THE FULLY NETWORKED CAR

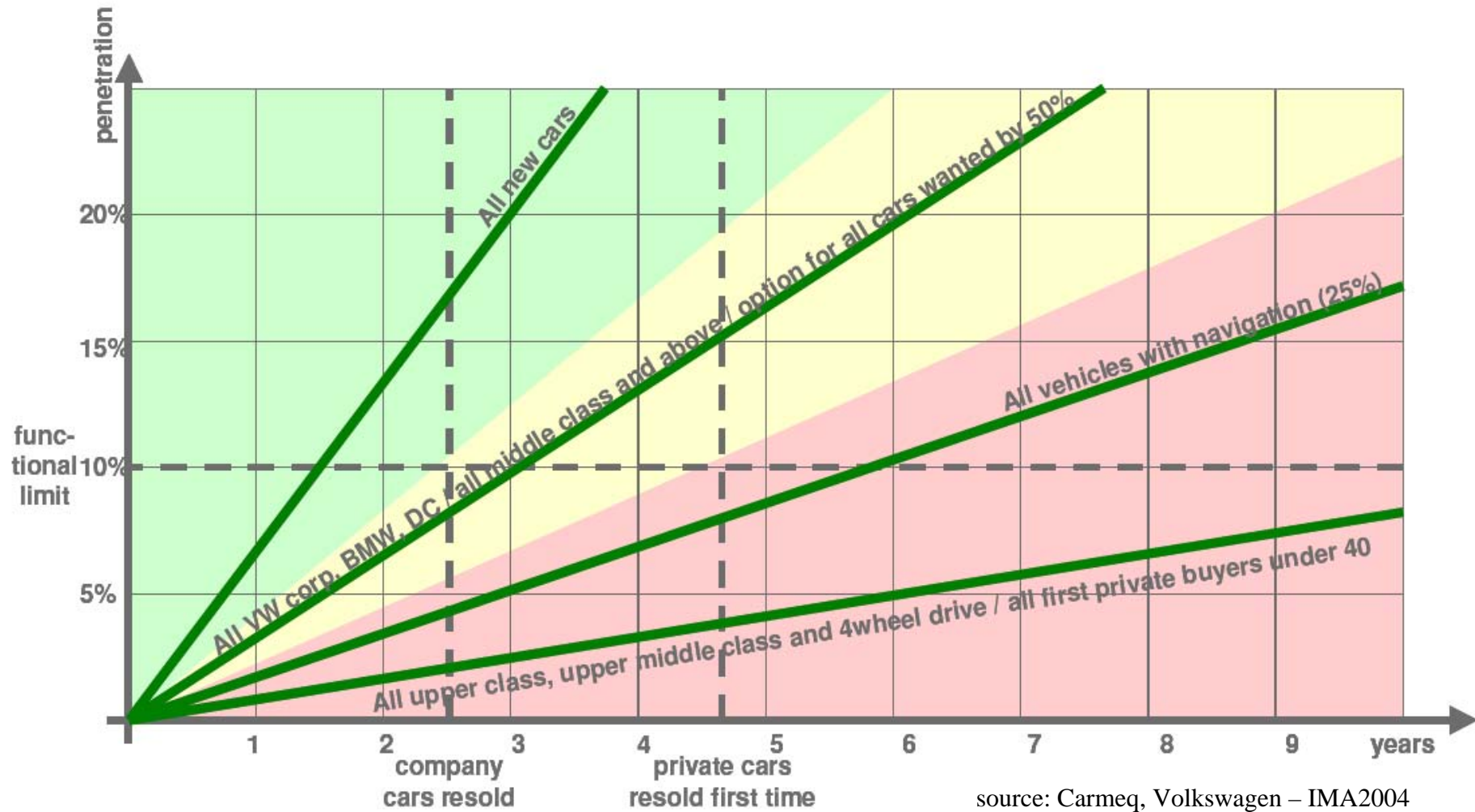## Uwe Daniel

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Safety Forum

Why is consensus needed (1)?

o communication based systems have threshold problems

1. V2V communication based systems need a high level of penetration to allow safety functions

2. V2I systems can only work where supporting infrastructure exists

3. end users can only benefit after 1. and 2. have been set up

penetration

20%

15%

func-
tional 10%
limit

5%

All new cars

All VW corp, BMW, DC, all middle class and above / option for all cars wanted by 50%

All upper class, upper middle class and 4wheel drive / all first private buyers under 40

All vehicles with navigation (25%)

1   2   3   4   5   6   7   8   9   years
company   private cars
cars resold   resold first time

source: Carmeq, Volkswagen – IMA2004

Why is consensus needed (2)?

o   safety critical applications need a well defined behavior

1.   all systems/components must comply with a minimum set of requirements (maximum delay time, availability etc.)

2.   all systems/components must interact in a well defined way (interference, protocols)

Why is consensus needed (3)?

o viable business models will only evolve if the market will not be fragmented

1. otherwise the threshold problems must be solved for each rivaling system

2. economies of scale are needed to make on board units feasible

3. infrastructure investments will multiply with system diversity

Why is consensus needed (4)?

o business models require revenue sharing

1. benefits will occur in national health care, insurance, economic savings etc.

2. investment will be needed by public authorities, road operators and industry

3. cash flow from end users will emerge years after the systems have been set up completely

What are the obstacles?

o spectrum:

1. worldwide different allocations (ITU regions 1-3)

2. Different policies in the EU member states and of regulatory bodies

3. competing services/technologies (outside ITS) for bandwith requirements

obstacles (2)

o standards

1. multimode/multistandard systems are more expensive than dedicated single standard systems

2. interoperability will be needed to allow additional future functions and services (open interface in on-board units)

Summary

o EU wide (worldwide?) harmonised spectrum needed

o standardised systems with guaranteed minimum performance (quality, reliability, function parameters) needed

o pre-investment in infrastructure needed

o pre-investment in on-board units needed

o business models must allow cash flow between profit owners and investors