



New York City Taxi of Tomorrow RFI

Appendix 2

Improving the New York Taxi Experience

Ricardo Inc

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Prepared for Ricardo by Smart Design

improving the NYC taxi experience



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NYC taxi revisited

In 2007, the New York City non-profit Design Trust for Public Space led a consortium of automakers and designers to create taxi prototypes for the Design Trust's Taxi 07 Exhibit at the 2007 New York International Auto Show. To participate, contributors were required to address Taxi 07's design challenges, which included a range of short- and long-term improvements for the safety and comfort of passenger and driver, overall vehicle accessibility, space efficiency, and sustainability.

The Design Trust enlisted taxi vehicle after-market manufacturers and facilitated their collaboration with top designers to produce prototypes. Smart Design, a key Taxi 07 participant, led one of these teams. Smart's concepts, developed over several months, were illustrated in the form of two full-size vehicle prototypes, both featured in the Taxi 07 Exhibit. This book captures the thinking that went behind each design element of the Smart vehicles, from the insights that sparked the idea, to suggested formats for implementation.



Design Trust's Taxi 07 + Smart Design

a user-centered approach

The Design Trust's Taxi 07 Exhibit aimed to demonstrate – unequivocally and by example – that the yellow cab can powerfully communicate New York City's commitment to sustainable mobility, access for all, and great design. Smart embraced these goals and approached designing the next generation of taxis like any other design project – by talking to people that use the system and discussing the best and worst aspects of the experience.

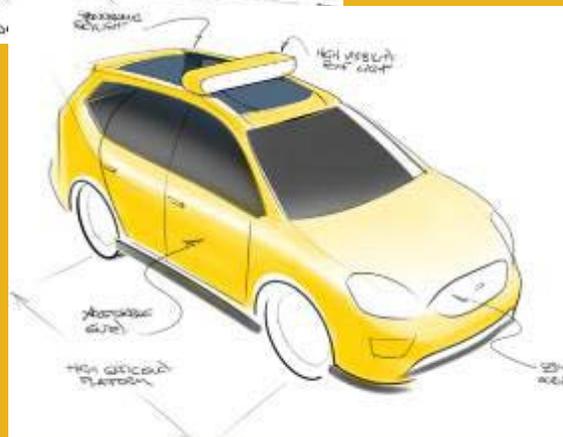
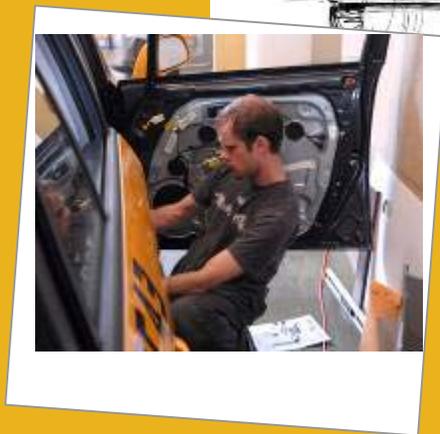
Luckily, Smart's NYC headquarters houses nearly 80 regular taxi users, ranging from born-and-raised New Yorkers, to international residents. Stories were shared, learning from similar transit systems in such places as Hong Kong, Stockholm, Bangkok and London.

In the end, Smart's vision for the NYC taxi was based on three tenets: make the taxi experience safer, more social, and more sustainable for all.



Smart's vision for the NYC taxi

process



a collaborative effort

The Design Trust's engagement of interested automakers, component and after-market manufacturers, and top industrial designers, enabled Smart to collaborate with a number of key partners and experts, and to deliver a well-informed vision for the future of the NYC taxi.

Smart partnered with a major auto manufacturer, as well as other industry sponsors, to produce prototype parts and to actively support and inform the design process.

New York City design firm Birsell + Seck made important contributions to the cab's interior design. Antenna Design, also a New York City based design firm, designed the rooftop communication system.

DESIGN TRUST FOR PUBLIC SPACE

Accessible Vans & Mobility

Antenna Design

Birsell + Seck

Bruno Independent Living Aids

Kia Motors

Pulsar Technology Systems Inc.

Taxicab Partitions Inc.

Ultrafabrics LLC

design partnerships

from sketch to show car

Some of the best design insights come from hands-on learning, prototypes, and physical experimentation. To this end, Smart Design received a donated vehicle to sketch, hack, and otherwise dissect in order to uncover the ideal taxi experience.

As the Taxi 07 exhibit approached, Smart transferred key concepts to a second vehicle, a “production show car” which would present the most near-term solutions at the Auto Show.

However, as more people became interested in the story behind the concepts, the original “sketch” vehicle was also included in the exhibit, revealing the hands-on design process, as well as some of the more ambitious concepts from the Taxi 07 team.



prototyping platforms

HAIL THE TAXI



no taxis
in sight!

GPS /
TXT
paging?



can't tell
if it's
vacant...

larger
rooftop
signage?



can't see
or hear
driver

interior
lighting
for driver

curbside
speaker?



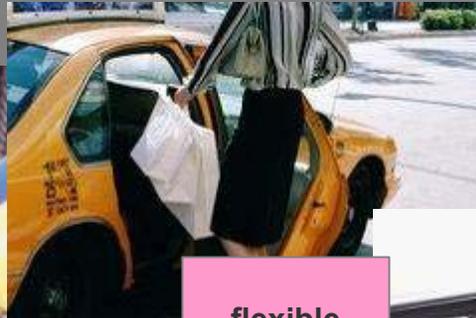
OPEN THE DOOR

STORE LUGGAGE



avoid cars & bikes!

rooftop traffic warning

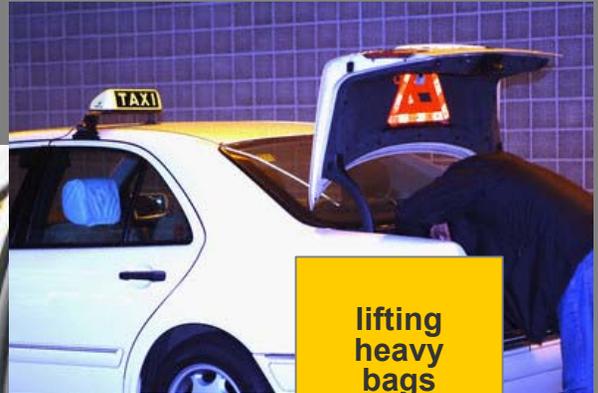


bring bags inside?

flexible cab/trunk space?



lower trunk?



lifting heavy bags

GET IN THE TAXI



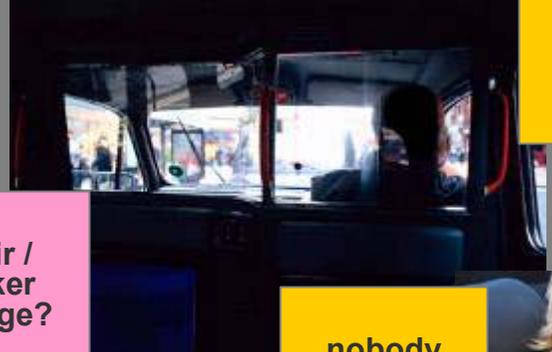
low cars
difficult
for some

higher
vehicle
platform

mobility
impaired?

swing-
out
chair

chair /
walker
storage?



poor
rider
visibility

manage
sight
lines...

nobody
buckles
up!



seat
belt
visibility

digital
reminder

REQUEST DESTINATION

line of sight to driver?

improved partition visibility

slow-dim interior lighting

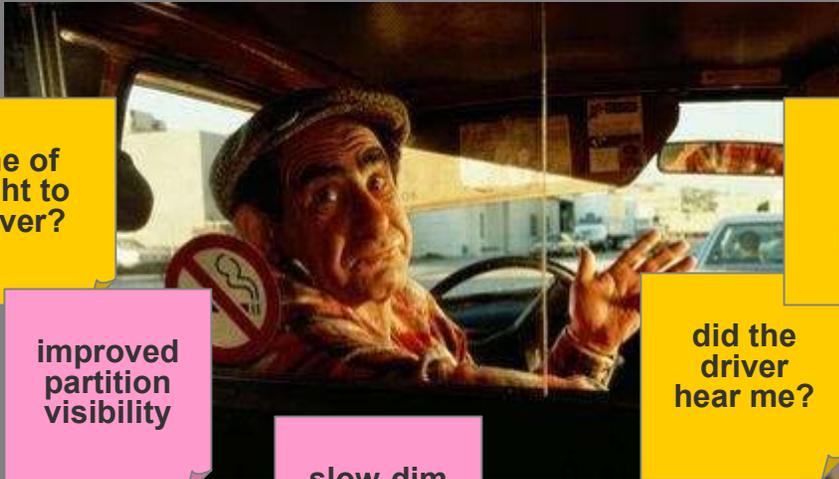
do we agree on route?

did the driver hear me?

PIM confirms destination

will there be extra fees?

display fees in advance



ENJOY THE RIDE



socially cramped quarters

more social layout



working on the go

power outlets?

PIM info, inter-activity?

sight-seeing!

skylight!

PIM Tourist info



CALCULATE FARE



dual display (PIM)

what's the rate? fees?

can't see meter

rate totals on PIM

larger clearer display?

prevent driver robbery!

prefer CC over cash

partition or cam security?

PAY FARE, GET CHANGE



cash
or
credit?

easy
cc swipe

late
night
security



swipe
card
earlier

hurry up!
honk
honk!

secure
cash
box



EXIT THE TAXI



watch out for cars & bikes!

backseat sideview mirror



don't forget anything!

trunk stowage reminder

RETRIEVE BAGS



handle & path lighting

can't find handles in dark



passenger
comfort



interior configuration

insight

Free from the demands of driving a vehicle, riding in a taxi with friends becomes a socially engaging experience.

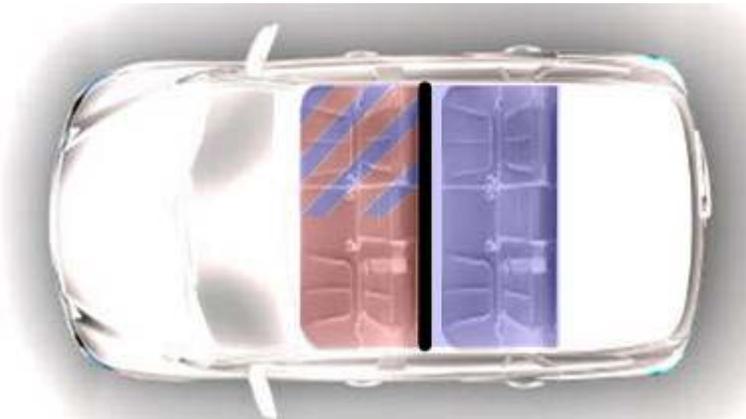
Currently, however, passengers find themselves cramped side-by-side, craning their necks to hold conversations, or ostracized to the front seat, on the opposite side of the wall partition.

recommendation

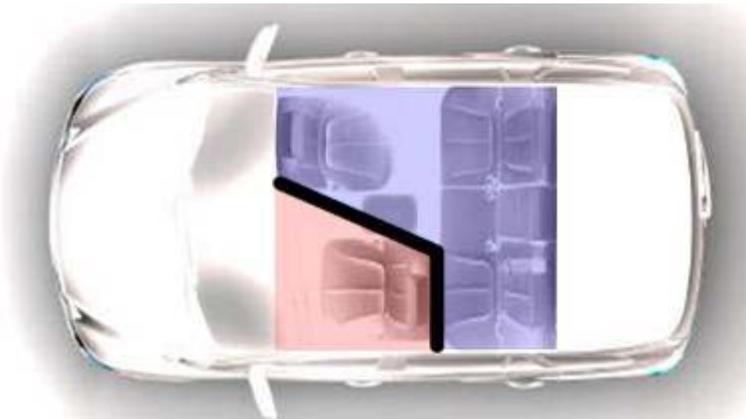
The passenger space of a taxi should be configured to be a “social space” for the passengers, while still providing for driver safety.

The partition should be minimized to a more efficient L-shape, or replaced altogether by a video surveillance camera.

A more long-term option would be to provide a rear-facing front passenger seat, creating a true inward-facing social space for passengers.



Current configuration. Wall partition restricts passenger space to linear back seat.



Alternate configuration. L-shaped partition creates a more open, social passenger space.

interior configuration



Mobile “living room”

A rear-facing front seat would further unify the social passenger space in a taxi.

passenger comfort

seating

insight

While most taxi rides are brief, the seat remains the largest “touch point” of the taxi cab experience for the passenger.

Proper seat design can mean increased rider satisfaction (tips) and a longer lifespan for the seat itself.

recommendation

The passenger seats are subject to frequent ingress and egress, and should be calibrated for such.

The back seat of the vehicle also has specific suspension requirements, and the seat should be calibrated for the smoothest ride possible.

Seating contours and stitching should be designed for comfort, but should facilitate easy cleaning and minimize the likelihood of losing items in the seat.



Comfort & performance. Seats should be balanced for a smooth ride.



Contours & crevices. Stitching should facilitate cleaning and prevent losing articles in the seat.

interior lighting

insight

Dark taxi interiors are often hard to navigate at night. Current interiors are black on black, leaving even seasoned New Yorkers to fumble for door handles and other controls.

recommendation

Enhanced passenger lighting should be utilized at all passenger touch-points including door handles, foot wells, transaction components, and all relevant window and climate controls.

Overhead spot lighting should illuminate the seating area during ingress/egress, and should also have controls accessible to the passenger for added nighttime convenience.



overhead spot lighting



highlighted door controls



illuminated foot wells

Light the way. Additional lighting aids in navigation and reduces article loss in taxis.

passenger comfort

provisions for work activity

insight

While most taxi rides are brief, there exists an opportunity to increase passenger productivity (and satisfaction) during longer rides, especially to and from the local airports.

recommendation

Future generations of the Passenger Information Monitor (PIM) may include more feature-rich applications, with email/web access, real-time flight updates, and hotel and restaurant reservations.

Additionally, the cab interior may offer a standard AC electrical outlet for a quick cell or laptop charge.

Passengers should be able to control the lighting in their space for nighttime visibility.



News and more. Feature-rich content and real-time services on the PIM.



Power to go. An AC outlet could “save the day”

passenger comfort

sight-seeing and visibility

insight

The taxi represents a tremendous opportunity to showcase the beauty of the city, for residents and visitors alike.

Enhancing the passengers' enjoyment of the city during a taxi ride further solidifies the taxi as the iconic mode of transportation for New York City.

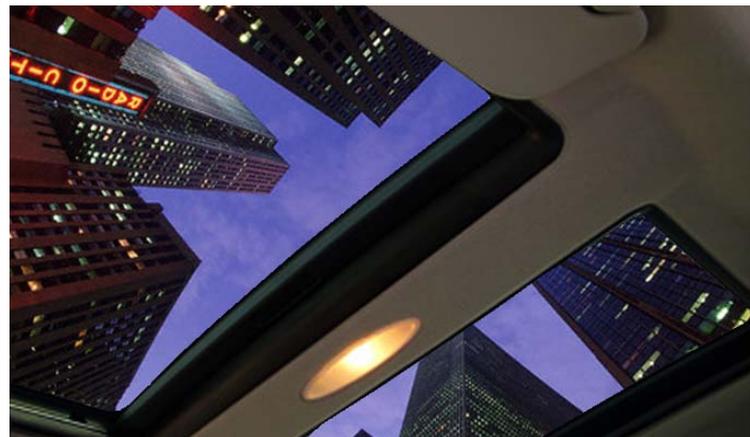
recommendation

The GPS element of the PIM allows for route-specific tourist information (“to your left you will see...”) as well as presenting points of interest and scenic route suggestions.

Furthermore, the best views of New York are not out a side window, but straight up! A panoramic skylight would make a taxi ride the best way to enjoy a skyward view of the city skyline.



Virtual tour guide. Real-time tourist info as you drive by, courtesy of the GPS-enabled PIM.



Ride with a view. The best way to view the vertical skyline!

passenger comfort

riding with children

insight

Taxis are the safest and most viable mode of transportation for families with small children, yet managing kids plus any accompanying strollers and bags can be a hassle.

Solving for this demanding situation will create a more enjoyable riding experience for any similarly encumbered passenger.

recommendation

To facilitate ingress and egress while managing children, the door opening must be wide enough to easily accommodate an adult passenger with a child in-arm.

Powered sliding doors and trunk would allow for easy hands-free loading and unloading.

Trunk and cabin stowage areas must be low enough to allow for easily lifting and stowage of a full-size foldable child stroller.



Power assist. Powered sliding doors will help both parents and power-shoppers.



Large & low. Trunk space must accommodate a full-sized stroller, and be low enough to lift it out.

interior climate control

insight

Current climate controls for the passenger section are sub-par aftermarket retrofits, required as a result of the wall partition.

Additionally, the controls are dark and difficult to reach, leaving most riders to suffer silently.

recommendation

Climate controls in the passenger section should be as accessible and intuitive as those in the driver's section, including proper illumination and ergonomic placement of controls.



Clear climate control. Rear climate controls separate driver and passenger preferences.

provisions for luggage

insight

Placing all luggage in the trunk of the vehicle is an extra and inconvenient step in the taxi process. Drivers must stop their vehicle longer in the street, frustrating surrounding drivers, and requiring either the driver or passenger to lift the luggage high over the lip of the trunk.

recommendation

For small and medium luggage, it is faster and easier for riders to bring their bags into the passenger compartment with them. A flexible ratio of trunk and passenger space (as in many crossover SUVs) would provide for this option.



Slide + store. Sliding seats open up space options in the Renault Twingo.



Fold + fit. Folding seat combinations are popular in small SUVs, like the Element.

passenger
safety



partition safety considerations

insight

Current wall partition configuration provides for driver safety, but creates a large obstacle during collisions, resulting in passenger injury.

recommendation

An L-shaped partition maintains driver safety while reducing the obstacle for passengers. A combination of safety considerations in the design of a new partition, as well as encouraging safety belt compliance, would greatly reduce the likelihood for passenger injury.

In designing an L-shaped partition, particular attention should be given to rounding (or padding) corners, as well as utilizing scratch-resistant materials, to provide optimal driver visibility.



Minimize obstacle, maximize safety. An L-shaped partition offers safety with fewer risks.

safety restraint compliance

insight

Current safety restraint compliance remains low, yet could significantly reduce passenger injury.

recommendation

A combination of improvements may draw attention to the safety restrains and encourage compliance.

Highlighting the buckle and receptacle in the iconic taxi yellow color will provide a visual reminder, while a message on the PIM would provide video and audio reinforcement to “buckle up.”



Highlight safety. Yellow hardware would visually remind passengers to buckle up.

child safety

insight

While smaller children usually travel with their own car seat/stroller, the CDC recommends that children weighing between 40-80 lbs utilize a car booster seat for optimal safety.

Currently, taxis offer only adult safety restraints.

recommendation

An integrated fold-out booster seat with specialty child restraint would provide a safe and secure ride for these most vulnerable passengers.



Safety for all sizes. An integrated fold-down booster seat offers safety for children between car-seat and adult restraint size.

safety lighting – passenger path

insight

Dark cab interiors, unseen curbside puddles and pavement grates can pose a dangerous situation to taxi passengers while entering and exiting the vehicle.

recommendation

Specialized lighting should clearly illuminate the ingress/egress path, including down-lighting outside the door, illuminated foot wells, and lighting to clarify head clearance in the doorway.



safety lighting – external warning

insight

Pulling over in traffic – whether to pick up or drop off a passenger – can cause considerable danger to both the taxicab and the passenger.

Oncoming traffic and bicycles require a clear alert to the taxi's intended actions.

recommendation

Enhanced rooftop messaging should clearly communicate the taxi's intent to stop, and which direction they are pulling over.

Additionally, a strobe light placed inside the edge of the door would flash a warning to oncoming traffic as soon as the door is slightly ajar, giving them time to adjust their course.



Stopping safely. Door edge strobes would alert traffic as soon as the door is slightly ajar.

passenger side-view mirror

insight

In addition, passengers inside the taxi must be made aware of the outside surroundings in order to avoid injury when exiting the vehicle.

recommendation

A small passenger side-view mirror to warn against rear-approaching bikes and vehicles would reduce risk of accident.

The mirror should be placed in an intuitive location so to naturally fall within the sight lines of the passenger while exiting.

Beware of bikes. A small side mirror can avoid collisions when opening the passenger door.



passenger safety

passenger-
driver
interaction



partition communication

insight

Current wall partition impedes social interaction between the passenger and the driver. The opaque wall creates a literal and figurative barrier which obstructs hearing, visual contact, and overall communication.

recommendation

A clear, L-shaped partition made of scratch-resistant materials would allow for better sight lines and more open interaction between passenger and driver.

Additionally, by allowing the driver to see the entire back seat, it discourages crime in the passenger compartment.

Alternatively, when the driver wants the partition to be “open,” the design should slide or fold away as much as possible.



passenger / driver interaction

transaction components

insight

The current credit card swipe and pivoting cash door are currently in disuse, often located haphazardly along the wall partition at a less than ergonomic placement.

recommendation

All transactions should be communicated through the PIM, and facilitated by easy to use, easily accessible components. Cash and credit components should be grouped together near the PIM for a more intuitive transaction sequence.

Pivoting cash drawers should be replaced by more elegant transaction dishes, providing the same protection with fewer moving parts.



Swipe & go. Card swipe integrated into PIM.



Simply secure. A bank-window inspired cash dish replaces awkward pivoting cash drawers.

accessibility



universal taxi design

insight

The current low-slung fleet of sedans provides little consideration for passengers of limited mobility, with walkers, additional baggage, larger framed passengers, or parents traveling with child strollers.

recommendation

In considering a new vehicle platform, a “universal design” approach should be adopted. Details such as door frame width and height, door opening angle, seat height, lighting and visibility should all be targeted to provide for the widest range of people possible.

This approach will facilitate not only disabled riders, but enhance and ease the experience of “abled” riders as well.



Wide doors for those with bags or kids.



Clear graphics for the elderly or vision impaired.



Seating and suspension for large frame or pregnant riders.

Taxi for all. Solving for the most challenging passengers yields a better experience for all.

passengers with reduced mobility

insight

The current taxi system offers disproportionately few provisions for less mobile passengers, including the elderly, disabled, and wheelchair-bound.

recommendation

Ideally, full wheelchair accessibility would achieve the goal of a “universal” taxi, but in the interim, alternate offerings could provide a balanced and economic solution to a wider range of less-abled passengers.

An outward-turning front passenger chair with a lowered seat height would provide a valuable accessibility solution without sacrificing the efficiency of a smaller vehicle platform.

Generally, targeting a more “universal” vehicle platform height will make the taxi more accessible.



Efficient accessibility. A motorized turn-out seat increases accessibility while maintaining a smaller, more efficient vehicle platform.

grips and support

insight

Outdated vinyl straps do little to provide appropriate support during ingress/egress.

Flexible fabric is not a sturdy anchor against which to leverage one's weight.

recommendation

Sturdy support bars, strategically placed, can offer appropriate assistance for passengers.

As with all safety features in the cab interior, grip bars should be highlighted to encourage use.



Outdated flexible straps offer little support in a moving vehicle.



New subway cars have abandoned straps for sturdy bars.



Sturdy support. Clearly highlighted grip bars offer optimal support during ingress/egress.

curbside communication



toplight

insight

The current toplight is small, difficult to read from a distance, confusing to visitors, and provides limited information.

recommendation

The next generation toplight should be larger for improved visibility, utilize color intuitively to denote vacancy status, and feature an LED array to communicate a broad range of messaging.



Clear and bright. Simple LEDs allow more universal communication of taxi status.

curbside communication

ride share

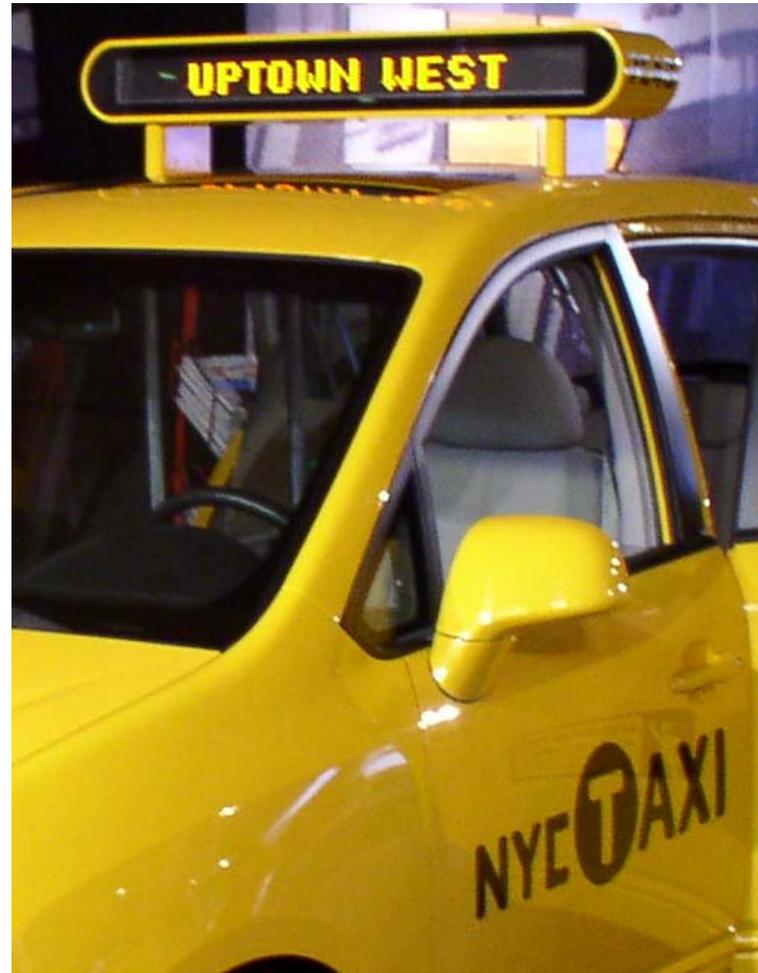
insight

Current research reveals continued interest in rideshare options to ease congestion and increase utilization of each cab trip, particularly during peak-demand periods.

recommendation

A fully-featured toplight with LED lettering would provide a clear communication tool to facilitate a future rideshare program.

Additionally, drivers returning from outer boroughs could communicate their destination, potentially attracting an additional return fare.



Going my way? Toplight communicates destination for ride share option.

curbside communication

driver
comfort
+ safety



general partition considerations

insight

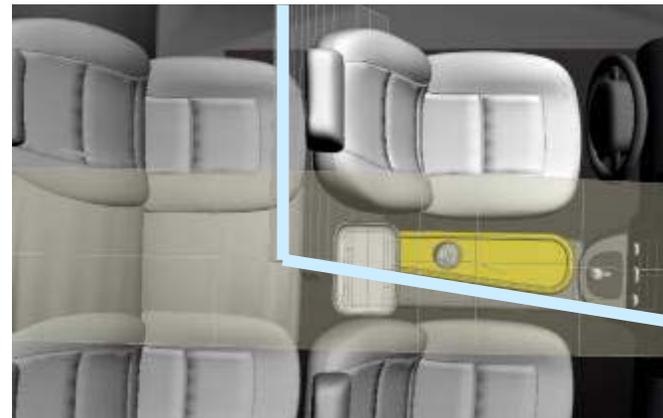
The current wall partition, instituted in response to the crime wave of the 70s and 80s, raises many questions regarding the trade-off of driver and passenger safety, and efficiencies of space and cost.

Additionally, many of the new hybrid vehicle models desired by taxi drivers do not accommodate the old wall partition.

recommendation

Ideally, the ultimate deterrent of crime would be to remove the target of theft – replace cash with credit card payment.

In the interim, for those drivers who prefer a physical crime deterrent, an L-shaped partition which fully considers the needs of both passenger and driver is required.



Next-generation partition. Many new platforms require a new partition design.

driver comfort + safety

transaction components

insight

Current cash transaction area requires an uncomfortable reach over the driver's right shoulder.

recommendation

In designing a new partition, the window opening for cash transactions should be located to minimize driver discomfort, yet remain within easy passenger reach.

Additionally, the cash window should be adjacent to the credit card swipe and PIM screen, so as to create a coherent, intuitive payment interface.



Considering both riders. Equal attention must be paid to the needs of both driver and passenger.

driver comfort + safety

personal space and storage

insight

The taxi interior serves as the driver's "mobile office" and should have suitable accommodations for the driver's paperwork, food and beverage, and personal belongings.

recommendation

To accommodate the L-shaped partition, a specialized center console should be provided to manage often-accessed things, including any paperwork, cell phone, food and beverages.

To free the front passenger seat, day-long driver storage could be relocated to the glove compartment area, or a specialized compartment in the trunk.



Easy access. A custom center console manages papers, drinks, cell phone, and other essentials.



Day-storage. A specialized compartment in the trunk holds bulky driver belongings.

driver comfort + safety

driver's seat

insight

Taxi drivers often work in 12-hour shifts on an uncomfortable Crown Victoria bench seat. As a result of these grueling work conditions, many drivers complain of hemorrhoids and lower back pain.

recommendation

These demanding conditions require a specialized driver seat, with ergonomic considerations similar to that of an interstate truck driver.

The driver seat design should promote proper blood flow, reduce joint pain, alleviate pressure points, and be “breathable” to distribute temperature comfortably.



Long haul. 12 hour shifts require seat performance similar to that of an interstate trucker.

interior climate control

insight

Drivers sitting in their vehicles for 12 hours straight have different climate preferences from passengers jumping in from the heat or cold of the outdoors.

Additionally, perfumes, foods and other scents may be intrusive to either party.

recommendation

The ventilation system for the driver area needs to be ducted completely separately from the passenger area. This will afford independent climate control, as well as keeping the air fresh for each zone.



Separate climates. Passengers may be dressed for different temperatures than drivers.



Separate odors. Food, perfumes and other scents require separate ventilation.

driver comfort + safety

sustainability
& maintenance



taxi as “green” icon

insight

Cars are widely seen as prominent contributors to pollution, and looking down a New York street, the road is dominated with yellow cabs.

Additionally, taxi drivers bemoan the increasing price of gas, while passengers feel “guilty” about the environmental impact of riding a taxi.

recommendation

Just as public buses have become a leading proponent of “clean air” fuels, taxis are poised to adopt a similar role as a symbol of progressive “green” technology for New York City.

Appropriate technologies should be adopted for taxis to tackle issues of clean emissions, fuel economy, and sustainable materials.



A symbol of progress. Taxis may become a ubiquitous symbol of a cleaner New York.

sustainability + maintenance

seating materials

insight

Current vinyl seating is hot, sticky, and uncomfortable for both drivers and passengers.

Additionally, vinyl is largely considered environmentally harmful, involving many volatile and potentially carcinogenic plasticizers and stabilizers in its production and destruction.

recommendation

Eco-friendly, high-performance upholstery materials, such as Milliken's YES Essentials or leather alternatives from Ultrafabrics LLC, can withstand the rigors of taxi seating, while leaving a much smaller environmental footprint.

Additionally, such materials often have better heat distribution and a better feel, while maintaining durability.

All interior materials should facilitate fast and easy cleanup for wet spills.



Material science. Modern materials have better durability, feel, and sustainability than vinyl.

sustainability + maintenance

floor covering materials

insight

The black vinyl flooring installed at hack shops raises similar environmental concerns as the vinyl seating, coupled with a potentially dangerous slippery surface and less than aesthetic installation.

recommendation

Many eco-friendly flooring alternatives exist while maintaining the non-permeability required for hose cleaning, such as recycled rubbers and polyurethanes.



Considered materials. Recycled flooring can offer durability standards while reducing toxins.

sustainability + maintenance

facilitating easy maintenance

insight

Cabs are the preferred “designated driver” in New York City, yet drivers are often inconvenienced by expensive clean-up after sick passengers.

In addition to the cost, drivers also lose precious driving time, and require faster more efficient interior cleaning solutions.

recommendation

Flooring and seating contours should be optimized for quick and easy hose-down. Door jambs should be low and flush with the floor, to facilitate quick drainage.

Removable seat cushions and fabric that allows for a quick hose-down would speed the process.



Ready for hose-down. Level flooring, such as in the Honda Element, allows for quick cleaning.

vehicle appearance



an “iconic look” for NYC

insight

The New York City taxi, like any other world-class service, needs a unified, iconic look to identify and assure the enhanced passenger experience ensured by the TLC.

recommendation

Yellow cabs need a modern, clean exterior graphic presentation which speaks to the timelessness and efficiency of the taxi system.

A clear graphic language will serve to unify all yellow cabs. These consistent graphic standards will not only strengthen the impression of this service, but will also build civic pride in the next-generation of NYC taxis.



A new icon. Unified graphics will serve to identify and enhance the new taxi experience.

vehicle appearance

thank you

