VOLVO TRUCKS: A TRUCKER’S PRIDE

TJ VANINETTI
“Judge [transportation] by how it makes you feel, not by what it does or doesn’t do.”

—Jeremy Clarkson
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In Loving Memory

of Shannon Vaninetti, who passed away during my masters studies. Thank you for everything. I would not see the world as I do without your always positive outlook on life.
The evidence has been piling up throughout history, and now neuroscientists have proved it’s true: The brain’s wiring emphatically relies on emotion over intellect in decision-making.” USA TODAY correspondent Dan Vergano reports. “A brain-imaging study reported in the current Science examines “framing,” a hot topic among psychologists, economists and political hucksters.”

As emotional preference has been proven to be instrumental in the decision-making process, it is no secret that business and societies have caught on; marketing firms have used “emotional advertising” to entice buyers for years. Emotion has been used in automotive design since the 1938 Buick Y-Job and modern vehicles are emotionally styled to increase their “emotional appeal”. The application of emotion to business and design have been applied for ages, but the understanding of how we emotionally attach to our belongings has been barely touched.

The goal of creating emotionally appealing mobility is still the same, though we can get there using new methods that put the human user – you and I, as the central focus. Creating emotional connections with our transportation will provide us better insight to why we like what we like and buy what we buy, and will present opportunities for new designs that explore the possibilities of emotionally connected vehicles.
During 2011, I acted as the head of design for a start-up car company in San Francisco called Lit Motors. Here, I designed and developed the C-1 Transportation Device and refined the design of the Cargo Scooter under guidance of the founder and president, Daniel Kim. The main focus of my work was on a human centered approach to an emotive user experience for the C-1. Though the form and aesthetics were important, they were second to the story and experience of the user. My work brought about a full scale concept mockup (interior and exterior, looks-like/feels-like) with “depth and substance” that is pure and emotional, yet approachable and simple. The select few that have seen the concept in person are already applauding its story and design.

At Lit Motors, I was fortunate enough to watch someone create an emotional connection with our concept. A woman, the daughter-in-law of a prominent VP of product development, did just that. I watched her as she walked around our prototype, smiling – the vehicle had been delivered just that day. She then opened the door, had a seat (was the first woman to sit in the vehicle for that matter), and all I can remember is her face. I was fortunate because I got to see an emotional connection with transportation occur before my eyes. To this day I cannot help but smile when I recall this memory and have a difficult time finding a way to describe the feelings in words. This experience was truly inspiring.

Though fleeting, I knew that what I had glimpsed was perfect and pure: the woman had fallen in love with a vehicle and its story. This experience made me want to understand how and why she fell in love with the C-1. The emotional connection between people and design is a key interest for me in my budding professional career.
“A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty.”

--- Winston Churchill
June 30, 2011: Nestled in at a humble little café in Ubud on the island of Bali in Indonesia, I sit and type away on our small netbook while listening to the rain pour down, refreshing the rice paddies and blessing the simple Hindu shrines with a cleansing vitality. Jenbo is reading a Stieg Larsson book, curled up next to me on this padded bench after talking to her family via Skype a few minutes before. We just uploaded some photos of our trip to Picasa and Facebook, and are chatting away with our friends about our travels; we update our blogs to journal our adventures. We are over 8,000 miles from home in a culture and nation completely foreign to us before now, but I cannot help but smile to know that, so far from home, the ones we love and care about are still so close.
It’s exciting to be a part of this digital age of communication. Wherever we are in the world, we can still be close to the ones we love. We have Facebook and Google+ profiles set up to tell the world about our social lives; blogs to pontificate our interests; Twitter to chat to whoever is listening. We have Skype to call anywhere in the world and can use it to see our friends and family from thousands of miles away. We have made digital versions of ourselves and the internet and the “cloud” our keepers. Throughout our daily lives, we are able to connect with the people we love.

Business professionals also have an increased need of communication. A study done by Plantronics in 2010 shows how the many methods of communication have all increased substantially over the last five years. More importantly, the study shows that the physical office is becoming virtual and mobile, thus increasing the need for prolific and reliable communication.

“Telecommuting and flexible schedules have transformed “office” from a fixed place to a state of mind. 90% of the surveyed Enterprise Employees stated that they spend at least some time working off site — almost 30% percent spent up to half their time working outside of their official office space, while the majority (46%) spent 25% or less of their time off site.

“No matter where workers are, the vast majority are expected to be present in meetings either online or via voice call-in at least once a week. Following the growing trend away from automation-based business and towards knowledge-based economies that are centered on innovation, skills and ideas, the primary focus of most meetings now (according to 91% of survey respondents), is brainstorming. This was followed by status updates (89%), presentations (86%) and project planning (80%).”

With developments in communication, society is becoming more deeply connected. “The proliferation of communication technologies is influencing not only what it means to be in touch with our networks of family, friends, and colleagues, but also with ourselves.”
THE LONELY LIFE OF THE AMERICAN OTR TRUCKER.

The lives of those involved in the transportation and logistics of goods offer a sharp contrast to the lives of general first world societies. Long hours on lonely stretches of highway keep good people disconnected from society, both physically and digitally. Though companies communicate privately with their drivers via satellite and cell phones, wireless internet is only available at select locations. This lack of access to communication causes relationships with friends and family suffer. A woman married to a trucker relates her experience:

"...I miss him so much but I know he’s doing what he’s doing for our family. It’s not always easy on them either though. He feels so bad when our 7 yr old says daddy stay home a lil longer bec he just can’t do that."

"...Communication is the key to being the wife of a truck driver."
The hauling of goods has been around since the dawn of man. Nomadic tribes carried their shelter on their backs when they relocated to more fruitful lands; we domesticated horses to expand our mobility and enable the trade of food and resources. From when we first carved out earthen roads for our carts and carriages to the creation of our complex modern transportation infrastructure supporting the numerous vehicles of today, the mobility of our goods and ourselves is a fundamental necessity to modern society. Civilization as we know it is unsustainable without the movement of goods; the industry is the life-blood of society.

The commercial freight industry is both complex and multifaceted, utilizing numerous means of transportation to spread the goods and resources needed by mankind across the world. Valued at over $13.05tr US (2002 estimate), the US industry makes use of air freight, cargo shipping, pipelines, and trucking. Trucking is the largest and most widely utilized facet of commercial freight in the United States. Generating over $154.9bn US in 2008, this segment dominates the US market in commercial freight activity. Trucking is the key enabler that increases the quality of life and brings a higher standard of living to people across the United States.

“IF YOU BOUGHT IT - A TRUCK BROUGHT IT!”

FUNDAMENTAL NECESSITY. THE LIFEBLOOD OF CIVILIZATION.
The trucking industry is in decline. A large percentage of drivers are aging and are expected to retire soon and there are few who desire to take their place. These realities are major factors that have created a shortage of drivers in the USA:

“Currently, within the long-haul sector, there is an estimated shortage of 20,000 drivers. That shortage is expected to increase to 111,000 by 2014. Trucking (especially the long-haul sector) is also facing an image crisis due to the long working hours, long periods of time away from home, the dangerous nature of the work, the relatively low pay (compared to hours worked), and a “driver last” mentality that is common throughout the industry.

“Employee turnover within the long-haul trucking industry is notorious for being extremely high. In the 4th quarter of 2005, turnover within the largest carriers in the industry reached a record 136%, meaning a carrier that employed 100 drivers would lose an average of 136 drivers each year.”[11]

The consequences of the declining number of long-haul truck drivers is severe:

“Trucks are the lifeblood of any nation. As soon as our trucks come to a standstill, so does everything else. Industry grinds to a halt; food rots at the farm gate; and our towns run out of food.”[12]

Everything we own has relied on a truck (at some point) for its very existence; from food and furniture to cars and housing. The need for long-haul truckers is fundamental.
To be a truck driver, “you must live to work.” Truck driving is not merely a career but a lifestyle choice. “This is not a ‘normal’ life by any stretch of the imagination.”

...truck driving is not a job. Far from it. This is a lifestyle. Everything I do out here revolves around the truck and the company’s customers...everything, and I mean everything, revolves around driving that truck.

As the driver and truck are the enabling factors essential for society to continue to grow and flourish, increasing the emotional appeal of this “trucker lifestyle” is key to keeping the trucking industry strong and society moving steadily forward.

“The emotional appeal of truck driving has faded due to the lack of driver consideration and the physical and emotional demands on the driver. The combination of these elements create undesirable working and living conditions.”

Professional truck drivers argue that there isn’t a scarcity of drivers, but a lack of decent wages and the regrettable working and living conditions that come with the career.

“There’s no truck driver shortage, there’s plenty of drivers, but not enough qualified drivers want a mediocre paying job with miserable working conditions and trucking related stress to drive.”

The emotional appeal of truck driving has faded due to the lack of driver consideration and the physical and emotional demands on the driver. The combination of these elements create undesirable working and living conditions.

"I DO LOVE BEING A TRUCK DRIVER... IT’S MORE OF A FEELING BEING OUT HERE."

"OBVIOUSLY, THIS COULD EASILY HAVE A SERIOUS NEGATIVE IMPACT ON THE FAMILY."

-Mike Rogers
OTR Trucker

-Hervy Christmas
OTR Trucker
The current “trucker lifestyle” lacks the emotional appeal needed to generate interest in the US long-haul trucking industry. An emotional appeal to the career path is hindered by the realities of the profession. In order to strengthen this industry and ensure the stability of society’s logistical requirements, the “trucker lifestyle” must be made more desirable.

As the driver and vehicle are the key figures in the “trucker lifestyle”, analyzing and strengthening their relationship is integral in generating an emotional appeal to trucking. We must look at ways to improve the driver’s experience in and with the truck. This will show how and the driver uses the vehicle and “connects” with it.

The development of emotional connections between driver and truck will strengthen the emotional appeal of the truck driving lifestyle and experience.

“GREAT DESIGN GIVES US SOMETHING TO RELATE TO AND SOMETHING TO FEEL CONNECTED WITH.”
— David Malouf
Volvo Trucks is the world’s second largest truck producer and have the momentum to become the world leader. They see their North American component, Volvo Trucks NA, is integral to future success.

Volvo Trucks agreed to collaborate on this project because of their desire to further saturate the North American Market. Their human-centered approach to product innovation has the ability to offer a poignant solution to the struggling US Trucking Industry.

Volvo Trucks are examined and analyzed, showing a holistic picture of who they are and how they are evolving:

- History of Innovation
- Volvo’s Core Values
- Global Brand Perception
- A Comparative Observation
- The Future Values of Volvo Trucks

The research and development of future products have always been strong suits for Volvo Trucks. Examples of their upcoming innovations are shown and explained:

- The SARTRE Project
- Vision 2020

With an understanding of the company and their future direction, Volvo Trucks’ design philosophy is analyzed through their Vision 2020 Concept.
EVOLUTION OF A LIFESTYLE.

The US Trucking Industry is in decline and is losing drivers at record rates due to retiring generations and the undesirability of the trucker lifestyle. As it declines, Volvo Trucks see opportunity to revitalize the market with their human-centered approach to product innovation. Their focus is not only on the functionality of their product, but how easy it is for us to understand and use. This design approach is already starting to show results in North America: Volvo Trucks enjoy a 12.1% market share as of January 2012, a jump of over 109% from the previous year. Volvo Trucks is motivated to address the challenges of the failing North American trucking industry.

This thesis follows the same design philosophy as Volvo Trucks, but will look deeper than the aspects of functionality and usability. This thesis aims to develop the pleasurability of the truck and the future trucker lifestyle: the emotional aspect of human-centered design. The resulting concept aims to appeal to us on an emotional level, thus creating a holistic synergy between human and machine. Creating an emotional appeal to the trucking lifestyle is instrumental in providing stability for the overland freight industry.

The goal of this project for Volvo Trucks is a successful design that aims to revitalize the US Trucking industry by addressing the emotional needs of the future trucker. A successful concept will make Volvo Trucks a more desirable brand for the US market and create demand for the trucking lifestyle with trucks from Volvo. In turn, this will help make Volvo Trucks more successful in the North American market to help Volvo become the largest truck manufacturer in the world.
A HISTORY OF INNOVATION.*

1927 - Series 1
First Volvo Truck

1946 - LV15 Truck
First Volvo Diesel Engine

1962 - L4751 TIPTOP
First Mass-Produced Tilling Cab

1979 - Globetrotter
Increased driver comfort

1993 FH Range + 2000 FH12
“Truck of the Year”

2006 - Integrated Safety Truck
HMI Testbed for Driver Monitoring

1929 - Series 3
First 3 axle Truck

1954 - L39 Titan
First Turbo-Diesel

1977 - F10 and F12
Ergonomics and Safety

1986 - FL6
First Turbocharged, Supercharged Diesel

1995 - ECT
Environmental Concept
First Driver Airbag - FH12

2005 - VT880
First 16L US Volvo Truck

2012 - SARTRE Project
Automated Road Trains

“Cars [and trucks] are driven by people. The guiding principle behind everything we make at Volvo, therefore, is and must remain - safety.”

Asar Gabrielsson & Gustaf Larson, founding fathers of Volvo

Safety is the primary core value of Volvo Trucks. The founders of Volvo used a no-nonsense approach to how our vehicles should be designed and used; vehicles are for people, and our safety is the most important thing to consider when it comes to our mobility. This value was established when the company was founded, and continues to be the key essence.

“Quality not only refers to truck quality - it is the guiding principle in everything we do... in design, engineering, materials, manufacturing, etc.”

Attention to detail is a key essence of Volvo and has helped the brand grow to become an industry leader in quality.

As an EPA Climate Leader, Volvo Trucks is deeply committed to the care of our environment.

“Care for the environment expresses our commitment to improve energy efficiency and protect natural resources. We’ll always do all we can to reduce emissions in every aspect of our business.”
Progress depends on balance. We are presented with new choices that we can take for granted, as well as new challenges that we cannot, but we have the responsibility to balance them both. For example, Volvo Trucks balances our need for global transport with our need for a clean environment. When it comes to environmental care, Volvo Trucks has been a leader for years, recently opening the world’s first carbon neutral assembly plant. They innovate in technology to assist truck drivers, and safety to protect them.

**THE BALANCE.**

The main focus for Volvo Trucks has always been driver safety. They don’t just manufacture trucks, they take a greater focus of what the trucks do and mean for our society, understanding their role in keeping it growing. Trucking affects every aspect of our lives, from the hauling of food, goods, and resources, to the very lives that depend on them for sustenance.

It is no surprise why Volvo Trucks focuses on the quality of the truck driver’s environment to keep society running smoothly. Creating both ergonomic and comfortable interiors, Volvo Trucks dedication to the drivers quality of life is unparalleled.

**HUMAN NEEDS**

Volvo Trucks innovates in the technology that moves the freight of the world. Not only do they design and manufacture the safest trucks on the road, they also focus on ways to increase the efficiency and output of their engines, advance alternative energies to minimize environmental impact and support and improve the truck driver’s lifestyle.

Volvo’s list of safety technology innovation is staggering, with notable examples including the seat belt, crumple zones, and side curtain airbags.

The future of Volvo trucks rests securely with the evolution of balancing human needs and technology.

**TECHNOLOGY**
Volvo Trucks is one of the largest truck manufacturers in the world, and has a strong history and heritage in Europe. As a company known for setting the standard in terms of technology, safety, and driver comfort, Volvo Trucks has a strong following of proud drivers across the EU.

“I’ve spent a lot of time driving Volvos and for me its the best all rounder you can get... Some trucks really make my back hurt but I never had a problem in the FH.”

:: oatcake1967 - European Truck Driver

“For me, I’m a Volvo man. I-shift is a god send and I can’t say it better than it just works... Most “complete” truck on the market in my opinion.”

:: @()l()w- European Truck Driver

Though there is a strong following of the Volvo brand, the perception of the trucks and what they are used for is appropriate for Europe specifically:

“European trucks, better or worse? I’d just say: different! You can’t compare something that shouldn’t be compared... Someone prefers old classics, others like the new designs... the fact that all the trucks [here] are designed for work thats completely different in Europe.”

:: Jan Rosecky - European Truck Driver

By continuing to build highly functional, technologically advanced, driver-focused cabs, Volvo Trucks will continue to be a leading truck manufacturer in Europe for years to come.

THE STRONG VIKING.

FUNCTIONAL USABILITY.

The brand perception of Volvo Trucks in North America is quite different than the image they enjoy in Europe; they are seen as quiet and humble tools of the trade. Though their drivers talk about the safety and the industry-leading capabilities of Volvo’s “premium” trucks, they explain that something important is lacking. Overwhelmingly, it is the emotional appeal, the image, the pride of being a truck driver in North America, that is not accounted for in Volvo Trucks.

“All in all not a bad truck, but it didn’t have that o/o flash appeal like a Pete or W900L but I liked it.”

:: tk4017 - Owner of an '06 Volvo VNL780

“I have to be honest and admit that I like the [Peterbuilts] and [Kenworths] on the road. They look magnificent and if they are decorated are even better.”

:: The Judge - Owner of '06 Volvo VNL880

The emotional appeal (pride) of a truck driver can actually be hurt in a Volvo truck. Lee, previous owner of an '07 VN780 relates one of many complaints:

“It’s embarrassing when children, standing along side the road, pump their fists for you to blow the air horn and you have no cord to pull. When I do honk they are disappointed with the strange noise.”

:: Lee - Owner of '07 Volvo VN780

Volvo Trucks specialize in creating functionality and usability for their products, but need to account for the emotional appeal, the image of the US-Trucker, to make their products truly desirable.
CONSIDER APPLE AS A CASE STUDY...

Apple was founded to make computer systems simpler and easier to use. This core directive created an innovative Operating System and the concept of the “Desktop”. These innovations made computer systems usable to average people; a huge step toward the proliferation of household computer systems. Their approach was truly innovative and centered around the user, not the technology. Their concept became a benchmark overnight and now all major operating systems use variations of Apple’s concept of the “Desktop”.

In the late 80’s Apple approached the business market. Though they succeeded at first, IBM quickly overtook Apple with their Windows OS. Now Apple was no longer innovating, but trying to compete in an unforgiving and non-essential market. IBM’s products were better. Apple had too many products but sales were slow; simplicity and user focus were lost. Apple struggled and nearly failed.

In 1996, Steve Jobs returned. He simplified and downsized the company, re-focusing on the human element. In 1998, Apple created the iMac, the first computer to integrate CPU and monitor in an aesthetic design, which appealed to the consumer market with great success. Focusing the brand back to the user brought back success. Today, they are the largest tech firm in the world, with a revenue of $60B/yr.

Though the iPhone and Mac are legacy’s of Steve Jobs, he will likely be remembered most for the iPod (2001). “People want music, not CD’s and Cassettes.” Apple’s core philosophy of thinking about the user EXPERIENCE of music brought the innovative iPod and iTunes. Synergy is a key word here: the object (iPod) and its supporting infrastructure (iTunes) are greater than each product/service individually.
Volvo's Opportunity for Innovation.

The case study for Apple correlates to the innovation opportunities available to Volvo Trucks.

Volvo Trucks has always been about people; safety is their main and essential core value. To this end, Volvo has held true to their values, and produce the safest and most technologically advanced trucks in the industry. But regardless of these qualities, Volvo Trucks lack positive brand perception in North America.

Volvo Trucks are a Swedish brand approaching an overwhelmingly conservative and foreign market. American brands flourish here, as they are true to their values and enjoy being “the local boys”. Volvo producing trucks that function and appear like the American brands is akin to Apple producing the PowerPC to compete in the business market. Not only is the product styling forced, but the essence of what makes the product strong is not realized to its full potential.

This is where the quote from Winston Churchill (p.009) is especially poignant. Though the future for Volvo Trucks NA appears bleak, the company is primed in a perfect position to re-establish itself in North America by creating a new vision for the future of trucking.

Volvo Trucks is the company to do this, as their core values revolve around the human. But to do this successfully, an evolution of the core values is necessary, to not only support the human element, but to integrate it. By putting the human first, Volvo Trucks can not only establish a strong brand perception, but also change the way society perceives commercial overland freight and the lifestyle of the trucker. And it will take more than just a truck, but an entire integrated and supporting infrastructure: the product and the service.

*System and Infrastructure design not in the scope of this project.*

*Volvo Trucks | 39*

A People Company.
Safety is the primary core value of Volvo Trucks, and it should continue to be in the future, but safety is “around” the driver and does not “include” the driver. By evolving safety to include the human element, Volvo Trucks can not only create a safe environment, but also a desirable and welcoming environment, increasing the truck driver’s “quality of life.”

Quality is a core value that includes everything from trucks to the people that make them. By adding the human element to quality, we still get quality, but one that is more specific and human focused. This “human quality” can be defined as resilience, toughness, and a standard of excellence. Human quality is, more than anything, the “quality of life.”

The environment is important to societies as well as the wellbeing of our planet. But focusing on the environment does not include human beings. As we are apart of this environment, it is much more our habitat and domain than something external we need to protect. Habitat is the evolution of the environment key word, including the human element.

By focusing on the human element of trucking, Volvo will evolve its roots and can truly innovate and revive the volatile North American overland freight industry.

To design for the human element, we need to understand what “the human element” actually is. Though the study of humans is practiced through the field of anthropology, we need to look even closer and break down anthropology into its main parts. These sciences are listed below:

- Physiology - how we function as human beings. The ergonomics and usability of a design is determined by our physiology.
- Sociology - how we function as a group. This includes how we do/don’t fit to our societies and our cultural considerations. Many visceral aspects of a design consider sociology.
- Ideology - our goals, aspirations, and tastes. A design’s main focus appeals to our ideologies.
- Psychology - how we think and feel. This includes how our brain works, how (and why) we behave, and our emotions. Though this field is a main focus in marketing, it has only recently been studied for the sake of design.

With a full understanding of the human element, we can now mold it to Volvo’s core values, in order to create a more holistic and pure idea of the company’s essence and main focus.
OUR FAST APPROACHING FUTURE.

The Safe Road Trains for the Environment (SARTRE) Project is the first step in automating overland transportation to reduce pollution and eliminate accidents.

"Funded by the European Commission under the Framework 7 programme, [SARTRE] aims to develop strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety, and comfort benefits." [26]

Volvo is the only vehicle manufacturer to collaborate with the SARTRE Project, and has offered their vehicles as the test bed for this future mobility solution. With recent advancements on the proving grounds, the SARTRE Project has just entered its final phase:

"Utilizing a combination of cameras and radar-based sensors, the vehicles in the platoon can travel up to 55 miles per hour while maintaining a 20-foot gap between each other. An electronics-packed truck takes the lead and handles driving for all the vehicles in the group, meaning there’s still at least one driver in control...by the end of [2012], the SARTRE team hopes to have up to six vehicles rolling in line, with the potential to reduce fuel consumption, congestion and – naturally – driver error in the future." [27]

Though the SARTRE Project is only currently being applied to automotive markets, the future possibilities for platoons of cross-country commercial overland freight is undeniable. The innovative footsteps left by the SARTRE Project will no doubt affect long-haul trucking in the not-so-distant future.
Volvo Vision 2020 is a future look to where Volvo Trucks is likely to go in the coming decade. Using new technologies developed from the SARTRE Project, and retaining its existing core values that puts human safety first, the Vision 2020 directive is to greatly reduce accidents and increase the efficiency and environmental considerations of future overland transportation. A press release from Volvo Trucks explains:

As road transport expands it must also become safer and more efficient. Volvo’s design concept contains ideas about how that can be achieved. Some of these ideas can be integrated into production today, while others are there to arouse interest and start a discussion.

One of the more startling ideas is to link vehicles together wirelessly into long trains that rush across the continents at 90 km/h.

“This will be possible when the transport sector’s vision of green corridors becomes reality,” says Rikard Orell. “Here heavy goods vehicles are separated from other traffic, driving in their own lanes, like a railway but without rails.”

Their press release also talks about improving the drivers working and living environment, as well as increasing aerodynamic efficiency and increasing collision protection. “Around the driver are large areas of glass providing good visibility out of the vehicle and even into it. This benefits eye contact between the driver and other road users preventing accidents. Privacy screening and blackout in the evening are controlled electronically.”
VISION 2020 DESIGN ANALYSIS.

EXTERIOR.
Following the pure and simple design language of the Volvo brand, the Vision 2020 Concept has a strong vertical orientation. Slightly top-heavy, the form integrates well with the trailer, optimizing aerodynamics and completing the overall feeling. The form language is simple, with most of the vehicle’s personality coming from graphic breakup. Both modern and timeless, the lines are both necessary and straight forward, but contain expression and are playful yet restrained. The Vision 2020 concept provides an honest glimpse into the future exterior design of Volvo Trucks.

INTERIOR.
The interior design of the Vision 2020 Concept offers a simple and lightweight solution that aims to appeal to future truck drivers. The “open” theme of this design is apparent from the large DLOs and expansive window glazing; the optimized interior space appears comfortable. The interactive control surface to the right of the driver is simple and modern, but lacks the “touch-me” feeling because of its sharp, beveled edges. The diving lines from the exterior reflect into the interior, creating a feeling of solidarity and movement.
With a solid understanding of Volvo Trucks, we can now take a look at the drivers of these vehicles to understand their unique lifestyle.

In this section, the lifestyle of the modern day OTR trucker is examined. We research and analyze the physical and mental process that people go through in order to become a trucker; we learn from their experience on the road, their lifestyle:

So You Want to be a Trucker...
- The Long Haul Lifestyle
- Hervy’s Daily Routine
- ‘Truckin’ by the Book
- “Truckers”
- Trucker Blood
- The Trucker Essence

The accurate snapshot of the trucker lifestyle allows us to place the lifestyle within the generational scope. By comparing the trucker lifestyle through many generations, we can see how the lifestyle has developed to understand where the lifestyle is going.

The results are presented at the end of the section in a timeline which discusses how the trucker lifestyle will need to evolve in order to appeal to future trucking generations.
Making a living while touring the country is one of the many reasons why people sign up to become truck drivers. Spending days on end piloting a powerful 18-wheeler down the open road, seeing beautiful mountain ranges, expansive plains, and blue blue sky sure seem idealic. But what do truck drivers really do? What is their lifestyle?

The truck driver’s main responsibility is driving the truck, but it’s not the only duty. The driver must also plan how to move from location to location, taking into account the weather, traffic conditions, fill-up locations and rest stops. The driver may need to do manual labor, loading and unloading the truck; the driver makes sure the loads are secured properly. Conducting thorough inspections and basic maintenance are also part of the job, ensuring the truck is running optimally and safely. Everything the driver does is entered into a log book, which aims to keep tabs on the drivers.

Ensuring the safe and timely transportation of goods across the country is the truck driver’s main directive. The decision to become a truck driver is less of a career choice and more of a lifestyle decision; it affects their families and personal lives immensely.

The good men and women who dedicate their lives behind the wheel are true heros of our society.
## THE LONG-HAUL LIFESTYLE.

### POSITIVE TRAITS.
- **PAID TO EXCERSIZE.**
- **PAID TO TRAVEL.**
- **PAID TO LEARN.**
- **LOTS OF QUIET-TIME.**
- **STRONG JOB SECURITY.**
- **DECENT MONEY.**
- **FLEXIBILITY OF EMPLOYMENT.**
- **FREEDOM AT WORK.**

### NEGATIVE TRAITS.
- **DIFFICULT TO MAINTAIN A GOOD DIET.**
- **DIFFICULT TO PLAN FOR BIG EVENTS.**
- **SUBSTANTIAL IMPACT ON FAMILY.**
- **PHYSICAL STRAINS ON THE BODY.**
- **MUST TAKE RESPONSIBILITY.**
- **MAY BECOME DEPRESSED.**
- **MAY BECOME LONELY.**
- **EASY TO DEVELOP BAD HABITS.**

### WAYS TO RELAX.
- **CATCH UP ON SLEEP.**
- **WATCH TELEVISION.**
- **READ BOOKS/MAGAZINES.**
- **UPDATE BLOG/WEBSITE.**
- **CALL FRIENDS & FAMILY.**
- **PLAY VIDEO GAMES.**
- **SHOWER/LAUNDRY/CLEAN.**
- **EXCERSIZE.**

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Courtesy of Hervy Christmas, OTR Trucker [39]
A Day in the Life of an OTR Trucker.

A trucker's life is based on routine, regardless of the driver's location. Hervy, the man behind www.lifeasatrucker.com, explains his daily routine in-depth on his website. Below is a summary of his day:

1. I normally wake up between 5-7am, depending on if I need to get a load or if I already have a load attached. Today, I don’t have a load and will need to call dispatch to see where my next load is. My dispatch call center opens at 8am.
2. First I hit the bathroom. If I’m at a truckstop, I use their facilities. If not, it’s time to wet a tire.
3. While I’m waiting for dispatch, I exercise and eat breakfast. Today, breakfast is a can of peaches and a bit of cereal.
4. After breakfast, I do a pre-trip inspection which is a mandatory safety precaution. I log it in my logbook.
5. 8am – I call dispatch and get the location for load.
6. Now I take out my map to route my way to the destination. I’ll call their shipping department to get local directions.
7. With their location figured out, I update my logbook and hit the road.
8. Once I arrive at the shipper, I get my dock assignment and prepare my truck for the load.
9. While I’m waiting to be loaded, I update my logbook, and plan the route to the final destination(s).
10. Some routes are between 500-2500 miles away so planning is important! I plan where and when I’ll want to go to bathroom, where I’ll be hungry and want to eat, and where I will sleep this evening.
11. Even if I don’t have to go, I’ll hit the bathroom one last time before I hit the road. This way, I can drive further.
12. With the load secured I sign the BOL (bill of laden) and update my logbook with my time of departure.
13. It’s now 10am so I grab a banana to snack on and another bottled water and hit the road.
14. I drive for 3-5 hours until I need to use bathroom.
15. I pull into a rest area to use the bathroom, and as I have some food on my truck, I eat lunch here as well.
16. When my break is over, I update my logbook and am back on the road.
17. I go through numerous weigh stations that make sure my truck isn’t over state or federal weight limits.
18. As I approach my final destination, I contact receiving to figure out where they want me to put the load exactly.
19. I work for a company where I unload the truck. Some guys don’t like it, but I like that I get paid to exercise.
20. Again, I update my logbook to show the specifics of the load delivery.
21. Now it’s time to find a truck stop or hotel with truck parking. This is where I will crash for the night.
22. I refuel immediately when I find my truck stop.
23. Now I grab some dinner, sometimes I eat in my truck, other times I eat at the diner.
24. After dinner, I wait for shower and watch some TV.
25. I take a shower and use their bathroom.
26. In the truck stop, I buy groceries for the next day.
27. Now I relax back in my truck and hit the hay, looking forward to another day on the road.

Hervy’s Daily Routine.

Courtesy of Hervy Christmas, OTR Trucker
Regulations and restrictions are imposed on truck drivers from all first world nations. The United States has (arguably) the strictest and most restricting regulations and restrictions in the world, imposed to keep drivers and the public safe.

US Truckers can only legally drive 11 hours in a 14 hour period during one 24 hour day, followed by a minimum rest period of 10 hours. Legally, truckers can’t work more than 70 hours in any 8 consecutive days and, on top of that, drivers must maintain a 24 hour logbook, recording every action they perform, from loading/unloading and driving to rest and bathroom breaks.

"Many of the drivers I have talked to don’t like the lack of flexibility with the current regulations. Who wants to stop when you are just a couple hours from home and forced to sit around at a truck stop? Wouldn’t it be better to let that driver go home where he/she can truly rest and enjoy their off-duty time? ... A happy driver is a better (and safer) driver." [32]

Canada offers more relaxed trucking regulations (but are equally safe).

"[Canadian drivers are allowed] 13 hours of driving in a 14 hour day in a 16 hour window. They must have 8 consecutive hours off duty. The 16 hour window allows for 2 hours during the day for breaks. Seventy hours are allowed in 7 days. Their day can be extended by 2 hours to allow for unforeseen things such as weather or traffic." [32]
“Truck drivers are realized human machines of the industrial age, if there were such a thing as a human machine molded by human hands, every movement shaped my a human demand... And below their certain shyness something still radiates because they want to be heard. But there is no room in their design for their desires.”

Mary Richardson on why she made the book: “I felt compelled to create a project about truck drivers because I had gained some awareness of the trucking industry and I felt compelled to pass it on. I wanted to replace our detached relationship to the stereotypical image of truckers from movies with the reality, and highlight the integrated role they play in our lives as consumers.”

Mary Richardson is a writer and editor who lives in Atlanta, Georgia. She became inspired to write the book due to the three years she spent as an editor of a trucking industry trade magazine. In 2006, she co-authored New Orleans Bicycles with her publisher, and she currently publishes and edits FALSE magazine, a small arts quarterly.

On this opposite page, you will find excerpts and photographs from her book, Truckers.

“...Truckers sit for twice as long as office workers, ears ringing, hearing shot from the sound of the engine running and the trailer rattling. Never a kindness, soft skin... Coffee, wash off the coffee. It is dirty in my head... Eyes blurry, squinting all the time, the pee bottle spilled on the floor this morning. Can’t shit right anymore after holding it in so many times.”

[An automated voice] Shower number three is now available. Shower number...

“...Truckers sit for twice as long as office workers, ears ringing, hearing shot from the sound of the engine running and the trailer rattling. Never a kindness, soft skin... Coffee, wash off the coffee. It is dirty in my head... Eyes blurry, squinting all the time, the pee bottle spilled on the floor this morning. Can’t shit right anymore after holding it in so many times.”

In a cab, 1

Butch Rodger’s feet and head touch the walls when he lies on the bed in the bottom bunk; a folding scooter is stored on the top bunk for transportation once the truck is parked. His blanket and sheet lie crumpled in the corner and stuffed animals are strapped into the passenger seat, all gifts from his wife.
Fifteen year trucking veteran Jason Cox explains how real truck drivers have “Trucker Blood”:

“Contrary to what some believe, trucking is NOT for everyone, it is a very hard job and you make very little money doing it considering the hours involved. To most people it's just a job, and the reason they got into it is that this is the easiest and quickest industry to get into with the “potential” to make good money.

“In the past fifteen years the “quality” of drivers has been dwindling. People who obviously don’t have “trucking in their blood” are ruining this industry.

“Someone with [Trucker Blood] is someone who doesn’t complain everyday about the job at hand they just do it no matter what it takes to get it done. It’s someone who can improvise and make do of any situation that arises, without having to “air it” for all to know. These are the ones who are looking for a pat on the back, or a hug. A true truck driver never ask for anything in return, they just want to climb back in the truck and get to the next load.

“Statistics have shown that if a person does not like the job they are doing, then that person is not going to continue to do that job. Now I realize that times are tough, and it is often impossible to avoid falling victim to unkemptness.”

Jason explains that those with “trucker blood” are the men and women who WANT to be drivers, and do what it takes to get the job done. But what about the “trucker image”?

THE “TRUCKER” STEREOTYPE.

Common trucker stereotypes give the trucking industry a bad image. Rick Huffman, and OTR trucker, talks about these destructive stereotypes:

“If we are to believe the stereotypical image painted by Hollywood, the typical trucker is an uneducated, unkempt redneck that has never quite mastered the art of taking a shower.

“Sadly, the formulation of any stereotype usually stems from a small kernel of truth. I see plenty of drivers who are unshaven with, perhaps, a streak of fifth-wheel grease on their tee shirt, and some splatters of mud here and there. I am occasionally one of those individuals myself. The nature of the work is not glamorous, and it is often impossible to avoid falling victim to unkemptness.”

Though there was a time not too long ago when “the image of a “trucker” was that of a cowboy boot wearing, tobacco chewing, “Good old Boy” from the “sticks”. The reality today is quite different.”

[The] newest tractors have spacious sleepers, wide beds, and even closets. Aerodynamic bodies and power steering means that smaller people can now handle an eighteen wheeler. This has given rise to record numbers of ladies joining the industry. Combine this with the volatile job market, trucking has seen people from all walks of life joining the industry. It is just as common to meet an ex-factory worker as it is to meet his former boss now driving a truck.”
VALUES THAT TRANSCEND CULTURES.

The essence of the trucker can be found in all cultures across the planet. Regardless of race, age, gender, or culture; truckers have an essence of who they are. Through observation and research, three main and essential traits are exposed:

Truckers are proud because they help the growth and movement of society, and know how essential their jobs are. The desire recognition and respect for the jobs they do.

Truckers need to show they are in control of the large and seemingly dangerous vehicle they drive. The promotes confidence in other drivers, as well as in the truckers themselves.

Truckers desire to physically see places they have not seen before. There is some need of travel that stirs their souls.

These essential traits will, as I believe, continue to exist for as long as the truck driving lifestyle exists. Therefore, to accurately design a vehicle for the trucker, we must look to their essence and design to who they are, all the way to the core.

RESPECT. RECOGNITION. PRIDE.

With a solid understanding of the essential characteristics of a trucker, we can see how these traits translate through human generations. On the following pages, we will look at past, present, and future trucker markets.
The good men and women that started driving our trucks in the 70s are from the baby boomer generation. Inspired to become truckers from the rise in popularity of "trucker culture", they are just now ending their careers and the lifestyle on the road. Wikipedia recounts the past:

“The decade of the 70s saw the heyday of truck driving, and the dramatic rise in the popularity of "trucker culture". Truck drivers were romanticized as modern-day cowboys and outlaws (and this stereotype persists even today). This was due in part to their use of citizens’ band (CB) radio to relay information to each other regarding the locations of police officers and transportation authorities. Plaid shirts, trucker hats, CB radios, and using CB slang were popular not just with drivers but among the general public.”

The appeal to the lifestyle has wrinkled in time. Though the drivers were (and still are) excellent in their jobs due to their strong work ethic and competitive attitudes, they have aged and are retiring, leaving the industry to future generations.

The majority of people who jumped behind the wheel of big rigs in the 80’s and 90’s are part of Generation X.

"Generation X was generally marked early on by its lack of optimism for the future, nihilism, cynicism, skepticism, political apathy, alienation and distrust in traditional values and institutions."

"[They] grew up in a rapidly deindustrializing Western world, experienced the economic recession of the early 1990s and 2000’s. [They] saw traditional permanent job contracts being supplanted with unsecured short-term contracts. Many found themselves overeducated and underemployed, leaving a deep sense of insecurity in Generation Xers, whose usual attitude to work is Take the money and run."

Interest in the trucking industry has declined with GenX behind the wheel. The "tough job" of trucking is not appealing to the educated and disenfranchised "90s Generation". Those who do drive cannot account for the missing work force.

**The Trucker Lifestyle**

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**Key Words**

- Retiring
- Worker Bee
- Competitive
- Just Do It

**Generation X.**

- Entrepreneur
- Disenfranchised
- Pragmatic
- Educated

**Current Drivers.**

- Retiring Generation.

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It is now up to the Millennials to take control of the future of the trucking industry. Those born in the mid 80’s are already in their 20s and starting to pilot our trucks, but a bulk of the population is too young to drive.

Millennials have been brought up with the digital world from an early age; they form groups more readily and prolifically than ever before (Facebook, LinkedIn). Though they are socially connected, they desire to be individual and express themselves as free thinkers. They aren’t shy with their opinions either, and when they relax to escape, they are still plugged in to technology.

The current trucker lifestyle (as of 2012) does not appeal to this generation, as it is lonely and disconnected from society. How then, do we make the lifestyle more appealing to the Millennials? A study by Investor Place gives an example:

“60% of Millennials say they’d rather drive a hybrid gas-electric car than a traditional gas vehicle, according to Deloitte, which surveyed 1,500 Millennial car buyers.”

Also known as the Internet Generation, this generation includes populations born between the early 90s and 2010. These people have been brought up entirely within the world of technology and have thus been called “digital natives.”

From what we can gather with preliminary research, this generation is one of curators, not brands. Brand image and loyalty is replaced by the measurable qualities of objects; this generation has access to the information from reviews on their social networks and they can choose the best. It is interesting to note that this data-mining and the resulting selection puts to practice Darwin’s Theory of Natural Selection in a the material consumer world. This generation is data hungry and is very open about their wants, opinions, status updates, and desires.

The generation to follow the “Digital Natives” are already being called “Generation Touch.” These children (born 2010 to current: 2012) have been exposed to touch screens and portable devices their entire lives. It is too soon to tell what we can expect out of this infant generation, but we know that soon enough, they too will pilot our trucks.
By mapping out the trends and expectations of current and future generations, we can project and predict how the trucking industry will develop over time. This timeline was created using data taken from marketing analysts.

Analyzing the timeline, we can see that the concept of “trucker blood” is in decline. More drivers are leaving the market than are being hired; people are not willing to sacrifice their lifestyle to pursue the career. As the Millennials are just now coming of age, their social nature and reliance on technology will keep them away from the trucking lifestyle. People are spending more time to become educated, and thus have a higher expected quality of life (the perceived “quality of life” of trucking appears quite low). Though the Millennials are not as career-oriented as their predecessors, it is predicted that future generations will have higher career aspirations.

The lonely nature of trucking and the negative view of the its lifestyle are causing the industry to decline. Making the lifestyle more desirable and increasing driver connectivity will remedy these initial challenges, but these solutions will not solve the underlying problem: the trucking lifestyle doesn’t appeal to future generations.

In order to interest future generations in the trucking industry, it is imperative that their needs and expectations are met and exceeded with technologically advanced lifestyle solutions.

Bell-graph volumes represent the quantity and market saturation of truck drivers. Individual lines represent trends associated with fading and future markets.
The future of the trucking industry and its appeal will be determined by advances in technologies, upcoming market predictions, environmental and infrastructure projections, and civilization’s insatiable need of goods and materials from around the world.

In this section, numerous technologies are examined, each aimed at appealing to future trucking generations. They include:

- Artificial Intelligence
- Autonomous Vehicles
- The Future of Communication
- Augmented Reality
- The Future Living/Working Space

Advances in trucking technology are also examined:

- Powertrain
- Aerodynamics
- Thoughts on Safety
- Infrastructure Projections

We now map out the development and implementation of these technologies through a timeline, and through analysis, can understand where this technology timeline is leading us: to an end goal.

With an end goal in place, we can now map out the transitioning trucker lifestyle with ideas and conceptualization from a workshop. Finally, the goals of the design are proposed and defined.
ARTIFICIAL INTELLIGENCE.

WHAT IS AI?

Artificial Intelligence (AI), is an intelligent system that perceives its environment, analyzes the data and takes actions to optimize its success. This upcoming technology is important because of three main reasons: AI quickly processes and analyzes large amounts of data that would take humans years, it aims to optimize worker productivity, and it will soon start replacing unskilled worker jobs.

“We will use artificial intelligence (AI) to greatly reduce the cost of health care, accelerate research and development into new medicines, [and] improve cars and roads to reduce gridlock.”

The development of AI will result in, the more efficient management and use of resources, an increased pace of medical discovery, and the creation and proliferation of the autonomous vehicle.

“...AI under the hood will certainly advance to the point where the driver takes on more of a supervisory role. In terms of traffic safety, this will have an enormous impact.”

AI’s predicted future capabilities are astounding.

ON THE MARKET.

The implementation and use of artificial intelligence has grown substantially since it was first introduced, and numerous examples of it exist within markets even today:

“AI is already directing traffic in major metropolitan centers through programs like SCOOT (Split Cycle Offset Optimisation Technique), a system that responds to fluctuations in traffic flow through detectors embedded in the road. It helps the FAA’s National Command Center in Herndon, Va., predict how a flight delay in Seattle will change departure times in New York. Many brokerage companies use AI programs to better time stock trades. Your local utility company uses AI to operate more safely and efficiently, and since the launch of the Apple iPhone 4S in October, millions of people around the world are using an AI program called Siri to find nearby restaurants, schedule meetings and more.”

As society continues to become exposed to and depend on the data analysis and predictions generated by AI, the technology will become an integral component of our daily lives.
AUTONOMOUS VEHICLES.

FUTURE OF DRIVING.

Autonomous vehicles will soon be commonplace in our society. They are truly “auto-mobiles”, moving people and goods around from place to place with little to no effort from us. One can think of these vehicles as “driverless cars”.

Because we are no longer the drivers and are now supervisors and passengers, it allows us to focus on other tasks or to relax and enjoy the ride. More important than our “ease of life” is the actual “preciousness of life”. Autonomous vehicles will, over time, nearly eliminate all traffic accidents and will decongest traffic prone areas.

How do they do it? These vehicles gather data from their surroundings using numerous sensors and receive and communicate data to and from external sources (e.g. traffic conditions, weather reports, etc.). The data is continually analyzed using onboard or cloud-based artificial intelligence, which plans the optimal routes and moves the vehicle efficiently from place to place.

Autonomous vehicles have long been a dream of futurists and science fiction writers, and though they are quickly becoming a reality, we still have a ways to go:

“While the current technology is good enough to navigate roadways and recognize obstacles, it will need some refinement before it’s human-safe. Driverless technology will initially require a driver, and it will creep into everyday use much as airbags did. First as an expensive option for luxury cars, but eventually it will become a safety feature.”

The proliferation of autonomous vehicles is not necessarily a positive thing to everyone, as it is a disruptive technology to both people and business. Autonomous vehicles will destroy many careers and will damage some industries over time:

“...over 232,000 taxi and limo drivers in the U.S. will lose their jobs; over 647,000 bus drivers will be out of work, as will 125,000 truck drivers. [Autonomous vehicles] will enable on-demand transportation services to replace the need for individual car ownership.”

This natural selection will phase out careers and lifestyles, but will introduce new ones as well. To be sure, autonomous vehicles are coming, but we will not see their standardization for another few decades.

“In the end, we will be driving towards a far safer and more resilient society, but we’ll be traveling down some very bumpy roads along the way.”
FUTURE OF COMMUNICATION.

MACHINE TO MACHINE.
The advantages that lie within the future of machine to machine communication (M2M) are fantastic. 

“[M2M enables] real-time data communication between remote machines and central management applications to enhance the value of the remote device to its user. 

“Connected cars with M2M can suggest better routes so drivers can keep their eye on the road and also send alerts when a car fails to operate correctly...”

SUPER WI-FI.
Super Wi-Fi was developed to extend the range and speed of the internet. Though it’s only recently been tested, the projected capabilities of Super Wi-Fi and its derivatives are impressive. 

“...the next generation of Wi-Fi [will bring] an even higher data rate, more like a gigabit per second.”

The derivatives of Super Wi-Fi will provide internet access with greater coverage at higher speeds than is currently possible. The end goal is to provide high-speed wireless internet across the United States.

IMMERSIVE VIDEO MEETINGS.
“...though the quality of video communication has greatly improved, it still cannot match the feeling of proximity generated by real, face-to-face conversation.”

Immersive video communication aims to remedy this problem by placing real-time video captures of numerous users into digital environments. This technology aims to bring human beings closer together and will be readily available on the market within the decade.
AUGMENTED REALITY.

WHAT IS AUGMENTED REALITY?
Augmented reality is a future technology that projects digital information over our physical environments in real time. Abigail Phillips, a technology writer for Business Review Europe, explains augmented reality in more depth:

“...it is augmenting the space within which the user is currently in; animating, illustrating and enhancing their reality.”

VEHICLE APPLICATIONS.
Augmented reality will soon enhance our driving experience, combining physical and digital worlds. Mr. Prasad, senior technical leader at Ford, explains:

“Cars are becoming platforms to participate in the digital world in a fully networked sense, just like your tablets can and your phones can.”

Gesture actuated augmented reality is in its pre-natal state, but in the near future, this type of vehicle interaction will be commonplace.

THE FUTURE OF A.R.
Though our current perception of augmented reality comes through our smartphones, we will soon be able to experience the world through stylish glasses and even contact lenses.

Our current perception of augmented reality is about visual enhancement, but the future of augmented reality will include the entire visceral experience.

“First it will be purely visual, then sound will be added, touch will follow soon after and eventually even taste and smell.”
THE MOBILE WORKSTATION.
As workers become more mobile, they are spending more time working on the road and less time in the office. This has brought about the need for functional and integrated mobile workstations.

“Essentially, a phone is connected to the car and turns the car into a rolling hotspot. This means that all passengers in the car work off the power of one phone (and the data plan associated with that phone).” [56]

FUTURE WORKING.

NEW DATA TRANSFER.
The transfer of data will go from the tedious fiddling of cables and manual movement of files to the high speed data transfers of surface to surface to cloud.

“[It] creates real time, seamless sharing of just about any type of content between your [devices] and then back again.” [57]

This technology will be able to analyze written data (such as business cards and receipts) and transfer the information directly to the cloud, making data transfer an enjoyable experience and reducing the amount of clutter in the office.

FUTURE LIVING.

HOLOGRAPHIC TV.
Just as 3D televisions and full HD flatscreen LED monitors are becoming mainstream, new technologies emerge into the consumer market. Soon you will be able to upgrade to holographic television.

“Images will be projected into the middle of a room as a “cloud” that can be viewed from every angle without 3D glasses. Manufacturers hope they could go on sale in 2012.” [58]

This television will provide the “ultimate viewing experience.” It is “a display with maximum realism and minimum unpleasant physiological effects.” [59]

GESTURE RECOGNITION.
Gesture recognition is fast becoming the future for interactions with our houses and our belongings. This technology senses and responds to your physical movements, rather than physical touch. In Microsoft’s “House of the Future” (2011), guests explained their favorite upcoming technologies:

“...visitor favorites include a countertop projection of recipes, appliance manuals and more that can be navigated by gesture or by voice.” [60]
THE FUTURE POWERTRAIN.

HYDROGEN FUEL CELL TECHNOLOGY.

Fuel cell propulsion systems will power the trucks of the future. With the ability to utilize numerous types of fuel (from diesel and petrol to vegetable oil and hydrogen), fuel cells are as adaptable as they are efficient. A report by the US Dept. of Energy (2002) presents a vision of 2030 with hydrogen in mind:

“By 2030, hydrogen will be the dominant fuel for government and commercial vehicle fleets. It will be used in fuel cells for both mobile and stationary applications.”

With hydrogen as our power source and the use of fuel cells to make the energy usable, the system provides cheap and efficient power to society. This type of propulsion system is ideal for trucking and the commercial freight industry for these reasons:

1. Low Maintenance Needs
2. High Degree of Reliability
3. Efficient Energy Conversion
4. Reduced Dependence on Oil
5. Reduction of Greenhouse Gases
6. Quiet Operation

The technology is rapidly developing, reviewing the report data appears to indicate that all of the R&D projections have been met and surpassed thus far.

HOW THE SYSTEM WORKS.

Fuel cell propulsion systems are currently and typically comprised of the following main components:

1. Fuel Storage Tanks
2. Fuel Cell Supply System
3. Fuel Cell Stacks
4. Cooling System
5. Electric Engine
6. Transmission

Fuel from the tanks is run through the Fuel Cell Stacks, producing heat and electricity. The electricity then powers an electric engine which powers the vehicle, for both propulsion and auxiliary purposes.

CHALLENGES TO OVERCOME.

There are three main concerns to address with the future of hydrogen fuel cell systems. These concerns must be understood and addressed to make hydrogen fuel cell propulsion systems a viable reality:

1. Infrastructures worldwide need substantial upgrades to adapt alternative fuels (e.g., hydrogen).
2. The cost of production, transportation, and storage of hydrogen needs to be drastically reduced.
3. Current fuel cell technology requires heating/cooling units for the fuel cells to operate within their optimal temperature range.
Increasing the aerodynamic efficiency of trucks and their trailers is integral in optimizing overland commercial freight. This increases fuel economy and cuts operating costs. Moving the vehicle through the air equates to approximately 40 percent of the overall fuel usage.

“As a vehicle’s frontal area increases and average speeds exceed 45 miles per hour, aerodynamic drag tends to dominate vehicle efficiency. Aerodynamics therefore has a large impact on vehicles with a large frontal area and highway-dominated driving patterns in large-vehicle classes, such as tractor trailers... Better aerodynamics could improve on-road truck fuel economy by more than 10%.”

Truck aerodynamics have been largely dominated by vehicle architecture and powertrain, which present less than optimal drag coefficients. By redesigning the vehicle architecture and better integrating the powertrain, the aerodynamics can be integrated into the design to create “slippery” solutions.

Opportunities for improvement exist around the wheels, under the body, between the cab and trailer, and at the end of the trailer.

Through simulation, BMI showed that retrofitting existing trucks with advanced components like the Trailer UnderTray will improve current fuel efficiencies by nearly 12%; with the potential of making future advanced trucks up to 50% more efficient.
THOUGHTS ON SAFETY.

COMMUNICATION IS KEY.

The future of trucking safety rests with communication: advanced communication between the driver and the truck. The driver controls and directs the truck while the truck monitors the driver’s fatigue, along with road and traffic conditions, other vehicles, and the surrounding environment. The need of good communication affects more than just the driver.

“Various vehicle tracking and communication systems offer important services to the driver, the haulier and the customer by enabling better planning and execution of the freight task.”

This advancement does not only affect the trucking industry. The US DOT recently awarded $14.9M to the University of Michigan’s Transportation Research Department to test the technology of vehicle to vehicle and vehicle to infrastructure communication.

“This is the next major safety advancement, one that’s comparable to seat belts, air bags, and electronic stability control.”

BIGGER IS BETTER.

A recent report run by the US government shows statistical data of how larger and heavier trucks have fewer accidents and are more stable than traditional OTR truck configurations.

“Many higher capacity vehicles have equivalent or even better intrinsic safety characteristics in some respects than most common workhorse trucks. This is suggested by the literature and by computer modelling undertaken for this report of heavy truck types and confirmed by a number of case studies of higher capacity vehicles on the road (e.g. in Canada, Sweden and Australia). Their dynamic stability tends to be superior. Their axle load distribution, on a greater number of axles, often enhances brake capacity, with shorter stopping distances and reduced brake fade.”

The safety record for this type of truck can be attributed to the higher quality of drivers, more advanced operational controls, and more numerous and specific safety devices.

Larger trucks can haul more freight per unit making more money for all parties involved. However, larger trucks require more responsible drivers, who need more extensive training.
INFRASTRUCTURE PROJECTIONS.

HIGHWAY INFRASTRUCTURE.

The highway infrastructure of the US is an integral aspect of how the future of overland freight will play out. Currently, this infrastructure is crumbling and little is being done to repair the thousands of miles of road. This eroding system causes more than delay and a concern to the trucking industry:

“Americans spend 4.2 billion hours a year stuck in traffic at a cost of $76.2 billion a year—$710 per motorist. Roadway conditions are a significant factor in about one-third of traffic fatalities. Poor road conditions cost U.S. motorists $67 billion a year in repairs and operating costs—$333 per motorist; 33% of America’s major roads are in poor or mediocre condition and 36% of the nation’s major urban highways are congested. The current spending level of $70.3 billion for highway capital improvements is well below the estimated $186 billion needed annually to substantially improve the nation’s highways.”

For the security and stability of the overland freight industry, it is imperative that more money is reallocated to upgrade and repair our crumbling infrastructure.

HYDROGEN FUEL INFRASTRUCTURE.

There have been many recent governmental discussions about transitioning from our petrol-based fuel infrastructure to a hydrogen fuel infrastructure. Hydrogen is widely available, but is easily accessible to the general public:

“According to GM, 70% of the U.S. population lives near a hydrogen-generating facility but has little public access to that hydrogen. The same study, however, shows that building the infrastructure in a systematic way is much more doable and affordable than most people think.”

Currently, there are only 200 hydrogen fuel stations globally (as of 2010), but these numbers are on the rise, and will grow exponentially:

“According to a new report from Pike Research, as a result of this infrastructure investment, more than 5,200 hydrogen fueling stations for cars, buses and forklifts will be operational worldwide by 2020.”

Though the trend of investment into the hydrogen fuel infrastructure is on the rise, we can only hope that this trend continues to gain momentum and will be our future fuel system.
It is obvious that technology will grow as time progresses, but it is important to project the rate at which it grows, in order to utilize appropriate technologies to future generations.

Artificial intelligence is projected to begin its proliferation in society at around 2030. Though it has recently been introduced (SIR), people will still be cautious to use and trust it extensively. Autonomous driving options will become standard by 2020, though market uptake will be slow and it will not become fully integrated until at least 2100. Augmented reality is the fastest growing technology, for its novelty and added information. Expect it to become integrated into our society before 2030. Our need for information on demand will speed the growth and availability of wireless internet, which is projected to become widely available by 2030. The usage of the mobile office, as well as gesture recognition, will grow slowly but steadily throughout time.

Due to the rapid growth of technology, the trucking industry will drastically change over the next fifty years. By these projections, the capacity to produce fully autonomous vehicles will widely available to modern, first world societies by 2100, thus eliminating the need of truck drivers altogether.
Fully automated overland commercial freight is the end goal for the movement of goods across the country. As a fully automated system, there is no opportunity for human error, thus deliveries will be made faster and on a precise schedule without fear of accidents or delays. Though many technologies are moving toward this end, full automation implementation is over a century away.

We will still need truck drivers for at least another century and the immediate and mid-range need for truck drivers is dire. It is imperative that we explore and project the future lifestyles and roles of the career, in order to determine how best to make the trucker lifestyle more appealing and desirable, thus ensuring the stability of our commercial freight system.
After gaining insight into the current trucker lifestyle and researching future markets and technologies, it became apparent that the project would benefit from many minds discussing the development of “the future trucker lifestyle”.

A group of eleven designers participated in an intensive brainstorming session after a presentation about the current state of the industry and future market and technology projections. They focused their efforts on three main questions:

- What will future trucker responsibilities be?
- How will the future truckers relax?
- How will future truckers cope with loneliness?

The brainstorming session generated numerous ideas and solutions, creating many possible scenarios for the future trucker lifestyle.

- Truck drivers are hired because of their abilities to monitor and react. Numerous observation tasks could be repurposed, from mobile security guards to sports recruiters. One OTR driver could monitor many trucks in a road train. Think mobile “Air-Traffic Control”.

- Future truck drivers will monitor passively - they can focus on administrative tasks, such as data entry, payroll, or reception.

- Mobile Lecturer - Geography Teachers. “Truck driver” career needs a new name. They spend less time driving, more doing other things.

- Mario Kart was a huge inspiration for this group. Thinking about how drivers can leave digital messages/tokens/reviews about various locations on the journey (accessed via augmented reality). Scavenger Hunt. “Relax while driving, work at the stops.” Living Room-like cabin, walk and stretch while driving.

- Digital Painting on the windscreen through gesture recognition. Also, games like X-Box Connect to keep driver active while driving.

- Combine Facebook with Google Maps to create a physical/digital relationships. Truckers can see their friends’ location in real-time, and exchange messages.

- Good driver should have a “like” button. Senses to remind of home in a good way.

- Make a moving Wikipedia - information of what’s going on on the road/history of places.

- Take friends on virtual tour of real world.

- Place driver lower to the same level as traffic, this integrates them into society better.

- Create conversations with automotive traffic - offer advice and where to get good experiences.

GROUP BRAINSTORM.
This is a timeline that projects the lifestyle of the truck driving career. By mapping the career responsibilities and lifestyle desirables of future truckers, we can determine how their trucks should evolve over time.

The truck driving career and lifestyle is on the verge of entering a period of dynamic transition. The coming change will be huge, evolving and repurposing the responsibilities and lifestyle of future truck drivers. These lifestyle changes do not only affect the drivers, but will also impact the truck driving educational institutions and various cultural perceptions of what the trucker lifestyle is all about. The image of “truck driving” is about to enter metamorphasis.

We must transcend traditional views of what the trucker lifestyle is and means in order to appeal to future generations to bring in more drivers and reinvigorate the trucking industry.

From our projections, we can see that the roles of the truck driver will shift away from driving and move toward other responsibilities as the trucks become more automated. Communications and social integration will drive the future generations, and will be expected and necessary in any industry.

The initial key transition period is 2030. This will be the first time in trucking history where the primary responsibility of the truck driver will no longer be the act of driving. This specific date is of key interest as it presents numerous opportunities for innovation and will set the tone for future designs.
In 2030, vehicles will have advanced automation capabilities but will still need to be monitored, repaired, and physically driven in specific and numerous situations. The truck driving lifestyle will have evolved to a point that requires alternative architectures and user-focused designs.

Broadly, the design intent is to “visualize a truck: interior, exterior, interactive, and informed engineering” for 2030. But in reality, the design intent is to design a transportation experience that tells the story of the future of long-haul commercial freight. It is to focus directly on the vehicle operators and will take into effect the changes in social and cultural perspectives and the coming advances in technology.

Because the concept is to focus directly on the future trucker lifestyle, the final result will illustrate an intimate solution. As the vehicle will still be the main “character” in the driver’s daily life, it is important that the driver feels “connected” with the vehicle. Therefore, the way to successfully communicate the vehicle design is through the human approach: create emotional connections with transportation.

The final concept will be as much a transportation experience as it is a vehicle design.
Using design to appeal to emotion is the main directive of this design project. Thus, understanding emotion and how it relates to and is created by design is imperative for the project’s success.

In the first section, we take a deep look into emotion, learning about what it is, its appeal, and how to emotionally connect:

- What are Emotions?
- How are they Formed?
- Left Brain vs. Right Brain
- Appeal and Connect
- Heart to Heart

With a good understanding of the psychology and physiology of emotions, we can apply our knowledge to design. Now we can accurately analyze how and why people become attached to their things:

- Experience Design
- The Four Pleasures Framework
- Don Norman & Emotional Design
- The Emotional Timeline

Case studies are now examined. These illustrate emotion and design in context of modern society, and provide benchmarks and milestones in the field of emotion and design.

Finally, the design approach and design drivers are presented, leading into the initial concept ideation.

THE FUTURE OF DESIGN.
Emotion is essential to human nature, but what is it exactly?

“Emotion is a feeling that is private and subjective... a state of psychological arousal, an expression or display of distinctive somatic and autonomic responses... [and] are actions commonly “deemed”, such as defending or attacking in response to a threat.”

The antonym of emotion is reason, and is thus a difficult concept to quantify.

Though emotions are integral in our everyday lives, one may assume that rationality rules the decision-making process. Surprisingly, emotion is the ruling factor when we make a decision. “...about 80% of buying decisions are based on emotion; and only 20% are based on logic.” This verifies the importance of emotions, not only for our personal lives, but in business and marketing as well.

How important are emotions to human beings anyway? According to Maslow’s “Hierarchy of Needs”, it is an integral aspect of who we are and how we function.

“The most fundamental and basic four layers of the pyramid contain what Maslow called “deficiency needs” or “d-needs”: esteem, friendship and love, security, and physical needs. With the exception of the most fundamental (physiological) needs, if these “deficiency needs” are not met, the body gives no physical indication but the individual feels anxious and tense. Maslow’s theory suggests that the most basic level of needs must be met before the individual will strongly desire (or focus motivation upon) the secondary or higher level needs.”

SELF-Actualization

Esteem

Love/Belonging

Safety

Physiological

maslow's hierarchy of needs

maslow's hierarchy of needs

What are emotions?

Why are they important?

Emotion is essential to human nature, but what is it exactly? “Emotion is a feeling that is private and subjective... a state of psychological arousal, an expression or display of distinctive somatic and autonomic responses... [and] are actions commonly “deemed”, such as defending or attacking in response to a threat.” The antonym of emotion is reason, and is thus a difficult concept to quantify.

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Emotion & Design |

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Understanding the range of human emotion is important to determine which emotions are relevant to focus on for the design; but how are emotions created? There are numerous theories on how we create emotions, though they all rely on an event or action and create an emotion or reaction. One thing is certain: emotions are created through interactive experiences, an EVENT.

Nearly all of the theories on emotion support the concept that we become aroused from an event and form emotions based on how we are aroused. This arousal can only come from the sensory experience. We use our five senses: SIGHT, SMELL, HEARING, TOUCH, and TASTE, to examine and analyze our surroundings and experiences. Without our senses, we would be unable to form emotions.

Plutchik’s psychoevolutionary theory of emotion is one of the most influential classification approaches for general emotional responses. He considered there to be eight primary emotions:

**ANGER - FEAR**
**SADNESS - JOY**
**SURPRISE - ANTICIPATION**
**DISGUST - TRUST**

He visualized this theory with the wheel of emotions. "This wheel is used to illustrate different emotions compelling and nuanced. Plutchik first proposed his cone-shaped model (3D) or the wheel model (2D) in 1980 to describe how emotions were related. He suggested 8 primary bipolar emotions: joy versus sadness; anger versus fear; trust versus disgust; and surprise versus anticipation. Additionally, his circumplex model makes connections between the idea of an emotion circle and a color wheel. Like colors, primary emotions can be expressed at different intensities and can mix with one another to form different emotions."
The left hemisphere of the brain is known for the logical and routine aspects of our thought process. This is where we ask questions like: “Why?” “What happens if...?” “If you compare A to B, what are the benefits?”, etc. These kinds of questions are formed based on facts, reason, data and exact calculations.

Aside from providing logic and reason, the left hemisphere also controls positive aspects of emotion. Located in the left frontal lobe, positive emotions such as relaxation, joy, and forgiveness are felt. In a recent study, 62% of patients that suffered a left frontal lobe stroke experienced anxiety and depression, compared to only 10% who suffered a right frontal lobe stroke.

The right hemisphere of the brain is known for the creative and novel aspects of our mental processing. This is where we ask questions like: “How did you feel about that?” “What was that experience like?”, etc. These kinds of questions are formed based on sensory and emotional perceptions. Aside from providing creativity and approximations, the right hemisphere also controls the negative aspects of emotion. Located in the right frontal lobe, negative emotions such as sadness, boredom, and anger are generated.

Regardless of how emotions are formed, they are created in the depths of the human brain. The brain is complex and is composed of many segments, but the main area associated with emotion is the left and right frontal lobes. Emotions are physiologically experienced through the use of dopamine, serotonin, and norepinephrine; these neurotransmitters are aptly described as “The Molecules of Emotion”. Understanding how our emotions are formed helps us determine how to create desirable emotions.

THE HUMAN BRAIN.

THE "HOW" OF EMOTION.

LEFT HEMISPHERE - COGNITION

The left hemisphere of the brain is known for the logical and routine aspects of our thought process. This is where we ask questions like: “Why?” “What happens if...?” “If you compare A to B, what are the benefits?”, etc. These kinds of questions are formed based on facts, reason, data and exact calculations.

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THE HUMAN BRAIN.

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Emotional appeal is important because it’s a strong way for a product or person to distinguish itself from its competition. In 2011, Lake Research measured emotional vs. rational decision making in car purchasing in a qualitative survey of over 12,000 motorists. They concluded: “...to halt any decline in market share [automotive companies] must “embrace stronger emotionally appealing design” to deliver greater brand satisfaction and loyalty for consumers.”

The emotional appeal of our products are more important than ever; keeping sales up and brand loyalty strong.

Emotional connections are important because they are a basic human need. Both emotions and connections are “d-needs” in Maslow’s “Hierarchy of Needs” (3rd Tier). An article in Businessweek discusses how consumers crave “personal meaning” in products and services: “…emotional connections are on the critical path to product success. Products and services need to connect emotionally and physically [with] the people using them.” If “Emotional Appeal” is the first date, then “Emotional Connections” are the long lasting relationships.
With a solid understanding of emotional appeal and emotional connections, we can look at the important aspects of both in our lives and determine our emotional needs. Our primary emotional needs include security, acceptance, significance, and connections with others. Though the list of emotional needs is unique and varies in importance to each person, the list is common to all of society. Our primary emotional needs must be met in order for us to remain human.

It is worth noting that our primary emotional needs involve interacting with other living things. We create the strongest emotional connections by interacting, communicating, trusting, and (to a certain degree) loving the entity we are connected with. When we become so strongly attached to an entity, we create feelings of irreplaceability. "...feelings of irreplaceability are likely to form the most important component of attachment, because they are based on the personal, idiosyncratic relationship..."[81] When we know and love an entity’s personality traits, their quirks and emotions, we can become so emotionally invested that we cannot bear the thought of losing the entity.

We do not only create emotional attachments to living things, we also attach to our possessions and services. A report from the Department of Industrial Design at the Delft University of Technology (2008) goes into detail about the importance of consumer-product attachments:

"From the viewpoint of sustainability, a high product turnover is in many cases undesirable, because it produces waste and it uses up more scarce resources. Therefore, it is worthwhile to attempt to lengthen the psychological life span of durable consumer products. One possible strategy to slow down product life cycles is by increasing the attachment people experience towards the products they use and own. When a person becomes attached to an object, he or she is more likely to handle the object with care, repair it when it breaks down, and postpone its replacement as long as possible."[82] Sustainability is an important outcome of consumer-product attachments, but not the only benefit. Products will increase in physical and sentimental value as we become attached; the connections we create with products will make them appear more desirable and provide us more meaningful experiences. The key word here is experience.
Experience design is exactly as it sounds; designing a product that gives us unique and desirable experience. The methodology of experience design is opposite that of traditional design approaches, targeting pleasures and emotions before the actual use and functionality of the product. Though three aspects of human-centered design are met, they are approached in reverse order.

**Pleasurability**

Pleasurability is the first criteria to meet when designing for an experience. Here, designers ask “What kind of experience does the user want or need? What emotions do we want to tap into? What kinds of pleasures do we want the user to feel?” These answers will decide on what the product is and does; what the experience will be.

**Usability**

Usability is the next step in experience design. Once an experience is established, we need to understand what the user would need to do to get the experience. “How will the user get this experience? What ways could the user get the same experience? How easy is it to get the desired feeling? These questions will lead to functional innovation.

**Functionality**

Lastly, functionality is addressed. Here is where innovation takes place. We are able to design and engineer new functions that physically create the emotion, pleasure, and experiences we target. Though usable functionality enable an experience, it is the experience that is remembered long after the product is retired.
DESIGNING PLEASURABLE PRODUCTS

Former head of design at Philips Design, Patrick Jordan is a pioneer in the field of emotional design. His groundbreaking book has become one of the most widely read and referenced books in the field.

Jordan states that there are three different types of pleasure associated with products: emotional, hedonic and practical. Pleasure with products comes from the relationship between a person and a product. Therefore pleasure is not a property of a product but of interaction. The concept of “Four Pleasures” comes from anthropologist, Lionel Tiger, who first classified these pleasures (regarding evolution) in his 1992 book “The Pursuit of Pleasure.”

Physio-pleasure. This pleasure can best be described as physical bodily pleasures that come from our five senses. Using touch, taste, sight, smell, and sound, we experience our surroundings and products. Physio-pleasure is pre-cognitive, meaning that it comes before any thought. It is an instinctual reaction to stimulus given to the senses. This is the first reaction one has with a product.

Psycho-pleasure. After we “sense” the object, we have cognitive and emotional reactions. We first assess the usability of the product; for example, poor usability can cause anxiety, stress, and frustration. Now we sense how the object makes us feel, not only about the object, but also about ourselves. This feeling is key to the success of an emotional design.

Socio-pleasure. “Socio-pleasures arise from relationships with other people or society as a whole. Social need pleasures avoid discomfort of not being socially accepted.” These pleasures include personal taste, moral values, and individual aspirations. Examples of socio-pleasure focused products include clothing and mobile phones. These products act as markers of social acceptance, and aim to keep the user connected to society.

Ideo-pleasure. “[Ideo-pleasures are] important in defining how people do and would see themselves.” These pleasures include personal taste, moral values, and individual aspirations. Products designed with ideo-pleasures in mind often utilize a specific design language (art deco, bauhaus, etc.) to appeal to an individual’s tastes.
Donald Norman’s book stems from his previous work on usable design (see “The Design of Everyday Things, 1988) and takes cues from the work of Jordan. This book offers numerous case studies and examples of emotional design, that both illustrate and add color to the relatively new and underdeveloped topic. I highly recommend the entertaining read for designers of any industry.

“Visceral design is what nature does.”

What Dr. Norman means is that we have evolved to perceive the world (and thus design) with our five senses. Through the nuances of touch, smell, sight, sound, and taste, we experience all that is around us. As these principles are “wired in”, good visceral design will transcend people and cultures.

“Behavioral design is all about use.”

The only important aspect of this design component is the performance of the product. What matters is “function, understandability, usability, and physical feel”. “...behavioral design should be human-centered, focusing upon understanding and satisfying the needs of the people”

“Reflective design is all about message, culture, and the meaning of a product or its use.” For example, when someone buys a vehicle for its status or an original painting because it’s “original”, they are purchasing these objects based on their reflective qualities. There is nothing practical/biological with the answers; the products offer a story.

Don Norman, cognitive scientist and co-founder of the Nielsen Norman Group, is an expert on usability and emotional connections with design. In his playful and informative TED Talk (2003), Dr. Norman goes on to explain how good design makes you happy through our three levels of processing: Visceral, Behavioral, and Reflective. He uses three teapots to individually show how good design should satisfy each level of processing.

Dr. Norman further explains the concept that attractive/playful things work better through case studies and examples. An inspiring TED Talk, indeed!
THE EMOTIONAL TIMELINE.

A product’s “Emotional Timeline” is the process of how people develop emotional attachments to products. Developed by the director of experience design at frog (Austin, TX), Laura Seargeant Richardson, the timeline goes through five steps to develop emotional attachment: History, Alignment, Engagement, Utility, and Attachment.

**WHAT IS IT?**
A product’s “Emotional Timeline” is the process of how people develop emotional attachments to products.

**HISTORY**
The users’ history with a product is the first step in the timeline. “Every consumer has a different emotional history toward a product and its brand, whether or not the product is familiar.”

- If a product is truly innovative, then users will try to associate the product to something similar.

**ALIGNMENT**
The second step in the emotional timeline is the product’s visceral appeal. Does the product capture the user’s interests? Does its physical appearance, its haptic quality, its audible sound appeal to the user?

- With this pre-cognitive analysis, we react to show our pleasure/displeasure of the product. This step in the timeline is associated with the physio-pleasures.

**ENGAGEMENT**
After the user’s initial sensory reaction, the user starts to think. The user first analyzes the product to determine if it is socially acceptable. If so, the user will determine if the product will fit into his/her lifestyle, if it similarly expresses the user’s moral values, if it “feels right”.

- This stage of the timeline engages the users socio and ideo-pleasures.

**UTILITY**
Once the user determines that the product fits his/her lifestyle, then the user determines how the product actually functions. “[the brain] examines the product’s utility and usability, its task efficiency, controllability, challenging features, ergonomic properties, etc.”

- If the product is as usable as expected, the user experiences psycho-pleasure.

**ATTACHMENT**
“...once product acquisition and initial inspection have passed, the user moves to product attachment; its emotional after-life.”

- This includes the imagined use of the product and what the user aspires to become by using it.

Appealing to the four pleasures through Norman’s three levels of processing, the timeline connects people to products.
FEVERCHAIR was created as an example of emotional design by Tara Mullens at the Art Institute of Chicago in 2009. She writes about how it creates an emotional attachment:

“FEVERCHAIR is an aluminum chair that warms when you sit on it, and changes color from black to white with rising temperatures. The action of sitting in the chair triggers a tactile response based upon heat, which enriches the users experience and comfort. It also provides a visually dynamic surface that evolves based on temperature changes brought about through the users actions or its environmental conditions.”
CASE STUDY.

PING PONG+

Created in the MIT Media Lab in 1998, Ping Pong + is physical and digitally interactive table tennis. The Tangible Media Group website explains:

“[Ping Pong +] features a “reactive table” that incorporates sensing, sound, and projection technologies. Projectors display patterns of light and shadow on the table; bouncing balls leave images of rippling water, and the rhythm of play drives accompanying music and visuals. In the process, this project explores new ways to couple athletic recreation and social interaction with engaging digital enhancements.” [31]
The GINA Light Visionary Model (2007) by the BMW Group spearheaded by Chris Bangle is truly a concept of designing for people. The flexibility of the form allows the user to “personalized” the vehicles form, thus creating strong emotional bonds.

“Successful design arouses desire. In order to achieve this, it is more crucial than ever before that car manufacturers create the conditions that allow customers to establish a close relationship with their cars. Therefore, designers seek ways to promote and intensify people’s identification with their car that reach beyond pure aesthetics.” [85]
This research has presented numerous opportunities for innovation, many of which should be pursued further to develop the field and future of overland commercial freight.

Initially, the project goals for this thesis are proposed.

Secondly, I discuss key areas of the trucking industry that would benefit from additional design thinking.

Finally, I reflect upon the research and give my thoughts of various aspects of the trucking industry and its future.
PROJECT GOALS.

Using experience design methodology to create the vision of the future trucker lifestyle, I aim to visualize the emotionally appealing experiences of future truckers. Below is a breakdown of my design approach:

1) Consider future markets and technologies to understand who future truckers are and what they will want.
2) Determine the pleasures future truckers will seek.
3) Show inspiration for the visceral appeal of the design.
4) Explore how truckers will get their desired pleasures.
5) Create functionality to achieve the desired pleasures.
6) Review using Norman’s philosophy.

Following these steps, an appropriate and innovative experience design can be created and a lifestyle evolved.*

Though the research has exposed numerous design areas to explore and evolve, the work of this thesis will revolve around two primary goals:

Create a design experience that targets the emotional needs of future truck drivers in the USA.

Create a vision of trucking that makes the OTR trucker lifestyle desirable to future generations.

DESIGN APPROACH.


EMOTION & APPEAL.

*Conclusions | 128

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**KEY DESIGN OPPORTUNITIES.**

For Volvo to truly evolve into an industry innovator, opportunity exists to expand business horizons. In the near term, Volvo must explore and implement ways to make the trucking lifestyle more desirable through vehicle design and exceptional customer service. In the far term, Volvo must transcend product manufacturing and approach the freight industry from a systemic approach; designing the lifestyle and everything that goes with it (service, maintenance, rest areas, roadwork, etc).

The initial path to innovation is a dedication to the customer, down to the lowest level. Happy employees work better and more efficiently than unhappy ones. Happy employees have their emotional needs met. Emotional needs are met through innovative vehicle design and positive social recognition. In turn, this will create a demand for the lifestyle which secures the near-term future of our commercial overland freight.

Strong business growth will ultimately come from the best “pitch” of the trucker lifestyle. This pitch must include everything that revolves around the trucker, from truck and service, to infrastructure, log book, and lifestyle promotion. Only this combination of product and service will secure future growth.*

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**FREIGHT SYSTEM INFRASTRUCTURE.**

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**REDESIGNING THE LOG BOOK.**

The trucker’s log book is the diary of their daily lives, keeping tabs on their every action and movement. This mandatory “Big Brother” limits the driver’s freedom and imposes restrictions on their lives. In turn, this reduces the trucker’s quality of life because of the perceived lack of trust and loss of control.

By revisiting the idea of the log book, opportunity arises to create seamless monitoring systems that can record the drivers’ route and actions automatically. This must be done delicately and with the trucker’s emotions at center focus, to give them a higher quality of life, thus promoting a more appealing lifestyle.

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**THE FUTURE TRUCKER’S WORKING ENVIRONMENT.**

Though this research has posed some questions regarding the working conditions and environment of future truck drivers, further in-depth studies and analysis is necessary to accurately map their lifestyle as it evolves toward the end goal.

The evolution of the trucker lifestyle is inevitable if we are to stabilize the future of our commercial overland freight. The actual “work” aspect of the trucker lifestyle will be an integral selling point. Therefore, opportunity exists to further develop the job description and training methods and facilities of future truck drivers.
THE ROAD AHEAD.

TRANSITION TO WHAT END?

The end goal for the trucking industry is far beyond the next horizon, but we know it is out there, and we know where to aim to transition to this end. If unplanned for, this end could pose serious business instability for Volvo in the far term; with no driver on board, the "human element" of Volvo is lost. Therefore, for Volvo to transition to this end, they must focus on all areas that support this system. It will all start with the human.

Developing a strong fan base will secure short term stability. Creating this strong fan base will come from in depth analysis of current and future truckers, and appealing to their emotional needs. These emotional needs can be satisfied through appropriate vehicle design, successful and relevant competitions (racing, crash testing, comparisons, etc) positive social media marketing and exposure, and most importantly, a positive educational approach to the public about the qualities of the future trucker lifestyle.

Education of future truckers is necessary to show how their careers will transition. If Volvo can develop new careers (and the paths to these careers with strategic planning), truckers will feel secure in their evolving lives.

Becoming involved in political arenas, from a local level all the way on up, will be beneficial in passing legislation through and working to creating a better freight system. Volvo will need to invest in communications, roadway infrastructure, and powertrain technologies, in order to secure a place in the future without drivers; being an integral player in the future freight system will depend on it. The future of Volvo Trucks NA exists only with change.
The appendix serves as a section offering a deeper look into various aspects of the report. First you will see a deeper look into Volvo Trucks

Thoughts on Truck Driving Values
The Evolution of Volvo Values
Volvo VN 780 Exterior Researched
Volvo VN 780 Interior Researched

We now move on to the Trucker Lifestyle.

Trucking History in the US
Various Scenarios a Trucker will Encounter
Truck Stop Research and Analysis
A Day in the Life of the Future Trucker
THOUGHTS ON VALUES.

Current US Trucker Values:

--> Freedom
--> Independence
Observer
Patience
--> Feel Needed
--> Power/Strength
Routine
--> In Control
Inquisitive
--> Travel/Experience the World
Humble
Money is an incentive
$ competes w/ safety
Higher pay for less education
Hard Worker - Work to Live
Rebel
--> “AMERICAN”

Future US Trucker Values include:

Social Connectivity
Technocratic
--> Proud to be a trucker
Work smart, not hard
“Quality of Life”
Culturally Aware/Considerate
Educated - Capable

“American” Truck Values

Powerful
Reliable / Predictable
Tool
Easy
Safe
Reflected Self Image
--> Truck Image is driver’s image

Essential US Trucker Values:

Freedom - Independence
Pride - Respect
Strength - Resilience
Travel
Feel Needed - Recognition
American (as in “part of America”)
In Control
“Quality of Life”

“American” Truck Values

Powerful
Reliable / Predictable
Tool
Easy
Safe
Reflected Self Image
--> Truck Image is driver’s image

Volvo Trucks Core Values

Safety
Quality
Environment

Each of these values gives foundation to create important and necessary products, though they do not consider the user in his/her entirety; e.g., as an emotional being. Adding the human element into the equation will evolve Volvo Trucks to holistically become a truly human-centered entity.

The Future of Volvo Trucks Values

Safety + Human Element = Life
Quality + Human Element = Quality
Environment + Human Element = Habitat
Life (Safety evolved with Quality of Life)
Quality (with an evolved definition)
Habitat (evolution of Environment to include humans)

“Life” is the evolution of Safety. (Bubble Boy is “safe” but how does he describe the quality of his life?)

Safe = Boring = opposite of Rebel = Current Trucker Image.
The “American Dream” = quality of life.

“Quality” has evolved to include the human element, which includes “personality”, “character”, and “emotional appeal”.

“Habitat” is the evolution of Environment, including the human element. Individuality and independence blend with teamwork and society, keeping in mind the care and respect for the environment in which we live.

To successfully approach the US Market, Volvo Trucks need to appear more powerful and aim to accurately reflect the image of the truck’s operator. Specifically focusing on the “quality of life” aspect and “future image” aspect of the trucking industry are opportunities for Volvo Trucks to approach the North American market.

Volvo Trucks Core Values

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Environment

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Safe = Boring = opposite of Rebel = Current Trucker Image.
The “American Dream” = quality of life.

“Quality” has evolved to include the human element, which includes “personality”, “character”, and “emotional appeal”.

“Habitat” is the evolution of Environment, including the human element. Individuality and independence blend with teamwork and society, keeping in mind the care and respect for the environment in which we live.

To successfully approach the US Market, Volvo Trucks need to appear more powerful and aim to accurately reflect the image of the truck’s operator. Specifically focusing on the “quality of life” aspect and “future image” aspect of the trucking industry are opportunities for Volvo Trucks to approach the North American market.
THE NORTH AMERICAN LONG-HAUL.

INTRODUCING THE VOLVO VN 780.

The VN 780 is Volvo Truck’s largest and most powerful Long Haul Tractor. It is aerodynamically designed with safety in mind to maximize fuel economy and protect the driver. Below is an excerpt from Volvo Truck’s own product spec sheet:

“The aerodynamic VN 780 will change your impression of how a long-haul truck should look, ride and handle. The raised roof is tall enough for a person 6’10” to stand upright, and the massive 77” sleeper cab offers exceptional space efficiency. There’s room for every amenity to make you feel at home. And with its fully insulated cab, the interior is as quiet as many passenger cars—even at high speeds.”

“From the sloping hood and windshield to the rolled-under bumper, recessed door handles, and wedge-shaped headlights is sculpted and streamlined for the lowest possible drag coefficient. And with the shorter Volvo wheelbase, the gap between cab and trailer can be minimized for less air turbulence, requiring less engine power to push through the air. Which can mean fewer stops at the pumps.

“Whether pulling a van trailer, flatbed, or reefer, the VN 780 makes every move with ease and precision, especially in tight spots like loading docks, where both space and time are in short supply. The set-back axle and up to 50º wheel cut deliver a turning radius that’s one of the tightest in the industry. And Volvo’s responsive steering maneuvers safely and confidently in any terminal or traffic situation.”
THE VNL 780 INTERIOR.

FEELING OF CONTROL.
The interior of the VN 780 was designed to optimize driver comfort, control, and focus. An excerpt from Volvo Trucks explains the vehicle’s interior layout and driving features in depth:

“In the VN 780’s driver’s area, an advanced climate control system keeps you comfortable regardless of the weather outside. Twenty-two strategically placed air vents-plus cold draft panels and airflow valves-circulate fresh air through the cab; double-seated doors keep out water, wind and noise. Controls are within easy reach, and often-used switches can be located right on the steering wheel. The driver display is positioned to let you quickly read key diagnostic information from a single large screen.”

A DRIVER’S EXPERIENCE:
“This is the best truck I’ve ever driven. We both love the smooth, quiet ride; it just floats down the highway. The visibility is incredible and the controls are all at your fingertips. The interior is spacious and well-equipped. One of Jan’s complaints was that our previous truck rattled so much she couldn’t sleep. This 780 is so smooth & quiet sound sleep is never a problem.”

Paul and Jan Elmore
O/O, based in Cheyenne, WY
Drives for UPS Ground Freight
Pulls vans and doubles coast-to-coast
Average annual mileage: 240,000
Driving Experience: 35+ Years

HOME ON THE ROAD.
The interior space of the VN 780 has been maximized, giving the driver lots of room to work and live. It is adaptable to numerous features and add-ons, allowing the driver to customize his/her environment.

“The VN 780 is the functional equivalent of a bedroom, office, kitchen, dining room, and den. The workstation doubles as dining table and office desk, and bench seats quickly convert to a full-length lower bunk. The upper bunk folds out from the back of the cab, and a foldaway ladder allows easy access. Stacking cabinets can be custom-configured to suit your storage needs and to accommodate your microwave, refrigerator, and TV/DVD. You can even specify a built-in sink with running water.”
TRUCKING HISTORY IN THE US.

70’s = Physical growth.
Trucker jobs are meaningful because they enable growth during this booming time. Truckers feel good about what they do. Lifestyle is desirable. Media and culture reflect this through positive movies and "image" perception.

80’s = Physical growth slows.
Industry focuses on efficiency, profits, cost; less focus on people. Truck driver is starting to be seen as a machine component in the freight system. Trucker image is slowly deteriorating. Regulations are put into effect that limit the "freedom" of the truck driver's lifestyle and career.

90’s = the "Trucker-last" mentality.
Driver becomes the last and smallest consideration when it comes to fleet purchasing; money is more important than man, it's all about "faster cheaper more". To the public eye, commercial freight is seen as more of a nuisance than a support. Media and culture reflect the negative lifestyle of trucking through negative movies and career isolation.

1995 - The concept of a "digital world" is introduced to the US public with AOL, creating a new interest in digital personalities. People start to develop the idea of a digital self.

00’s = Trucker's start to leave.
Their careers start to become overshadowed as society becomes immersed in the digital world. The speed at which we access information is vastly improved, but has influenced society to expect physical things to move faster as well. Society demands their goods faster and cheaper. The freight industry struggles to keep up. Drivers leave their jobs at record rates; 2005 marks the low point in the industry. As of 2010 – the US Long-Haul Industry is short 20,000 drivers.

10’s = the lifestyle is addressed/Change is needed.
The digital world becomes as important as the physical world (2018); people nourish their digital connections as much as their physical lives. Truckers are needed, but few stay with the industry for more than a few years because of the toll on their families and lives. The industry shortage brings drivers in from 2nd and 3rd world nations to work unchanged conditions. Industry realize change is needed.

The change comes from the approach to selling the image of the trucker lifestyle. It is changed to appeal to future generations who seek experiences more than belongings. This trucker lifestyle promotes "experiences" and has vehicles designed to facilitate the gathering of experiences while seeing the world and making money. Their careers are made to feel necessary through showing the public what impact each driver has. This change of approach creates the industry to rise by the end of the decade.

20’s = Truck Driver Lifestyle is positive yet again.
Truck Driver lifestyle is transitioning toward the positive through numerous approaches (media, "reviews", social ed-ucation and perception, changed image). Digital world and physical world become integrated through augmented reality. Technological advances make the trucking lifestyle easier to live through thoughtful design and social connectivity.

2020 – Commercial application of autonomous driving capabilities is first introduced.

30’s = Truck driving is now truck monitoring.
The primary responsibility of the truck driver is no longer driving the vehicle. The driver is now a monitor and technician and one who sees the world first hand. Truck driver careers are akin to pilots and ship operators; social perception of the trucker lifestyle makes the trucker a hero again.

Milestones
2018 – Humans gather experiences in the trucker lifestyle.
2030 – Anyone can be a truck driver – the job is easy.
2030 – Not just anyone can be a truck driver; the job requires skill and special training.

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VARIOUS SCENARIOS A TRUCKER WILL ENCOUNTER.

Living
Eat – Cooking vs. Diner
Breakfast
Lunch
Dinner
Snack
Drink
Water
Other
Alcohol
Sleep
One Driver
Two Drivers
Romantic Couple
Transportation
Personal Mobility - Town
Personal Mobility - Local

Use Toilet
Bathe
Clean
Bathroom
Interior
Exterior
Dishes
Trash Disposal
Clothes – Laundry
Storage
Personal Belongings
Devices
Memories
Kitchenware
Personal Mobility
Game Systems
Clothes
Dry Food
Refrigerator
Freezer

Relaxing
Talk to family
Phone
Videoconferencing
Watch News
Browse Internet
Play Games
Smoke Cigarettes
Read Books
“Hang out with friends”

Working
Drive
Manual Mode
Autonomous Mode
Monitoring
When vehicle is partially automated
When vehicle is fully automated
When vehicle is connects with trailer
When vehicle is needs to articulate
Couple Trailer (attachments)
Uncouple Trailer (attachments)
Load Trailer
Manual
Automatic
Unload Trailer
Manual
Automatic

Refuel
Location Finding
Ease of Refuel
Payment
Record Actions
What actions does the driver do?
What does truck record automatically?

Waiting
Weigh Stations
Vehicle needs minor maintenance
Vehicle needs major maintenance
Flat Tire while driving
Hit an animal while driving
Report an accident
Other Occurrences
Hot Weather

Human Considerations
Obesity - Overweight
Sleep Apnea
Diabetes
Difficulty Moving
Physically Handicapped
Mentally Handicapped
Smoker
Family on board
Pet on board

How does the truck keep the driver cool?
Snowy Weather
How does truck keep driver warm?
How does the driver keep snow/dirt outside the vehicle?
Driver gets sick
“Truck stops big and small are what make trucking life bearable, they play an important role in life on the road.”

Most truck stops have showers (free with 50 gal Diesel) for drivers to use. Some stops provide a towel, a washcloth, soap, and key for privacy. These shower rooms include a private toilet, the shower, a sink and a mirror, and are cleaned after each use.

Many truck stops have restaurants, which normally provide good American home cookin’. The large quantities of hearty cuisine make us feel like we are getting our money’s worth.

Some truck stops also include entertainment for the drivers. These include video games, pool tables, theater rooms (for movies), cable rooms (for TV), and some even have casinos and bars to keep us entertained and help us relax after a long day of work.

Truck stops are a place where truckers decompress and talk with other drivers. Some use these facilities to meet with friends and family, while others use it for refueling and spending the night. These facilities are physical and social “hang-outs” for truck drivers. These cases reconnect truckers with society and make the drivers feel “human” again.

Designing and evolving the concept of “Truck Stop” can address the future needs of future truckers. As Volvo Trucks is a company with a human-centered approach, developing “truck stops” presents an excellent opportunity for expansion and innovation.
The following text is a vision of the future truck driver daily routine, devised from research and analysis of future markets and technologies:

**Living in the truck**
1. Wake Up to SOOTHING sound (not a beeping alarm, this is disruptive to quality of life)
2. Smell coffee automatically brewing (planned the night before)
   a. NOTE – not necessarily coffee; some smell to remind of home/wake-up.
3. Stretch (there’s enough space)
4. Use toilet - warm floor, good ventilation, airy.
5. Dress for the day – Storage for clean and dirty clothes at least 10 days.
6. Access table/chair(s).
7. Get Cup from Storage, pour coffee.
8. Make Breakfast (easy access to all needed materials) (Cereal? Eggs?)

**Working in the truck**
9. Sip coffee, eat breakfast, enjoy the peace at a table and chair meant for the eating table.
10. Clean Dishes (or save for later?)
11. Store Table/chairs.
12. Shower, brush teeth, etc.

**Access Onboard Computer**
15. Computer shows any diagnostic issues and gives recommendations.
16. Computer asks driver to do pre-trip inspection. Power to wheels cannot be accessed until inspection is done. Once inspection is complete, driver digitally enters inspection into log book, verified by computer. Power is now accessible.
17. Computer Displays loads in the area
18. Driver selects load based on choice/need/location, etc.
19. Confirmation is recorded by computer; driver commits to load.
20. Computer plots numerous routes to the selected load.
21. Driver selects the desired route and starts driving.
   a. Driver has option to drive or use vehicle automation.
22. Driver arrives at facility; manually navigates the truck to waiting area.
23. Once load is located and instructions are received, driver manually navigates truck to the load.
24. Truck’s sensors lock on to load and the truck automatically lines itself up for the load. Driver Monitors.
25. Truck automatically moves to connect with the load.
26. Truck communicates with the load (auto), and is informed of additional steps required to secure the load properly. Load also informs truck of any diagnostic problems or errors. Truck relays this information to the driver and shows how to act.
27. Trucker exits the vehicle to do final attachments, and does a final check of the load. Driver returns to truck.
28. Trucker digitally signs for the load (fingerprint or other verification); receives email confirmation from shipper.
29. The load’s final destination(s) is communicated from the trailer to the truck, as is its timeframe for delivery.
30. Using this information, the onboard computer provides various routes which the driver can select from; driver can modify them if necessary.
31. Driver manually navigates out of facility, following A.R. directions integrated in the windshield.
32. Limited automation becomes available when the vehicle enters main roads. The driver cannot leave the driver seat during this time. (Compare it to take-off in airplanes.)
33. Truck enters the highway. Automation takes over fully when merging into traffic. (This is akin to aircraft gaining speed/altitude).
34. Once at highway speed, truck asks driver if he/she would like to drive.

35. The driver accepts; automation mode is disengaged.

36. The driver has full control of the truck, including its velocity and direction. However, the on-board computer still monitors the driver with sensors to make sure the vehicle is being operated safely.

37. Driver decides to let the vehicle drive and engages full automation.

38. Driver seat adjusts to a passive role and moves away from the wheel.

39. Driver is informed by the truck when it is safe to leave the driver seat.

40. On Board Computer uses cloud-based data and onboard sensors to inform driver of upcoming road, traffic, and weather conditions. This informs the driver when it's safe to move in the cabin.

41. In automation mode, the driver can select from numerous productivity modes, allowing access to various digital tools for various jobs & duties. (see tool layout change for PS5)

42. In automation mode, the driver can select from numerous productivity modes, allowing access to various digital tools for various jobs & duties. (see tool layout change for PS5)

43. Driver’s main responsibility is monitoring the vehicle and its status, though the vehicle is self-monitoring.

44. Driver stops for lunch, giving the truck time to cool and “rest”. Driver either prepares food from the truck, or eats at a diner. Truck explains to driver why the break is a good thing, and that the truck is “happy”.

45. Back on the road, driver is bored of sitting. Driver adjusts seat to “lean” position, which moves the steering system as well. Sensors monitor eye movement and provide optimal placement of A.R. graphics. Driver can adjust the placement of these graphics if need be.

46. Truck informs driver of upcoming weigh station. Driver decides to weigh in. The communication between truck and weigh station is automatic; the driver is informed that all is well. This info is automatically entered into the digital log book.

47. Truck approaches destination and informs driver “return to driver seat.”

48. Truck enters fully automated mode when exiting the highway, though driver can intervene (the truck will still monitor and keep some degree of control for the sake of safety).

49. Truck arrives at destination.

50. Truck uses sensors to determine the layout of the docking bay. The truck automatically docks the trailer to the correct bay for unloading. Driver monitors the action and can intervene at any time.

51. Driver exits the vehicle to detach any necessary couplings.

52. Once load is delivered, trip statistics are displayed, including money made, miles traveled, efficiency, etc.

53. After a long day of work, driver wants to find a place to park for the night.

54. Onboard computer provides numerous locations for the driver to go to rest. Driver selects and the truck drives to the requested area.

Living in the truck

55. Once parked, driver accesses “home” mode. This causes the mood and environment of the truck to physically change:

a. The interior space expands through slide-out rooms. This motion is dramatic.

b. The transition (movements) from work mode to home mode is the physical interpretation of “decompressing after work”.

56. Driver makes dinner using in-truck kitchen, and cleans up like after breakfast.

57. Truckerman takes shower to wash away the dirt of the day in the on-board bathroom.

58. Driver now relaxes. The way the driver can relax is as follows:

a. Talk to friends and family via video conferencing.

b. Browse the internet

c. Watch movies / TV streaming from the internet.

d. Social Networks via the internet.

e. Read (either via handheld device or truck systems)

f. Exercise

59. Driver can rest well in the large and comfortable bed.
Thank you Internet.
REFERENCES.


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