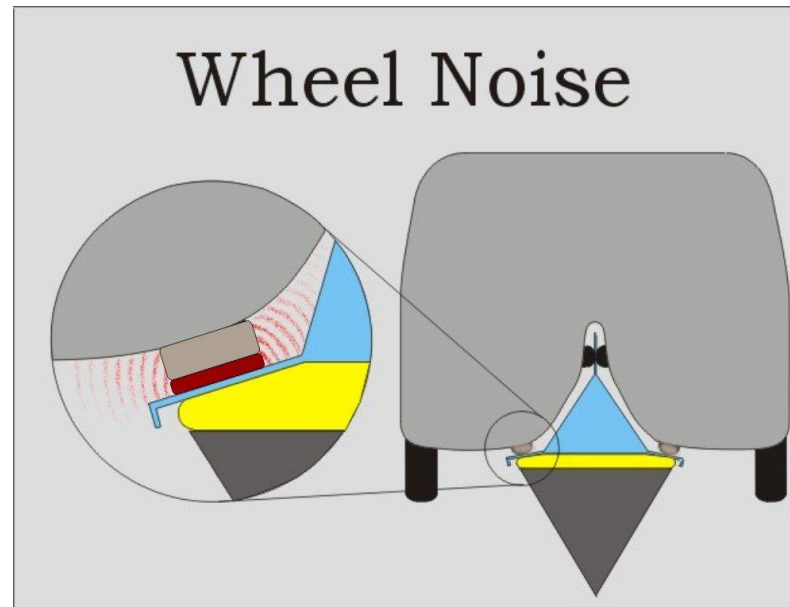
Comments:

# Claim no. 19

# Low Noise

Noise and particle pollution from the tires will be much reduced compared to highway driving.

The support wheels are smooth and placed in such a way, that the wheel noise cannot easily escape to the surroundings. Half of it is absorbed in the slot between the car and the monorail



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

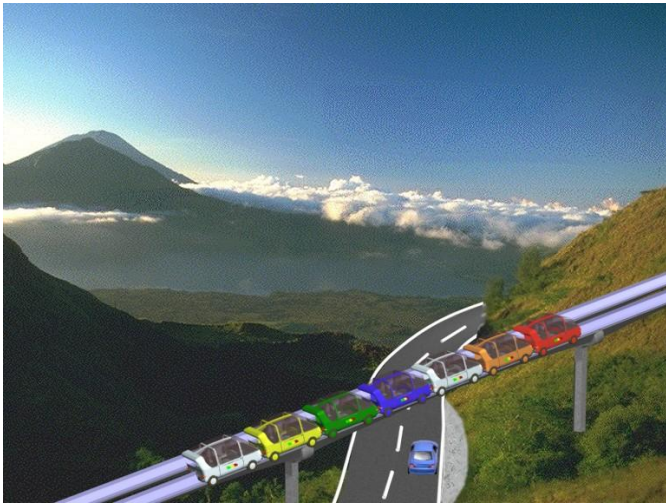
Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 20

# Steep slopes

A RUF line can handle steep slopes due to its special drive system, where the drive wheels press against the top of the monorail



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

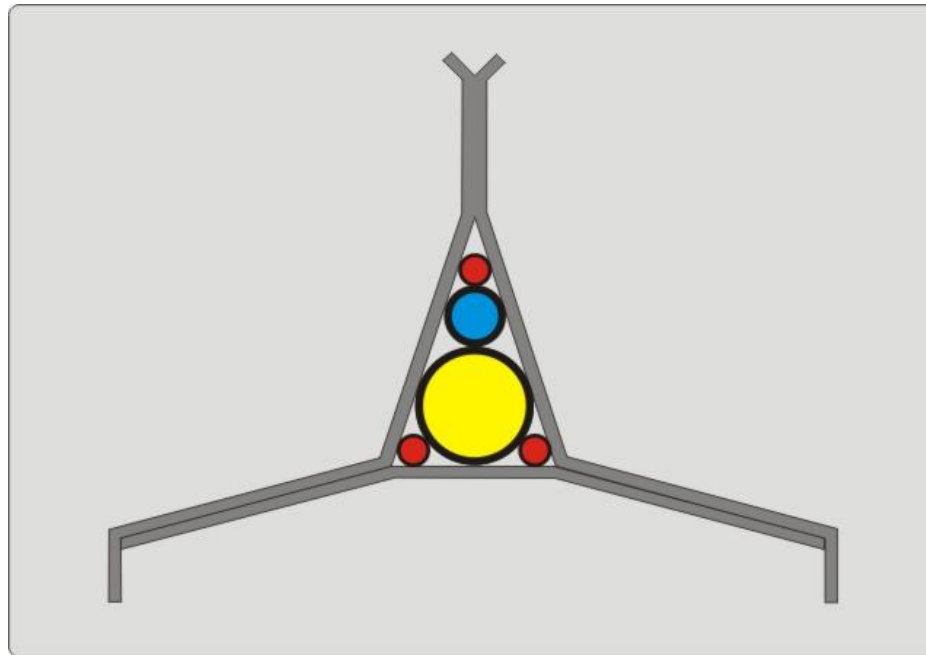
Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 21 Usable rail space

The inner space in the monorail can be used as a protected space for critical infrastructure.  
Data via fiber optics, electric power in copper cables, water and other liquids and gas.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

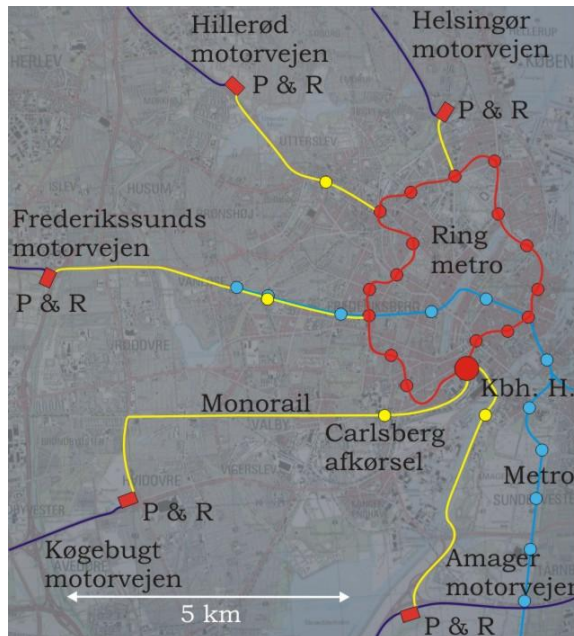
Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 22

# Park and Ride

A very attractive Park and Ride function can be obtained using the maxi-ruf with a chauffeur. The chauffeur has the function to bring the users to the monorail. The car driver can wait in his warm car and only need to walk a few meters.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 23 User friendly access

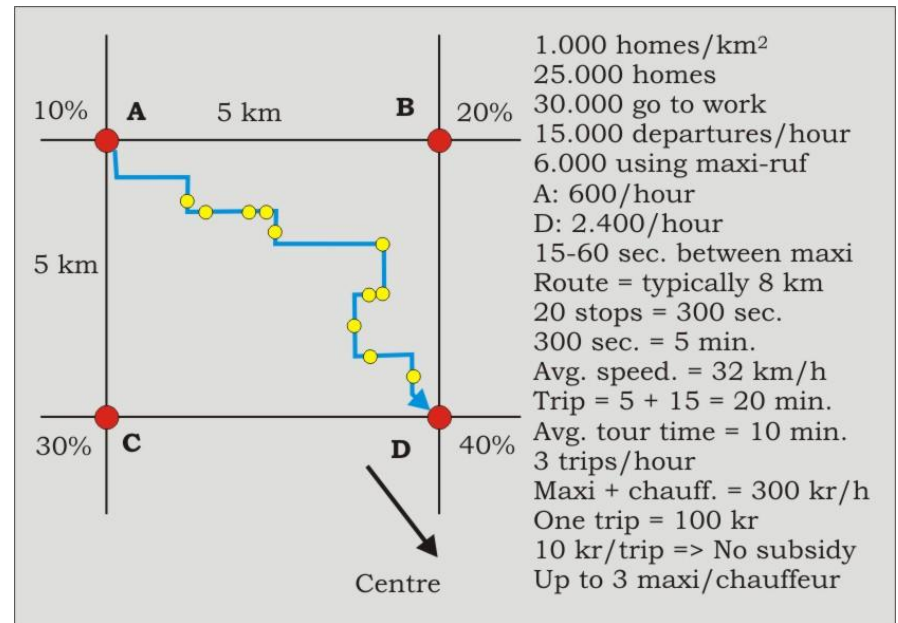
It can be made very easy to choose the fastest maxi-ruf if you are entering from street level in a network of monorails.

A color code will indicate where the maxi-ruf will enter the monorail network.

Farve kodet maxi-ruf



Let at forstå



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

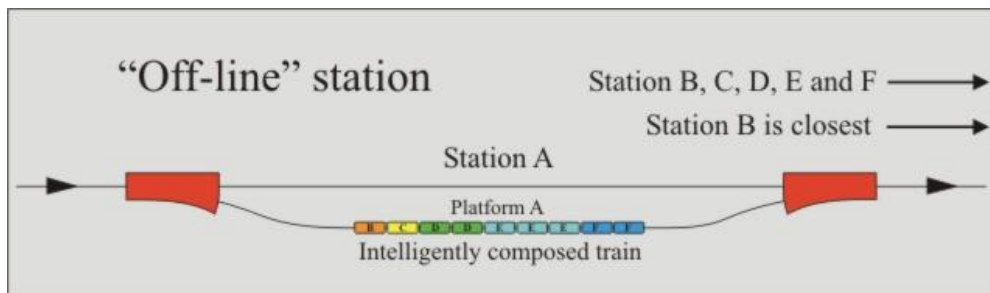
Comments:

# Claim no. 24

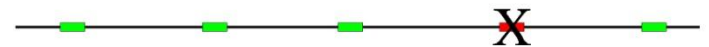
# Off line stations

Offline stations makes it possible to find a maxi-ruf which will bring you non stop to your desired station.

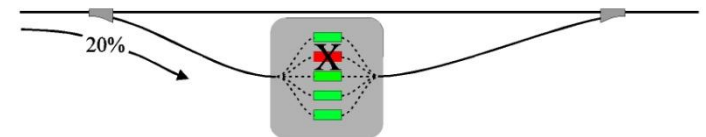
The line will also be more resilient in case of a vehicle breakdown.



TRAIN: Problem at X => System breakdown



RUF: Problem at X => 96% functionality



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

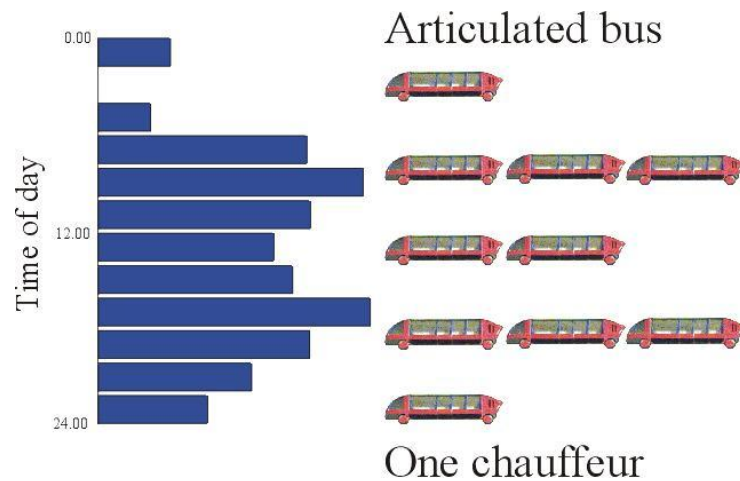
Comments:



# Claim no. 25

# Demand match

A maxi-ruf can be running as an articulated bus where the length depends on the demand.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 26      Easy support structure

A street can be equipped with a RUF line using support structures placed directly on the road surface.

It will be at a very low cost and can be removed again if needed.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 27

# Sub Surface Metro

A "RUF-metro" can be placed just below the surface of a wide road.

Stations are at the surface and the middle section can be used for fast bicycles.

In case of flash flooding, the bicycle lane can be used to take care of the water.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

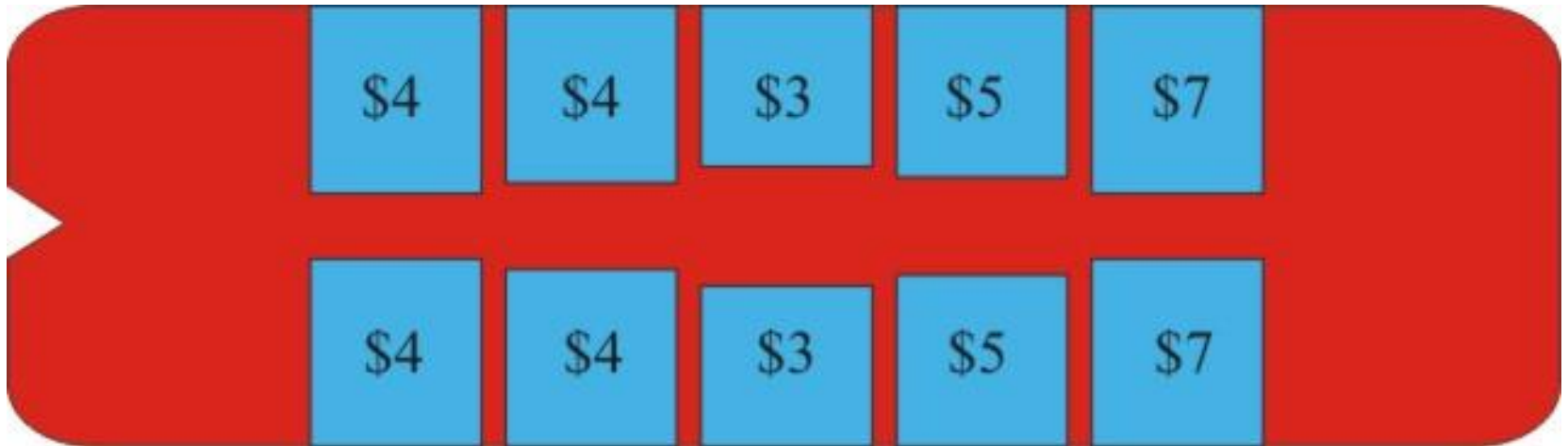
Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 28

# Flex Fare

It will be possible to pay for a better trip, because the seats are separate. The passenger in the rear seat has payed for a door-to-door trip in a wide seat.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

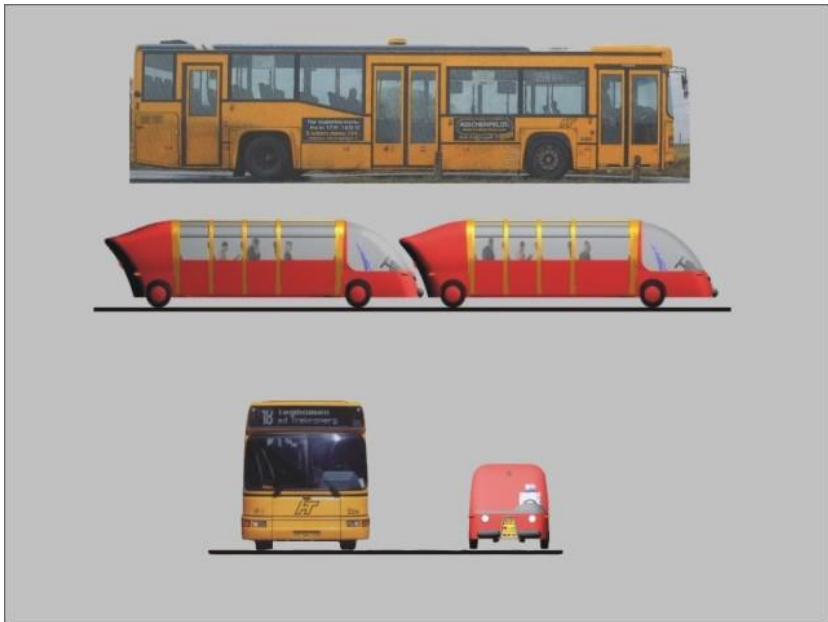
Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 29

# Road destruction

The small maxi-ruf busses will not destroy the pavement, unlike big heavy busses.  
It is well known that one heavy vehicle destroys the pavement as much as 10.000 cars.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 30

# Vehicle weight

The maxi-ruf bus is small and light weight since it has no standing and only 10 seats

## Vehicle weight [kg] per seat (excl. pass.)

TGV



1100

LRT



440

RUF



250

BUS



250

MAXI



250

Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

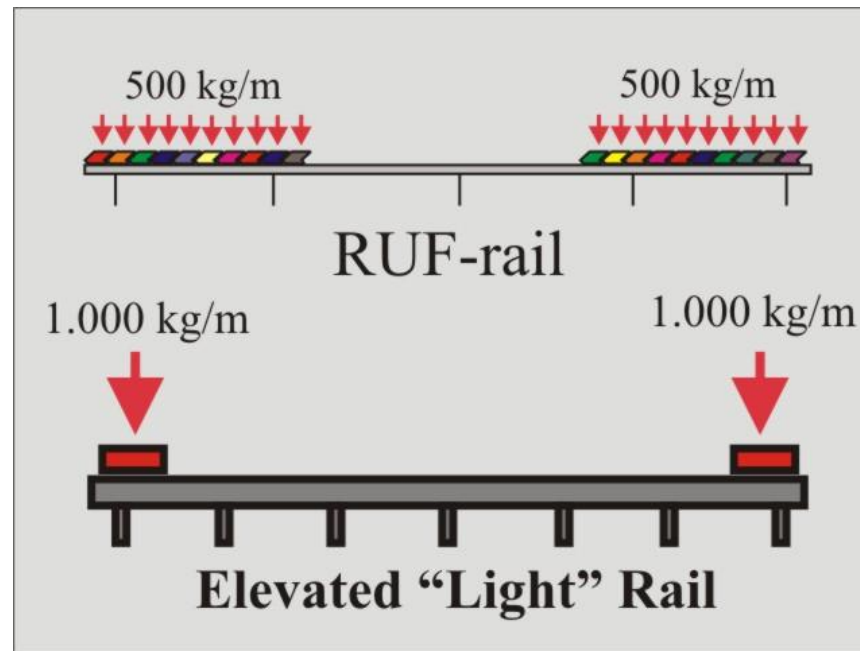
Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 31 Light Weight Monorail

RUF monorails are very slender compared to normal elevated train systems. The normal monorail has to be dimensioned for the maximum load even if it is empty most of the time. The visual impact of a RUF monorail will be much smaller than other monorails.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

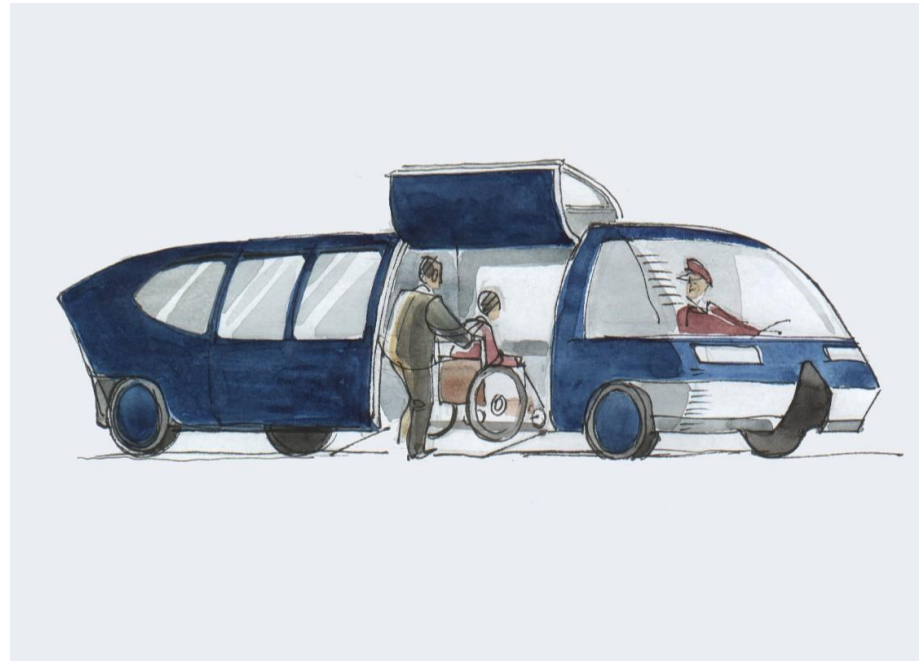
Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 32

# Wheelchair access

A wheelchair will be able to use the room between the two front seats, where the seats are folded.



Is it credible? -100 to 100

Is it improving traffic function? -100 to 100

Comments:

Is it beneficial for the climate? -100 to 100

Does it come at a reasonable cost? -100 to 100



# Claim no. 33

# Network Topology

A battery with a range of 50 km will be sufficient when the monorail network has a mesh size of 5 x 5 km and a hybrid unit is available for longer trips outside the monorail network.

## RUF network



- ◆ Junction speed = 30 km/h
  - Line top speed = 150 km/h
- Average velocity vs. Junction separation:**
- 5 km => 100 - 120 km/h (10-2 ruf/train)
  - 3 km => 75 - 100 km/h
  - 1 km => 50 - 75 km/h



**Los Angeles**

1) Select O and D  
2) Calculate Travel

Show Route

Travel Length

Road: 7280 m  
Rail: 37397 m

Travel Time

Travel Time by Car = 59 min  
Travel Time by RUF = 35 min (24 = On-Line)  
Travel Time by Main-rail = 47 min

Energy Cons. / pass.:

Energy Consumption by Car = 2.563 liter  
Energy Consumption by RUF = 0.771 liter

3) Select New Route

New O/D

ASSUMPTIONS

10 miles

**RUF network performance**

Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

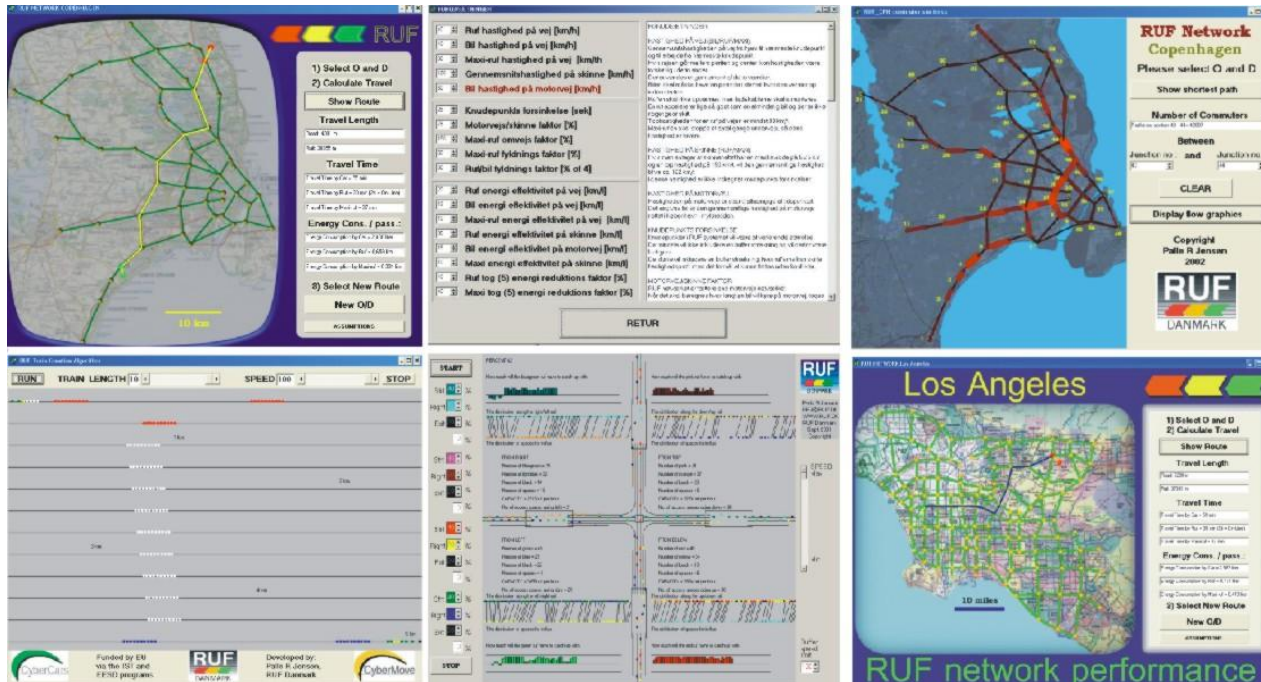
Does it come at a reasonable cost? -100 to 100

Comments:

# Claim no. 34 Performance calculations

In the EU projects CyberMove and CyberCar, RUF Denmark has worked on all aspects of networks in order to prove the claimed performances.

See: [www.ruf.dk/rufcph.exe](http://www.ruf.dk/rufcph.exe), [www.ruf.dk/rufcom.exe](http://www.ruf.dk/rufcom.exe), [www.ruf.dk/ruftrain.exe](http://www.ruf.dk/ruftrain.exe), [www.ruf.dk/rufsim.exe](http://www.ruf.dk/rufsim.exe), and [www.ruf.dk/rufla.exe](http://www.ruf.dk/rufla.exe)



Is it credible? -100 to 100

Is it improving traffic function? -100 to 100

Comments:

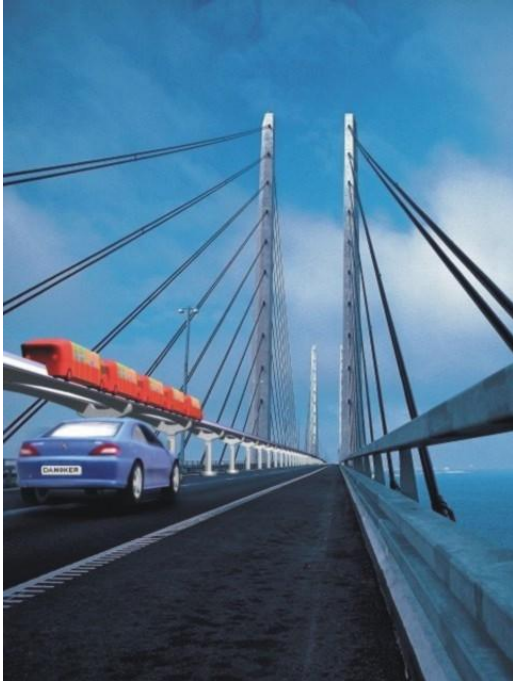
Is it beneficial for the climate? -100 to 100

Does it come at a reasonable cost? -100 to 100

# Claim no. 35

# Weather resilience

Vehicles using a triangular monorail will be far better to function during strong wind and heavy rain than vehicles using a highway.



Is it credible? -100 to 100

Is it beneficial for the climate? -100 to 100

Is it improving traffic function? -100 to 100

Does it come at a reasonable cost? -100 to 100

Comments: