

The Benefits of Ultra-Narrow Vehicles

by Rick Woodbury

Our purpose here is to acquaint this committee with a fresh idea to consider and utilize to confront the problems of congestion, parking scarcity, pollution, and dwindling natural resources.

This proposal simply calls for the most convenient and efficient use of our existing transportation infrastructure, in a fiscally responsible and safe manner.

Senate bill 5985 defines Ultra-Narrow Vehicles (UNVs) as any vehicle having a maximum width of forty-two inches from mirror to mirror.

Commuter Cars has developed a revolutionary Ultra-Narrow Vehicle that dramatically improves the mobility of commuters while addressing the issues of parking scarcity, air quality, energy consumption, and reliance on foreign fuels.

In conjunction with other efforts and strategies currently being considered and applied, the Commuter UNV can be a powerful ally.

As we proceed, we hope, too, that the economic opportunities in launching and building a new Washington state industry...with global reach...will not be absent in your considerations.

Here is our approach to dealing with the following issues . . .

Reduction of Roadway Congestion

Ultra-Narrow Vehicles (UNVs) accomplish this by increasing the vehicle capacity per lane by 126%. In other words if a given lane on the freeway has a capacity of 2,000 vehicles per hour, as UNV's approach 100% lane occupancy, capacity increases by well over double, to 4,520 vehicles per hour. This is the conclusion of two different studies included in this package. One is from the Institute of Transportation Studies at the University of California, Berkeley. The other is by Booz-Allen & Hamilton. These studies were funded by the California Department of Transportation, the Federal Highway Administration, and others.

This increase in capacity effectively expands current infrastructure without requiring additional capital investment from the state to construct additional freeway lanes.

The premise is based on the fact that between 85 and 90% of all vehicles have only one occupant. In any other existing vehicle, with the exception of a motorcycle, a whole lane is used for this single person. 1,400 to 2,600 square feet of freeway real estate is used per person at 67 mph for braking delays of 1 to 2 seconds. As it's unlikely to convince a large percentage of commuters to endure the discomfort and danger of motorcycles, the UNV comes to the rescue.

Occasionally people question the practicality of cars driving in a narrow lane with the same clearance that a truck has in a 12 foot lane. As the 42 inch proposed maximum width of a UNV provides precisely the same clearance in a 6-foot half-lane that a truck has in a full 12-foot freeway lane, I'd like to point out two additional factors. When several trucks occupy adjacent lanes at 67 mph, the time that they are side-by-side or have the potential to hit one another if one were to swerve toward the other ranges between 67% and 100% of the time as the braking delay ranges between 2 seconds down to 1 second. The UNV at 8 and a half feet long, will only be side by side with another UNV from 8% to 16% of the time as the braking delay ranges from two seconds down to one second.

The other factor is that truck drivers have a much more difficult time placing the truck in the center of the lane because of visibility, particularly to the right side of the truck. Mirrors must be used to determine accurate lane placement. Not so with the UNV. Because of the cab-centered position of the driver, both sides of the vehicle are the driver's side, making lane placement quite natural and easy.

Commuters should naturally gravitate toward the UNV because of the inherent benefits of parking and driving convenience as well as safety.

To get the quickest benefit however, some simple incentives that cost the public little or nothing would accelerate the adoption of UNVs.

The senate bills before you are a preliminary step toward this end. The current law does not prohibit two cars from occupying a single lane, however, in anticipation of possible confusion on the part of traffic officers in regards to this, this clarification, along with a definition of a UNV, are being submitted for your consideration.

When the Tango was featured recently on the front page of the business section of the Seattle Times, hundreds of emails and phone calls came in requesting information. Many of them expressed strong interest in the Tango *if* it would be legal to use in the HOV lane with a single occupant. This would be an incentive for many and hopefully pave the way to such widespread use that traffic congestion would be reduced.

For future consideration, a very strong incentive would be to allow UNVs to operate in a manner that has been legal for motorcycles in California for over 30 years. In your packets, there is a copy of the California Highway Patrol's Q&A web page regarding this practice.

Q. "Can motorcycles riders 'split' lanes and ride between other vehicles?"

A. "Lane splitting by motorcycles is permissible but must be done in a safe and prudent manner."

I'd like to point out that a UNV by the proposed definition is 2 inches narrower than a Honda Gold Wing motorcycle. The Tango is actually 5 inches narrower.

Further benefits are pointed out by the Motorcycle Safety Foundation division of NHTSA where it states: "A motorcycle's narrow width can allow it to pass between lanes of stopped or slow-moving cars on roadways where the lanes are wide enough to offer an adequate gap. This option can provide an escape route for motorcyclists who would otherwise be trapped or struck from behind. There is evidence (*Hurt, 1981*) that travelling between lanes of stopped or slow-moving cars (i.e., **lane splitting**) on multiple-lane roads (such as interstate highways) slightly reduces crash frequency compared with staying within the lane and moving with other traffic.

"Although lane splitting is allowed in just a few areas of the United States, notably California, it appears to be worthy of further study because it offers a means of reducing congestion in addition to possible safety benefits. It is widely used in many other countries."

If congestion pricing is initiated, exempting UNVs could be another incentive.

Other than the obvious capacity increase that is afforded by UNV drivers, I'd like to point out that the road surface used by a UNV is almost always a different surface than that used by ordinary vehicles and trucks. From my own driving experience on on freeways, I tend to straddle the ruts.

Reduction of Emissions

Although electric vehicles have zero emissions where they are used, there are some who question if the pollution is just being moved from tail pipe to smokestack. Because an electric vehicle runs approximately twice as efficiently as an internal combustion powered vehicle, considering all losses from electricity production, power transmission, charging, power train, and friction from vehicle to pavement, there are, at worst case, half of the

emissions. In the Northwest, because of the high percentage of hydro and non-polluting renewable sources of electric power, there is as much as a 94% reduction in emissions which include CO₂ production for every mile travelled.

A further benefit is some relief from the 5.7 billion gallons of fuel wasted each year due to congestion, as pointed out by the Texas Transportation Institute in their 2002 *Urban Mobility Report*.

Another interesting comparison with the ICE (Internal Combustion Engine): The day a new ICE car is sold is the cleanest it will ever run. 5 or 10 years later, the emission control systems will degrade to a certain degree. Electric cars become cleaner as time passes and power plants are built using cleaner sources of energy. So, in 10 years an electric car purchased today will run cleaner than it would today.

Dependence on Foreign Fuels

As just pointed out, approximately half as much fuel is used to propel an electric car because of efficiency alone. A further benefit is that oil is almost never used to produce electricity in this country. At worst case, highly-regulated burning of domestic coal is used to produce electricity in the eastern states.

Urban Parking and “Park and Ride” Lot Capacity

Whether commuters choose to park-and-ride or drive directly to their destination, parking is a growing problem.

Ultra-Narrow Vehicles, as defined by the bill before you, are 42 inches wide, or less. As a reference, the Tango is a mere 39 inches wide.

With these dimensions, UNVs have the opportunity to increase parking capacities fourfold. Parking perpendicular to the curb, four Tangos fit easily in a 22-ft parallel space with adequate space to open either door.

In a parking lot, re-striping to accommodate UNVs could yield a 3.5 to 1 density increase. In this packet, you will find documentation illustrating this in the Booz-Allen & Hamilton *Study of Road Infrastructure Requirements for Innovative Vehicles*.

This UNV feature benefits public, private, and employee parking concerns.

Safety

The Tango's safety features are hallmarks of Commuter Cars' technology and design. They far exceed standards deemed acceptable in other production cars, and focus on passenger compartment integrity, performance, and the highest standards of crash survivability.

Features include:

- An all-around roll cage that meets or exceeds the safety standards of two major racing sanctioning bodies, SCCA and NHRA. The protective cage is constructed of steel tubing that meets NASCAR requirements.
- A rollover threshold of 56 degrees, or a 1 point five to one ratio of half the track to the center of mass height, is equal to the lowest-slung sports cars. This gives the Tango a 5-star rating according to NHTSA static rollover stability standards.
- Maneuverability and width are comparable to a motorcycle—it more easily avoids pedestrians, objects, animals, and other vehicles.
- Acceleration, traction, and top speed are programmable and can be governed by password-protected settings with a laptop or Palm Pilot.

Charging Infrastructure

Pure electric drive hasn't proven practical when used to power family cars. This is because of the lack of range that is needed, at least occasionally, in such a vehicle. As the commuter car or UNV is a niche vehicle, and will rarely be a first vehicle for a household, most consumers will not find the range inadequate. In fact, with inexpensive lead-acid batteries, giving an 80 mile range, they can travel almost 4 times the average daily commute. With charging from either 110 or 220-volt outlet at work, the daily range is doubled. Another benefit of lead-acid batteries is that they can be charged to 80% in about 10 minutes if 200 amp 220v power is available. Infrastructure for charging will surely grow with demand. There are already hundreds of charge stations throughout California at Costcos, Kaiser hospitals, BART transit stations, and many parking garages. As park & ride lots fill, the 3.5-to-one capacity increase would be an incentive for installing chargers.

Transportation Revenues

Even as incentives are enacted to encourage and enable the use of UNVs, whether they be battery-electric, fuel cell, or hybrid, the need remains to fund transportation infrastructure development and maintenance.

This could easily be handled through a re-charging or re-fueling system's ability to monitor and apply appropriate fees for energy use. For electric charging, a separate meter could be installed at the charger to include road tax.

Economic Development

We see this as a huge new industry for the state of Washington. There are strong markets for these vehicles throughout the world. We have a U.S. patent and patents pending throughout the world. It is our intention to start operations here in Washington.

According to one of the Booz-Allen & Hamilton studies, the California market has a potential for 69,000 UNVs per year and a saturation of 826,000. These numbers are the averages of the high and low markets from averages of 3 different methodologies.

In September, 2002, Representative George Nethercutt invited Commuter Cars to Washington, DC to present the Tango to members of Congress. We carried letters of support from Governor Locke and Spokane Mayor John Powers.

As a result of that trip, Congressman Nethercutt is actively working to include provisions in TEA-21 to encourage states to consider incorporating Ultra-Narrow Vehicles into their transportation planning.

UNV access to HOV lanes, lane-splitting, and funding for striping and signage are among the provisions being presented.

In Closing

Commuter Cars presents a new and exciting industry for the state of Washington.

Through your support, we will build this company to offer relief from transportation and budget issues while increasing economic development and improving the environment.

The Commuter Car is not just a solution—it is a Washington solution to a worldwide problem—and that is something we can all be proud of.