

# Taking Traffic to the Air

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In years of working as Emergency Physician I have pronounced dead too many Motor Vehicle Accident, or MVA victims, and I have cared for too many critically injured patients from those accidents in the Emergency Room.

## I. Epidemiology.

One of the basic tenets of medicine is prevention. All that has been done to improve automobile and highway design has improved safety, but we still have a high mortality and morbidity of traffic accidents. Riding in, or driving a car, is the most dangerous thing everyone does, and is the major cause of death under age 40. My mission as a doctor of medicine is to prevent this ongoing health care carnage, as well as addressing health related air, and ground pollution problems.

It is unacceptable that in 1999 there were 43,000 deaths in U.S A. by human driven wheeled vehicles; it is unacceptable that in 1999 there were 3 million injuries of car and truck drivers, passengers, pedestrians, cyclists, etc.; and it is unacceptable to continue to spend billions of unproductive labor hours per year in traffic tie-ups.

Since the invention of the wheel mankind has had the fixation that all vehicles must have wheels. There is a better way. There are improvements in ecology, air, and earth pollution inherent in the following proposal, *but this is fundamentally a Preventive Medicine challenge.*

## II. Etiology (causes of)

Three conspiring factors contribute to this accident rate.

A. The obligatory, two dimensional, all-on-ground-level location, all on one plane of operation, of wheeled cars, trucks, trains, that compete with children, pedestrians and cyclists. They are all vying for the same space at the same time on this single surface level.

B. The inevitable need for manual guidance and control of all of surface wheel vehicle travel with their variable skills, sobriety, attention, physical and mental

conditions. Human driven vehicles are the cause of the vast majority of accidents.

C. The requirement for good surface traction for wheels on roads all year round despite changing weather, including icy, snowy, rainy and foggy conditions.

## III. Treatment:

Dr. Bertelsen's Rx for prevention of all of the above is "Taking Traffic to the Air". Aeromobile Inc. has developed and perfected, **The Aeromobile-Aeroduct System of Automated Transportation** (abbreviated as A-A System). Air cushion technology in ground transportation promises a "Sea Change" in surface travel practice. The A-A System of total Automation of all vehicles is a viable alternative. The full-scale prototype can be seen in action on the Aeromobile Inc. Web site: [www.aeromobile.com](http://www.aeromobile.com). (Also, See figures 1 - 8).

### A. Rx: For Greater Capacity, Provide Many New Elevated Aeroducts Traffic Lanes on Air.

To fill the prescription for prevention, the first of the three factors, the need for a multitude of new traffic "lanes", can be accomplished by The A-A System:



*Figure 1. The Aeromobile 17 moving frictionlessly at speed with thrust from a slight tilt of the Gimbal Fan on the curve of the Aeroduct ROW. It is shown slightly banked by centrifugation on the turn.*

A whole new realm of many more traffic "lanes" overhead can create a three dimensional traffic system. Elevating Aeroducts costs far less than even building roads on the ground. The same steel or aluminum structural materials and methods used

to build bridges and elevated highways can build elevated Aeroducts. There will be less steel or aluminum used per mile in Aeroducts, but, there possibly will be many more miles of Aeroducts built. At 40 million dollars per new lane mile we have neither space or funds for laying any more concrete or asphalt. We must stop extending and continuing world wide ecologic surface destruction by bulldozing roads through environmentally sensitive tundra, rain forests, etc. Where roads go, Aeroducts can also go. But Aeroducts can go where roads cannot economically go, not being limited to erecting them over existing road and rail rights-of-way. The elevated guideways can be routed cross-country, across water, marshes, deserts, flood plains, swamps, etc., with minimal environmental impact. It is possible to get easements or permission to build on farm land without disrupting farming.



*Figure 2. Left front view of the single passenger 800 lb. gross weight Aeromobile 17 shown power off in its sheet metal and plywood guideway.*

The tube or groove ROW can be elevated with steel, aluminum, or composite structure superimposed over roads or over the median of Interstate highways, or go cross country. Aeroduct capacity can be greatly increased by adding more tubes or grooves laterally or stack them vertically in multiples, one above the other.

The inescapable conclusion, in the absence of other alternatives, is that to enormously increase traffic lane miles we must go on elevated "lanes". It is also cheaper for tunnel contractors to bore cylindrical tunnels with minimal lining for Aeromobiles vs. tunnels with road bed preparation for wheels-on-roads or rails. There will possibly

be more tunneling "on Air" since it will be cheaper per mile to bore.

The A-A System could become a new utility, public, private, or both. Like the utilities that precede it, electricity, water, sewer, telephone, cable, etc., all businesses will want to be connected. All that is needed for wider deployment of Aeroducts is that the A-A System be seen, felt, experienced, used, and demanded by the public.

No other systems such as monorails, buses, light rail, etc., provide automobile size, "virtual cars" that have immediate access, independence, and convenience. With the far greater traffic lane capacity and 24 hour availability of Aeroducts lanes the A-A System will lure them from driving their cars. Automated Aeromobiles will go, and return, when and where they wish. Further inducements are providing even more amenities than can be provided in manually driven cars, such as TV, computers, etc.

Aeroducts will be without crossings or intersections, having one-way, nonstop origin to destination travel since, in contrast to all-on-ground-level roads and rails, the elevated groove ROWs can cross at different levels. Zero crossings by elevation is "prevention" of road traffic and pedestrian collisions, fatalities and injuries.



*Figure 3. View across the Aeroduct ROW and the North straightway.*

On our Interstate highways, and the Autobahn, there are vacant median strips which could be occupied by many overhead "lanes". The very inexpensive nature of the guideways, allows for elevation high enough above, or be deviated around, immobile obstructions.

The air cushion vehicle has such a light "foot print" or base pressure, that our full-scale guideway, is

“paved” with only 26 gauge, or 1/32nd. of an inch thick sheet metal. The full scale Aeromobile 17 has a base pressure of 0.12 p.s.i. bearing on it. It is a very small fraction of 30 p.s.i. of car tires, and 90 p.s.i. of truck tires. Air cushion suspension decreases the load by a factor of 200 in automobile tires, and by a factor of 600 in truck tires.

The mass of the guideway itself to support is insignificant compared to elevated steel highways or bridges. They can be engineered to carry the mass of the Aeromobiles on the straight-aways, and accept the centrifugal acceleration forces



*Figure 4. The Aeromobile 17 on cushion at the end of the ROW, with 1 or 2 inches of free air space between the skirt tips and the sheet metal guideway. This renders it totally frictionless, perfectly centered, and positively confined to the groove ROW.*

of the vehicles centrifugally banking on curves. Aeroducts are cheaper than almost any other rights-or-way, and orders of magnitude cheaper than Maglev.

There is almost no limit to the mass that can be carried on air cushions. The British hovercraft SRN-4, carries 300 tons, the U.S. Navy LCAC's carry 100 tons, both amphibiously, both on water. Even with these massive loads, their maximum base pressures are only 0.25 p.s.i. We certainly can design guideways for buses, semi trucks, or even train loads.

Developing countries have not yet built enough surface roads, and need “links” from distant villages to cities, and in and around cities. It is vitally important not to bulldoze roads through jungle or rain forest areas. Aeroducts can be built to pass through the canopies of lush tree and vine growth with near zero impact on them. The

anchors for the support members can be built at intervals on the ground with minimal impact.

The A-A System has been exhaustively proved in full scale on Aeromobile Inc. plant property with years of experience in flying The Aeromobile 17 in it's cylindrical groove guideway. The production amphibian Gimbal Fan Aeromobile 2000, which with some modification could be used in the Aeroduct to carry up to six passengers is also show in action on the Aeromobile Inc. Web site ([www.aeromobile.com](http://www.aeromobile.com)).

#### B. Rx: For Saving Life and Limb, Automation of Commuter Trips on Air

There is now wide recognition that automation is necessary. There is a heavily funded effort by government and private industry to automate cars on roads. This is called ITS or Intelligent Transportation Systems. However, all the ITS hardware and software so well developed for cars, trucks, and buses can be immediately used to automate, locate, and route automated Aeromobiles in Aeroducts. A family which now needs a car for each driver, will need only one automated Aeromobile to take and return all family members to their respective destinations and then return them.



*Figure 5. Oblique view of the West straightway of the Aeroduct ROW.*

The mass production of wheeled cars and trucks is unlimited, (and increased by one million last year), far out pacing the manually building of surface roads. We are facing bumper to bumper gridlock. Automation with perfect guidance is, therefore, not optional for personal and commuter type ground transportation. For these “preventive medicine” reasons it is mandatory !

A major paradigm shift in commuter type ground transportation is imperative!

### 1) Parking on Air

One of the less obvious but highly significant benefits of automation is the elimination of parking places, and square miles of parking lots in every city. ITS can effect magical results when applied to automation of perfectly guided, all-weather Aeromobiles in Aeroducts. Automated parking is not only a tremendous ecologic legacy, of The A-A System, but a solution to one of the most frustrating, maddening, and costly concerns of automobile travelers and the proprietors of their place of destination. Automated vehicles can return to the owners one and only parking space at home.

Ultimately all business will immediately want stations to provide enhanced public access to and from them by automated Aeromobiles without the parking hassle. Then inevitably homes, schools, malls, offices, theaters, etc., will all have Aeroduct stations. There will be no maddening search for a parking space, no hazard of rain, snow, sleet, "mugging" (prevention !), or theft of the vehicle or it's components.



*Figure 6. View of 220 degree cylindrical 90 degree Aeroduct curve sections to allow "banking" of the Aeromobile 17 at speed.*

### 2) The Disabled, and all ages will be Commuting Accessible on Air

An Aeromobile, private or publicly owned, will be accessible to anyone with the digital code of access, including those of all ages, economic status, or disability who can get transported to and from station in the System. All travel origins and destinations will eventually be from formal stations only, like those of vertical elevators. These stations will have digital addresses, with all arrivals and departures from stations inside homes, schools, airports, malls, stadiums, and office buildings, etc.

The vehicle floor and the station floor will be flush and level. The space above the door is open overhead so that passengers walk in and sit down. Likewise, a stroller, or a wheel chair can enter and emerge effortlessly. One other difference in the Aeromobile interior is the provision of wheel chair or stroller anchors and restraints to secure the occupants. These passengers will not need to transfer to, or from, a wheel chair, a child seat, or a stroller. And there will be no need for folding and storage of their equipment, which is a considerable improvement over cars in convenience and time saving.

### 3) Increased Efficiency on Air

With automation and ITS integration there will be no stopping between origin and destination in any trip to, or from any station. The "throughput" or efficiency of the near zero rolling friction, automated electric Aeromobiles with higher non stop speeds between stations, vehicle spacing and timing, should be, conservatively, ten times faster than manually driven, or automated cars on roads. Aeromobiles in guided ROWs, going programmed nonstop from origin to destination is a quantum leap over the block-to-block speed of cars on congested roads.

Total automation by programming all trips can be done in advance, to meet work or school arrival times, or at the time of departure. The commuter will be assured in advance of his time of departure and arrival, at the programmed station. All private and public stations will be indoors or under shelter. The doors of the station are more like vertical elevator doors. Both the vehicle and the station doors open and close simultaneously. The vehicle doors are on both sides of the craft, and right or left vehicle doors open on which ever side the station doors appear. The automated craft arrives at, and leaves from, a secure station, whether in the private home, the school, office building, shopping mall, stadium, etc.

The vehicles, the guideway structures, and ITS like electronics for automation can create new industries and a lot of new jobs internationally. There is a prospect of vastly increasing human productivity, more useful time made available by shortened commuting time. In addition, people can work or get recreation en route.

### C. Rx: For All-weather Operability on Air

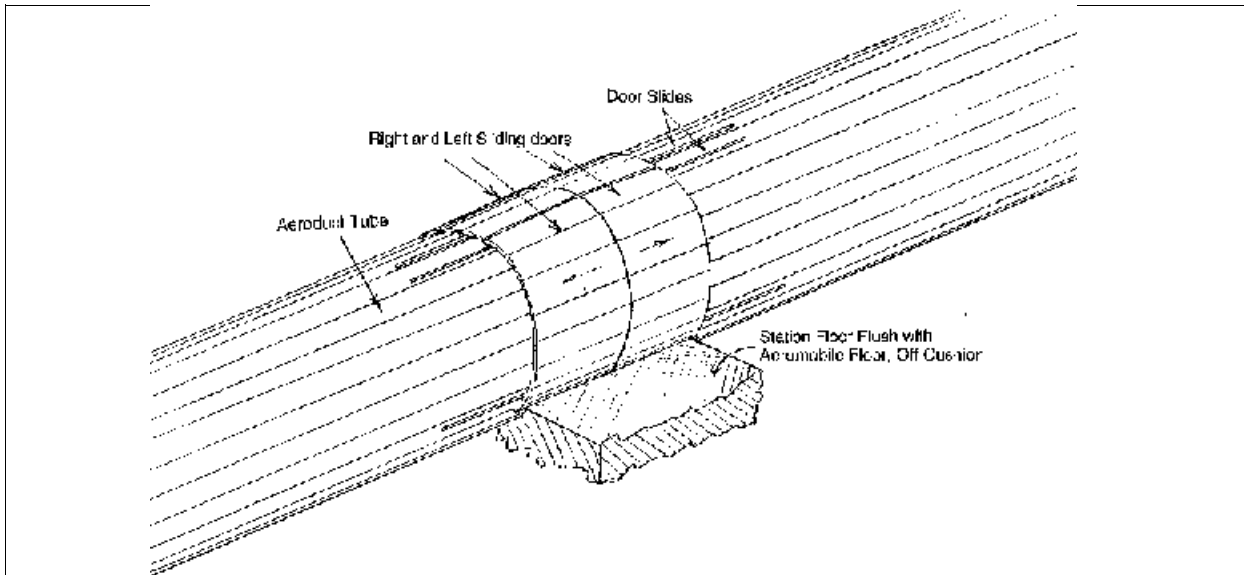
While only the Northern half of the United States, most of Canada, northern Europe, and Eurasia, the Arctic tundra, and Antarctic, are subject to snow, sleet, ice, etc., all roads are vulnerable to fog, and severe surface conditions in winter. Every country in the world needs relief from costly, deadly, traffic and rights-of-way problems, with an ITS automated all-weather A-A System. Open grooves will collect snow, but no snow plowing is necessary, no salting, no cindering, etc., are needed. In high traffic legs of the ROWs, the passing Aeromobiles will blow out the snow as it falls keeping the ROW open. In low traffic ROWs, service Aeromobiles can simply patrol that leg to keep the snow blown

transportation the new vehicles can be fueled by the ultimate zero polluting, solar generated hydrogen. We will finally have zero pollution with fuel cells and electric power generated by hydrogen fuel.

The A-A System as a new utility, is an exemplar, an alternative to both the fuel, the vehicles, and their rights-of-way, which can effect significant gains in all the ramifications of pollution, including global warming.

### V. Economics of The A-A System

#### A. Rx for Lower cost Rights-of-Way:



out and prevent its accumulation.

Figure 7. Exterior of proposed tube type Aeroduct Station with doors closed.

Snow accumulation in Aeroducts is no problem compared to precipitation management of roads. In tube Aeroducts tubes, there will be no precipitation accumulation.

### V. Rx for Lower Pollution on Air.

The ultimate objective of the A-A System is to have all Aeromobiles electric powered. Cars and trucks contribute a large percentage of the atmospheric CO2. Consider only the atmospheric damage (and health hazards) of the cumulative effect of burning fossil fuels. In the air cushion

Aeroducts can be assembled quickly and cheaply like "erector sets" with all prefabricated elements. If damage occurs from earthquake, snow or mud slides, etc., they can be replaced in hours rather than days or weeks as we now suffer with catastrophic road rebuilding.

There will be almost no wear and tear maintenance of the ROWs because of the airborne nature of the craft. "Flying" one or two inches off the surface they virtually never touch the guideway until they come off-cushion at a station. And, of course, there will be no freeze-thaw breakup, and no pot holes. In tubes there will be no precipitation. Automated Aeroducts will pay for themselves in time saving alone.

## B. Rx for Lower Cost Vehicles:

In a car there are great many things to buy and maintain. The Aeromobile is manifestly simpler and cheaper, consisting of a chassis, a skirt, and electric motor fans. The elimination of all the automotive running gear, and structure further lightens and cheapens Aeromobiles over automobiles, and will result also in even further energy saving in reduced power for lift, acceleration, and braking on, and by, air. An Aeromobile is a hollow shell of the complete automobile, but in Aeroducts, it provides tremendous, unique and unprecedented capabilities over all other transportation systems.

## VI. Rx for Implementation of The A-A System:

The Initial introduction of The A-A System can be like that of the vertical automatic elevator, but going horizontally. We suggest that the low cost Aeroducts may be first installed as an automatic "horizontal elevator" with 4 to 6 passenger Aeromobiles.

Aeroducts can be installed between well-traveled points such as stations in airport parking lots to shuttle passengers to and from airline gates, between industrial buildings, University departments, malls, office buildings, in and around amusement parks, etc. There is no limit to the mass to be carried, or the diameter of any specific

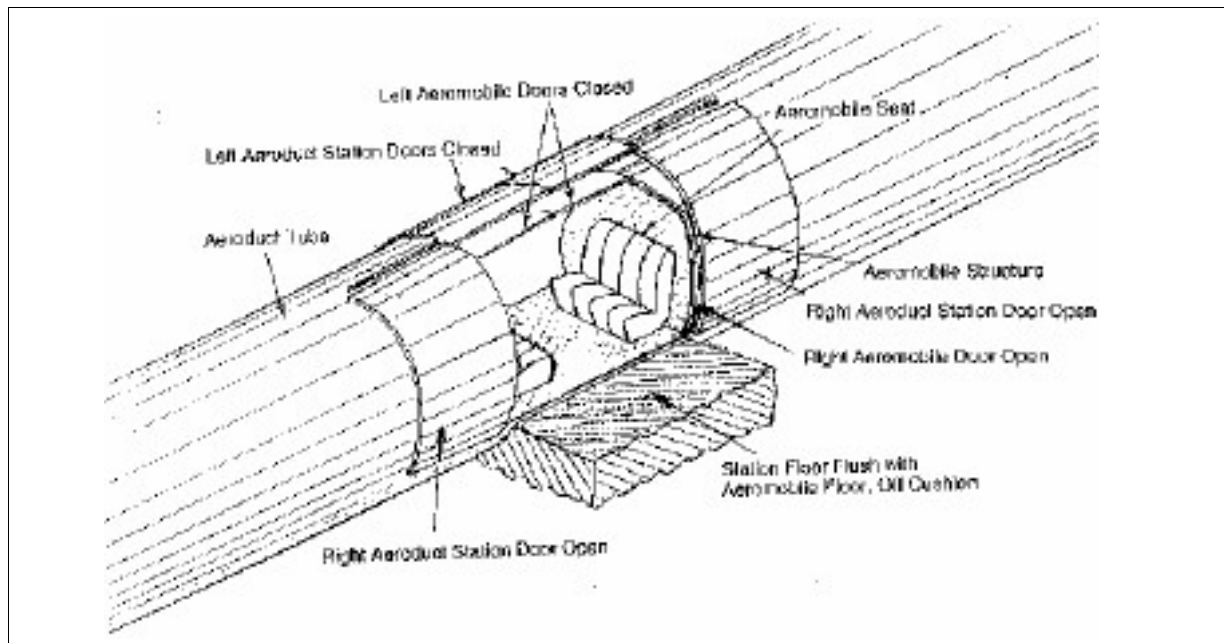


Figure 8. Proposed **Aeroduct** Station showing interior of **Aeromobile** off cushion, with both right station and right **Aeromobile** doors open.

The chassis of the Aeromobiles can be made of 90% recyclable materials. The skirt is of urethane-nylon, or neoprene-nylon and represents about 10% of the vehicle weight. The interior will be similar to the auto interior with seats, interior lighting, stereo set, etc. What can be added optionally will be a television set, personal computer, telephone, or other niceties as plush as the owner wants to occupy the now driverless "passengers" in this totally automated transportation system.

Aeroduct. Any size tube/groove can be specified depending on its mission.

An inexpensive R&D project will clearly establish the feasibility of air cushion vehicles in cylindrical guideways, and ultimately can be extended to greatly benefit all dense traffic areas. Once the advantages of the system are demonstrated, the system can be expanded to handle multiple stops, multiple guideways, and vehicles of varying sizes.

## **VII. Prognosis:**

If The A-A System is adopted and widely deployed it will prevent all of the above casualties, and confer a cornucopia of life-enriching qualities. There will finally be adequate increases in traffic lane capacity; greater economy in commuting; saving energy, minimizing pollution; safety, security, all-weather operability, accessibility to the disabled, and will also solve the parking dilemma. These are the manifold, unique, advantages of The Aeromobile-Aeroduct System of Automated Transportation. It is the commuter's best alternative, and it must be pursued. "Taking Traffic to the Air" is the quintessential solution to the challenges of ground transportation today and tomorrow.

And, it's what the doctor ordered!

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