

Intelligence MEMOS



From: Donald N. Dewees
To: Federal and Provincial Ministers of Transportation
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Re: HOW BIG ARE THE BENEFITS OF AUTONOMOUS AUTOS?

Proponents claim [billions of dollars](#) in benefits from accident prevention by autonomous (self-driving) vehicles. Many assume that autonomous vehicles will prevent 80% of motor vehicle accidents which seems reasonable when 93% of accidents arise from driver error. But there are many steps from today's cars to full autonomous driving on all roads in all conditions. There will be automated vehicle (AV) features from adaptive cruise control to automatic emergency braking through lane-keeping, ultimately to systems that navigate complex urban streets with pedestrians, bicycles, potholes and construction obstacles in rain and snow and slush.

We must also recognize how drivers react to safety features in cars. Drivers have responded to seat belts, air bags and anti-lock brakes by driving more dangerously, offsetting some of the anticipated reduction in fatalities and injuries. With partial AV we should expect more dangerous driving. Moreover some drivers have refused to use even simple and effective devices like seat belts.

We have all seen careless driving; driving too fast, following too closely, changing lanes into a space too small and weaving through traffic. These maneuvers would not be allowed by AV safety features. Are these drivers likely to submit to the placid ride of AV control, or do they value the fun or time-saving of aggressive motoring more than their perception of the accident risk? Some drivers will switch off or refuse to activate AV accident-avoidance features, particularly when those features may reduce the speed or enjoyment of their driving. Requiring partial or full AV collision-avoidance features in new cars will not ensure their use by those who need them most.

Can we require drivers to use AV collision-avoidance features? This would be unwise until their safety is proven which may require years of voluntary real-world use. Politically it may not be easy to mandate automated driving on a public that rejects photo-radar and red-light cameras.

Today's prototype self-driving technology is very expensive. While costs will come down as technology develops it is not clear what degree of AV capability will be cost-effective five or ten years from now. Even Google's self-driving project director said that self-driving cars may not negotiate challenging conditions for decades. Yet challenging conditions are when AV collision-avoidance is most helpful. For the foreseeable future, AV features will perform well only in limited situations and generate only a fraction of the hoped-for benefits.

Once reliable and affordable AV systems are proven, in a decade or two, it will take more than another decade to replace half the cars on the road. The majority of vehicles on the roads are going to have limited automation for a few decades. While I look forward to the benefits that AV safety features will bring, those benefits will be a small fraction of the theoretical potential for a few decades. Let's be realistic as we plan public policy and public expenditures for automated vehicles.

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