“The complete history of SkyTran plus a discussion of all the latest technical breakthroughs - in 13 minutes!”

PodCar City9 2015
Mountain View, California
Friday November 6, 2015

by
Douglas J. Malewicki
SkyTran, Inc. Founder and Chief Visionary
SkyTran history & all the technology in 13 MINUTES!!

Quickly, quickly – there’s no time!!

www.SkyTran.us
The “complete” HISTORY of SkyTran
HISTORY – early 1960’s

Education & early work
Apollo-Saturn V – Man to the Moon Program.
Senior Structural Loads Analyst, North American Aviation

Lunar module/Service module – Structural dynamic response analysis showed that the units docking ring structure had to be strengthened to withstand a possible hard-over thruster engine failure.

Launch Escape Abort System – Dynamic analysis and software for pyrotechnic event that deployed stabilizing canards.
HISTORY – mid 1960’s
First invention published in 1965
MAXIMUM ALTITUDE = \( \frac{1}{g} \left( \frac{W_l - \frac{1}{2} W_p}{C_D A \frac{1}{2} \rho} \right) \ln \cosh \left\{ g \sqrt{\frac{F_{AVE} W_l - \frac{1}{2} W_p}{W_l - \frac{1}{2} W_p} - 1} \frac{C_D A \frac{1}{2} \rho}{W_l - \frac{1}{2} W_p} t_B \right\} \)

+ \( \frac{1}{2g} \left( \frac{W_l - W_p}{C_D A \frac{1}{2} \rho} \right) \ln \left\{ 1 + \left( \frac{W_l - \frac{1}{2} W_p}{W_l - W_p} \right) \left( \frac{F_{AVE} W_l - \frac{1}{2} W_p}{W_l - \frac{1}{2} W_p} - 1 \right) \tanh^2 \left[ g \sqrt{\frac{F_{AVE} W_l - \frac{1}{2} W_p}{W_l - \frac{1}{2} W_p} - 1} \frac{C_D A \frac{1}{2} \rho}{W_l - \frac{1}{2} W_p} t_B \right] \right\} \)

COAST TIME = \( \frac{1}{g} \sqrt{\frac{W_l - \frac{1}{2} W_p}{C_D A \frac{1}{2} \rho} - 1} \left( \frac{W_l - \frac{1}{2} W_p}{W_l - W_p} \right) \left( \frac{F_{AVE} W_l - \frac{1}{2} W_p}{W_l - \frac{1}{2} W_p} - 1 \right) \tanh \left[ g \sqrt{\frac{F_{AVE} W_l - \frac{1}{2} W_p}{W_l - \frac{1}{2} W_p} - 1} \frac{C_D A \frac{1}{2} \rho}{W_l - \frac{1}{2} W_p} t_B \right] \)
HISTORY – late 1968 to 1972

More rocket stuff – Evel & Doug
The street & freeway licensed California Commuter

Doug has two Official Guinness World Records

157.192 MPG - gasoline record - LA to SF. Just 2.87 gallons to travel 451.3 miles!

156.53 MPG - diesel record - Anaheim, California to Las Vegas, Nevada. Just 1.68 gallons of diesel to travel 263.4 miles while climbing 7,993 feet of elevation gains.

www.SkyTran.us
HISTORY - 1983

“Aerodynamics of Human Powered Land Vehicles”
Cover feature article
HISTORY - 1985

Chief engineer for Olympic cyclist & Hawaii Ironman winner John Howard’s Bonneville Salt Flats motor paced speed record attempt

152.284 MPH average over a measured mile pedaling!
HISTORY

Other Relevant Jobs

leaning to an eventual SkyTran

Conveyor belt assembly lines – humans (70’s)

Semi-automated equipment handling machines (80’s)

Advanced sensors and controls (90’s)

ROBOTS…
GIANT car eating ROBOTS!

CAR-nivorous Robosaurus
Giant TRANSFORMING Robots!

Robo did his 1st show in January 1990

www.SkyTran.us
TIME TO END THE INSANITY!

TRAFFIC SUCKS!

DOING NOTHING ABOUT IT SUCKS EVEN MORE!
WORSE - there is NO more LAND for building more roads!

+ so much disgusting, visual pollution!
The ideal IS **ZERO** visual pollution

On the 14,508' summit of Mount Whitney. Sep 3, 2015

Mike  Ron  Kyle  Sarah  Doug  Karyn  Tom
HISTORY

All that *FRUSTRATION!* Then POOF

3 lbs of organic glop created People Pods (precursor to today’s SkyTran)

(Originally was strictly for Commuters)
People Pods HISTORY

Arrival At Destination
Figure 8 (drawing by Larry Wood)
Personal Maglev, Public Transportation

IRVINE, CA—How do you get Southern Californians out of their cars and into mass transit? It may take an ingenious version of mass transit. Meanwhile, the master computer routes idle Pods to high-traffic areas and controls Pod-spacing density. Malewicki is currently jockeying for funds to build a 1-mile test track in Orange County, California.

One key to People Pod economics: roll-forming machine, in background, lays steel track across utility poles.
### Performance Comparisons of Possible People Pod Concepts

<table>
<thead>
<tr>
<th>Single Seater</th>
<th>Single Seater</th>
<th>Two Passenger</th>
<th>Two Passenger</th>
<th>Four Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute Min. Teardrop (no luggage)</td>
<td>Comfortable + 30 lbs Luggage</td>
<td>Tandem</td>
<td>Side by Side</td>
<td>Two Front, Two Rear</td>
</tr>
<tr>
<td>Pod Weight</td>
<td>100</td>
<td>150</td>
<td>190</td>
<td>270</td>
</tr>
<tr>
<td>People Weight</td>
<td>170</td>
<td>200</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Total</td>
<td>270</td>
<td>350</td>
<td>590</td>
<td>670</td>
</tr>
<tr>
<td>Frontal Area .88 sq. ft.</td>
<td>4.7 sq. ft.</td>
<td>4.7 sq. ft.</td>
<td>10.2 sq. ft.</td>
<td>10.2 sq. ft.</td>
</tr>
<tr>
<td>Drag Coef.</td>
<td>.08</td>
<td>.1</td>
<td>.11</td>
<td>.13</td>
</tr>
<tr>
<td>C_d A</td>
<td>.070 sq. ft.</td>
<td>.47 sq. ft.</td>
<td>.52 sq. ft.</td>
<td>1.326 sq. ft.</td>
</tr>
<tr>
<td>Horsepower @ 100 mph</td>
<td>Air: .50 HP</td>
<td>3.38 HP</td>
<td>3.74 HP</td>
<td>9.53 HP</td>
</tr>
<tr>
<td>Rolling</td>
<td>.36 HP</td>
<td>.46 HP</td>
<td>.79 HP</td>
<td>.89 HP</td>
</tr>
<tr>
<td>Total</td>
<td>.86 HP</td>
<td>4.04 HP</td>
<td>4.77 HP</td>
<td>10.97 HP</td>
</tr>
<tr>
<td>Kilowatts</td>
<td>.68 KW</td>
<td>3.03 KW</td>
<td>3.58 KW</td>
<td>8.23 KW</td>
</tr>
<tr>
<td>Energy cost per 100 miles</td>
<td>$.06</td>
<td>$.27</td>
<td>$.32</td>
<td>$.74</td>
</tr>
<tr>
<td>MPG Equiv.</td>
<td>2,167 mpg</td>
<td>481 mpg</td>
<td>407 mpg</td>
<td>176 mpg</td>
</tr>
<tr>
<td>Relative Eff.</td>
<td>450%</td>
<td>100%</td>
<td>83%</td>
<td>36%</td>
</tr>
<tr>
<td>Accel. Power</td>
<td>13.5 HP</td>
<td>17.5 HP</td>
<td>29.5 HP</td>
<td>33.5 HP</td>
</tr>
</tbody>
</table>

Note: Gas cost = $1.30 per Gal and Elect. cost = $0.08979 per KW-Hr  
(Steady Speed of 100 mph)  
D. Malzwick 6/6/90

*This is the power of two hair dryers*
People Pods Inspiration

HUMAN POWER

Official IHPVA Newsletter

Winter, 1981

May 30, 1980
Vector Tandem on Intersate 5
Average speed of 50.4 MPH for 41.8 miles!

50 MILES PER HOUR
WITH ½ HORSEPOWER
PER PERSON!

Nice shot of VCTOR tandem at Stockton; sandwiched between Caltrans truck and C T criminal

HUMAN POWER ON THE FREEWAY

On Friday morning, May 30, 1980, Fred Markham and Chris Springer pedaled the Vector Tandem on California Interstate 5 from Stockton to Sacramento, a distance of 41.8 miles. The trip took just under 50 minutes, giving an average speed of 50.4 miles per hour. This is the story of how it happened.

Still, the Vector Tandem holds the current endurance record of 46+ miles in one hour and could maintain the legal minimum freeway speed (45) for that distance if the riders were of top quality. We could have a CHP escort, which would make it as safe as possible, and we could make the run early on Saturday morning, so it wouldn’t be so hot or windy, and the traffic wouldn’t be very heavy.

It all sounds almost conceivable, and what a great chance to show the world what human power can do! We’ll do it! Now to find two brave, strong riders...
ENOUGH HISTORY!
Time to discuss super new SkyTran tech. (well worth the 25 year wait!)

What is it?
25 years later!

#1 - Advanced magnetic LEVITATION
#2 - Magic magnetic PROPULSION
#3 - VERTICAL magnetic switching
#4 - Totally passive guideways

MagLev Private Rapid Transit (MPRT)
No New Land? No problem!

#1 - Two seat tandem = skinny
#2 - NEW vertical switch = skinny

SkyTran has ALWAYS been designed to be elevated above existing side walks.

No destructive right-of-ways required
THOUGHT EXPERIMENT…

How did Doug travel to Mountain View?

How would he have LIKED to travel here?

How could he minimize his total Point-to-Point travel time?

www.SkyTran.us

POINT-TO-POINT PERFORMANCE
(My trip to PodCar City9 - Irvine, CA to Mountain View, CA)

Drive (human)

Fly

2029 High Speed Rail ($64.8B)

On Demand Go Anytime!

On Their Schedule

On Their Schedule

If all are Google Cars:

Time: 6:12

Average Speed: 60.6 MPH

5:35

70 MPH

4:01

91.8 MPH

4:22

86.9 MPH

W/ all

7 stops

5:09

73.8 MPH
**POINT-TO-POINT PERFORMANCE**
(My trip to PodCar City - Irvine, CA to Mountain View, CA)

**SkyTran Non-stop 100 MPH**

On Demand
Go Anytime!

**SkyTran Non-stop 100 MPH with 150 MPH Intercity**

On Demand
Go Anytime!

**Time:**
- 4:18
- 2:51

**Average Speed:**
- 89.2 MPH
- 137 MPH
POINT-TO-POINT PERFORMANCE
(My trip to PodCar City9 - Irvine, CA to Mountain View, CA)

Hyperloop

On Demand
Go Anytime!
(Somewhat depends on the Hyperloop queue)

Time: 2:58
Average Speed: 152.2 MPH

Hyperloop with 100 MPH SkyTran

On Demand
Go Anytime!
(Somewhat depends on the Hyperloop queue)

Time: 1:50
Average Speed: 304.6 MPH
Eliminating traffic will take Super Heroes! Where are they when you need them?

One of them is here to help! The other is Elon Musk!
(WTF! Why That’s Fascinating.)
References

Website: www.SkyTran.us

Main business contact:
CEO Jerry Sanders Jerry@SkyTran.us

CEO Jerry Sanders TEDx talk in India:
http://youtu.be/Tqx2gL18pM

IEEE paper: Silicon is about to Change the World – Again!
http://tinyurl.com/IEEE-Silicon

Plus 13 pages of all new SkyTran insights discussed in Doug’s Amazon Kindle eBook
SkyTran
21st Century Silicon Based Transportation

Doug Malewicki
Founder and Chief Visionary
SkyTran, Inc.

address: 14962 Merced Circle, Irvine, CA, 92604
phone: (949) 559-7113
email: DMalewicki@cox.net
website: www.SkyTran.us

The End

(But wait, there’s MORE!)
I didn’t forget!

Nuclear War

50th Anniversary

Card Game

Award-winning, fast-paced & often everyone loses!

SuperVirus

(was based on the Space Shuttle)

Electrocution Wand

Nuclear Escalation

1982

2015
I’m done, but THERE IS A PART 2

(If EcoPRT’s Professor Choromanski still hasn’t appeared!)
SkyTran – PART 2
The ULTIMATE Transportation Solution
PodCar City9 2015
Mountain View, California
Friday November 6, 2015
by
Douglas J. Malewicki
SkyTran, Inc. Founder and Chief Visionary
That TITLE is a LIE!

SkyTran alone is NOT the ULTIMATE transportation solution!

The real ULTIMATE solution is:

A) HYPERLOOP combined with SkyTran
B) Google Cars
C) Bicycles & eBikes
D) Uber & WalkCar

WHY?
Because people want to minimize travel time, SkyTran Non-stop cruise speed is perceived as the maximum speed, not the travel speed. Light Rail travel involves walking to stations, less walking, and stopping (not moving) at intermediate stations. The actual average speeds for SkyTran and Light Rail are different.
THE TECHNICAL PRINCIPALS for what it will take to get from LA to SF in 35 minutes

- Trains depart every 30 seconds at peak times. Tickets would cost £13.
- The tubes could be above or below ground and designed to withstand earthquakes.
- Each capsule floats on a cushion of air it creates as it moves forward.
- Six to eight passengers per capsule. Three capsules per train.

JOURNEY TIMES:
- Aircraft: 1hr 15mins
- Hyperloop: 30mins
- Car: 5hr 30mins

HOW IT WOULD COMPARE
- Concorde: 1,354mph
- Hyperloop: 760mph
- Boeing 737: 485mph
- Bullet Train: 275mph
- Eurostar: 186mph

To minimise friction, a powerful fan at the front would suck what air is in the tube to the rear.

Capsules pulled along by magnetic attraction.

www.SkyTran.us
HYPERLOOP IS HALF OF SOLUTION?
You better ASK…

“How long did it take you to get TO the HYPERLOOP station in LA and then FROM the SF station to your desired final destination?”

Typically 1 to 1.5 hours* at each end?
SkyTran™ was designed to ЕLIMINATE commuter congestion within cities!

SkyTran is not a 700 MPH system. HYPERLOOP is needed to take you *between* cities FAST!
Benefits of Full City Coverage SkyTran 3D Grids

Go anywhere on a 3D Grid at 100 mph!

The 35.2 mile trip from SF to Google at a non-stop 100 MPH would take 21 minutes.

Would the young Google employees who prefer to live in SF approve?

www.SkyTran.us
At the same time let’s TRIPLE the Hourly Capacity of existing Freeways

- - HOW? - - WITH AUTOMATION - -

THE GOOGLE CARS ARE COMING!

Autonomous Driving

Google’s modified Toyota Prius uses an array of sensors to navigate public roads without a human driver. Other components, not shown, include a GPS receiver and an inertial motion sensor.

LIDAR
A rotating sensor on the roof scans more than 200 feet in all directions to generate a precise three-dimensional map of the car’s surroundings.

POSITION ESTIMATOR
A sensor mounted on the left rear wheel measures small movements made by the car and helps to accurately locate its position on the map.

VIDEO CAMERA
A camera mounted near the rear-view mirror detects traffic lights and helps the car’s onboard computers recognize moving obstacles like pedestrians and bicyclists.

RADAR
Four standard automotive radar sensors, three in front and one in the rear, help determine the positions of distant objects.

Source: Google

www.SkyTran.us

And better yet, the general public already accepts, believes and WANTS automated self-driving autos!
Fascinating Google driverless cars TED talk by head project manager, Chris Urmson

http://tinyurl.com/Car-Google-Robot
From Chris’s TED talk - moving video clip of everything the Google cars are “seeing”
Real time mathematical extrapolations of all nearby movements & potential interactions
Google Cars pay attention 100% of the time!
The US NHSB says 93% of all accidents are due to inattention by the human sensing and control organisms (the drivers).

Google’s Driverless Car Uses a Wide Range of Sensors

VIDEO CAMERA
Mounted near the rear-view mirror, the camera detects traffic lights and any moving objects.

LIDAR
A rotating sensor on the roof scans the area in a radius of 60 metres for creation of a dynamic, three-dimensional map of the environment.

POSITION ESTIMATOR
A sensor mounted on the left rear wheel measures lateral movements and determines the car’s position on the map.

DISTANCE SENSORS
Four radars, three in the front bumper and one in the rear bumper, measure distances to various obstacles and allow the system to reduce the speed of the car.

CARRIE COCKBURN/THE GLOBE AND MAIL  SOURCES: GOOGLE, ARTICLESBASE.COM, WHEELS.CA
Google cars can also safely follow much closer than human driven cars.
SkyTran pods will operate at $\frac{1}{2}$ second spacing. Twice this time interval spacing interval was 6.5 meters at 60 MPH = .24 second!

Have their been any computer speed and control systems improvements since 18 years ago?

IT is NOT NEW! 1997 Caltrans Demo

Safe close following is essential to increasing hourly capacity per lane.
Hourly Passenger Carrying Capacity

Pod Length = 12 feet
# of Passengers per Pod = 1

- 100 MPH
- 80 MPH
- 60 MPH
- 40 MPH
- 20 MPH

CalTrans equivalent carrying of a 3 lane freeway (6,300 autos per hour).

CalTrans claims California freeways carry a max of 2,100 autos per hour per lane.

CalTrans 1997 demo of autonomous cars
Google cars will yield perfectly safe, freeway speed, one passenger, *micro super efficient* commuter cars

Doug’s improved California Commuter aerodynamic shape will yield 300 MPG at 70 MPH (even on fossil fuels)

SKINNY VEHICLES ON HIGHWAYS CAN DOUBLE THE HOURLY CAPACITY AGAIN by driving side by side in one lane!

California Commuters & LITmotors.com’s gyro stabilized, fully enclosed motorcycles

www.SkyTran.us
The baby Google car
No steering wheel, gas or brake pedals!

Coming sooner than you think!

www.SkyTran.us
Technology to ELIMINATE traffic signal frustrations is coming in 2D! Much simpler today to use 3D!

www.SkyTran.us
THE REAL PROBLEM: How can we SAFELY move millions of small human payloads everywhere – super fast & efficiently!

Why are we using tons of assorted raw materials, energy and labor to build **3,500+ lb. machines and expensive roads** just to transport **170 lb. people**?
Are you sure we need ALL this just to give humans mobility?

3,500 pounds of processed materials
Instead of 3,500 lb machines how about those 15 to 25 lb machines

Powered by oatmeal, NOT fossil fuels
In Copenhagen, 50% of commuters going to work & school use bicycles!
Bicycle commuting is popular in Europe and Asia
eBikes have proliferated!

20 mph cruise speeds instead of 13 MPH pedaling
Surprise!
They do it in any weather, not just nice sunny days!
NO $20 per day parking fees either
10 times as many bikes as cars parked on the same amount of land
London Elevated Bikeway
Copenhagen Elevated Bikeway
Munich, Germany is planning $120 million of grade separated non-stop cycling routes.
Elevated non-stop Bikeway Capacity

4 bi-directional lanes
(2 lanes for each direction)

13 MPH in low speed
lane for pedaling cyclists

20 MPH in high speed
eBike lane

With a spacing of two
bicycle lengths between
ALL cyclists:

Commuters per hour
per direction =
10,050 per hour!
(20,100/hr total)
What counts is TOTAL TRAVEL time – NOT maximum cruise speeds!

Eliminating Red Light stops for cyclists yields higher hourly capacity and speeds than buses!
SkyTran will be an important contributor to eliminating all future commuter congestion.

Why? Because SkyTran IS MagLev PRT. It will travel at higher speeds than any wheel driven PRT, have higher MPGe & require less maintenance.
SkyTran™ Science Fiction is TODAY’S REALITY!

SkyTran™ is a Space Act partner with NASA!

www.SkyTran.us
SkyTran’s powered MagLev demo exists at NASA

www.SkyTran.us
Our new Major partner since October 2014

IAI is the largest employer in Israel – 17,000.

Link to a list of 64 recent Israeli innovations HERE. Medical (lots), computers, cell phone, food, desalination, solar power, etc.
Recently Innovation Endeavors Google Chairman Eric Schmidt’s investment company purchased all the Series A SkyTran stock www.SkyTran.us
SkyTran uses a new radical form of counter-intuitive, low-cost MAGLEV (magnetic levitation AND magnetic propulsion)

Invented by our partner Lee Wamble, whom we always picking on because we are sure he dreams about electro-magnetic fields in full color most every night!

www.SkyTran.us
VERTICAL MagLev Switches

Cuts costs and enables more practical use of SkyTran systems above existing sidewalks.

Engineers must think 3D to solve the commuting congestion problem totally (the vertical switches come from Lee’s brain, NOT mine!).

www.SkyTran.us
Lee has also recently proposed that we must consider onboard batteries for propulsion. Thank you Elon Musk!

Quick burst, high rate charging at each station (during pauses as people exit, while in the dwell line and/or during the pause while boarding - as needed.)

Use the minimum battery weight that gives a 100 mile max no-recharge range.
SkyTran, Inc. voted YES to go with ONBOARD batteries for propulsion.

MAIN ADVANTAGES

Eliminates friction losses for catenary sliding power pickups at speed.

Enables a TOTALLY PASSIVE guideway (levitation is already passive)

Thank you Elon Musk - again!
A PASSIVE guideway provides HUGE cost savings!

Our cost analysis tells us - is the roughly the cost of sidewalks. US$3.2 Million per mile. (US$2 Million per km)

Nowadays in the USA, a single mile of Light Rail costs US$150 Million per mile.

Means a 10 mile long Light Rail system can be replaced with 469 miles of SkyTran elevated guideway!

That is a 20 mile by 20 mile 3D grid enabling anybody to go anywhere within it FAST!

www.SkyTran.us
Whoa! What about the cost of the pods; the inductive charging systems, the stations, solar panels, electrical storage, distribution and profit to expand the SkyTran systems?

Ever hear of UBER? Want to invest in a pod that can do 10 to 20 revenue trips a day for you WHILE YOU ARE HOME or at your office? 5 pods? 10? MagLev machines have no tires or gear trains to wear out, do they? Maintenance costs per year will be way less than a car.

Same for the other components listed above.

Any government who wants ALL the revenue, can pay the full US$8 Million per mile. (US$5M per km)
Everyone is always asking…

What about the LAST ½ MILE?

The “URB-E” claims to have SOLVED the “last mile” problem.

WHAT? WHY does “URB-E” have a 20 mile (32 km) range?

To do get that excess range, it weighs 27 pounds! (13 kg).

BTW - The average walk from a SkyTran station will be ½ mile. Will take 10 minutes. (OR call UBER prior to arrival).
Last mile solutions

NOT GOOD

GOLD

Maybe BETTER - Robot Uber cars?
SkyTran’s levitation innovation uses strong permanent magnets to “fly” on aluminum.

At low speeds the angle-of-attack has to increase to provide total lift.

As speeds increase the angle-of-attack can be reduced for more efficient magnetic flight.

This means SkyTran poles can be farther apart. Since SkyTran is flying like an airplane, it can now fly a laser straight line - even if the structural guideway beam naturally sags a bit from its own weight.
New Form of Magnetic Drive
“WAMdrive”

Worldwide Patents applied for…
but our CEO and other SkyTran, Inc. Directors don’t want me talking about HOW it works - yet.

It does..
Solar SkyTran - Phase 1
Solar SkyTran - Phase 2

Breakeven & off the grid in 6 years!

www.SkyTran.us
The FUTURE keeps getting better!
The End

Get ready for a better world!

Thank You
Douglas J. Malewicki
SkyTran, Inc.
Founder and Chief Visionary

www.SkyTran.us