

SFMTA Municipal Transportation Agency



Muni Light Rail Vehicle Design Survey

Preliminary Findings and Recommendations

December 1, 2014

Executive Summary

Following the award of the contract for Muni's future generation of new light rail vehicles, the San Francisco Municipal Transportation Agency undertook a public process to gain input and feedback on public preferences for the exterior design and interior layout of the new fleet. An online survey solicited **8,755** individual responses over a three week period from mid-October to early November. Surveys offered in multiple languages were widely promoted through the SFMTA's digital communications and in partnership with other city agencies, community partnerships and stakeholder groups, such as Senior Disability Action and Light House for the Blind. Intercept surveys were also conducted at select locations across the city. In addition, outreach to several groups provided opportunities to gain input and understand preferences for specific needs related to people with disabilities.

More standing space and wider aisles were the most important elements for most respondents. The majority of respondents preferred the **longitudinal** seating arrangements (54%) where seats face into the vehicle over **transverse** seating (44%) where seats face forward toward the front of the vehicle and back toward the rear. **Seniors, people with disabilities** and those in **zip codes** furthest from the city center were more likely to prefer transverse seating. In contrast, stakeholders representing people with disabilities had strong preference for longitudinal seating to reduce impediments for people with mobility devices.

In terms of preferences on other design variables, opinions were nearly even split between the **Standard**, **Black** and **Red** interior color schemes, whereas the **Skyline 1** exterior design option was favored by nearly half of all respondents.

The SFMTA is appreciative of the level of interest indicated by the number of survey respondents and will consider the feedback received when making future LRV Design decisions.

Background

On September 19, the San Francisco Municipal Transportation Agency (SFMTA) awarded a \$648 million contract to Siemens for a minimum of 175 light rail vehicles (LRV). Siemens will manufacture the vehicles in their Sacramento facility with the first cars operational by the end of 2016. Options are in place for an additional 85 cars, bringing the overall total to 260 cars.

Muni's new light rail vehicles (LRV) model, called the S200 SF Light Rail Vehicle, can operate at speeds up to 50 mph and is a hybrid creation combining the best elements from both Siemens' successful high-floor and low-floor light rail platforms, over 1,300 of which are currently in operation. These vehicles exceed San Francisco's required reliability targets and provide an improved, more reliable passenger door system with fewer moving parts that will also require less maintenance.

Three different car designs—The Presidio, The Skyline and The Gate are being considered, with the selected design along with the final interior layout to be determined by public process.

Each Siemens car has capacity for more than 200 persons. The longitudinal seating arrangement has 143 passenger seats and standing pads. The transverse seating arrangement has 141 seats and standing pads.

Survey Methodology and Outreach

There were a total of **8,755** responses to the LRV design survey between October 17 and November 4. The surveys were conducted in English, Spanish and Chinese. In person intercepts with bi-lingual surveyors were conducted at select rail stops and stations across the city.

The survey was widely promoted on the SFMTA.com website and NextMuni, through Twitter and Facebook, and on Muni Email and Text Alerts. In person intercepts took place at rail stops and stations with bi-lingual surveyors. In addition, outreach included presentations to the SFMTA's Citizen's Advisory Committee (CAC), Multimodal Accessibility Advisory Committee (MAAC) and the SFMTA's Engineering, Safety & Maintenance Committee (EMSC), and joint meetings with Independent Learning & Resource Center San Francisco (ILRC) and Transit Justice.

Word of mouth was effective in gaining participation with 30% of respondents indicating they heard about the survey from a group and 20% heard from a friend.

Survey participants were informed that their input would provide guidance for the staff recommendation on LRV designs. The survey does not account for designs related to operator cab. Additional outreach to Muni operators and TWU-250A will undergo a separate process.



Ambassadors were deployed to survey intercept locations across the city.

Key Survey Findings

The LRV design survey focused on three primary decision points: 1) Interior seating; 2) Interior color choice; and 3) Exterior design of the vehicle front, known as the "front mask". Survey questions included additional questions about the customer experience with the current Breda LRVs, ridership habits and demographics.

Results indicated a strong demand for more space and capacity on vehicles, and a need for safety structure that allows people to safely stand while the vehicle are in motion. Nearly 40% of riders indicate that they have the most difficulty getting on or off the train and only 20% strongly agree or agree that there is enough space to stand. Customers also indicate that they are most likely (49%) to board a vehicle that is very full even if it means pushing and shoving onto the train.

More than 74% of customers rated standing space extremely important, followed by wider aisles for fast (un)loading. More than 49% of customers ranked floor-to-ceiling poles as the #1 interior feature that makes them feel most safe while standing.

When survey participants were shown illustrations of vehicle interior design schemes, they indicated a preference for longitudinal (54%) versus Transverse (44%) seating arrangements.



Longitudinal seating arrangement (left) and Transverse seating arrangement (right)

Certain groups including seniors, people with disabilities and those with zip codes farther from the city center preferred Transverse. Of customers over the age of 65, approximately 77% preferred the Transverse seating arrangement. Similarly customers who indicated a disability, 62% preferred Transverse versus 38% who preferred Longitudinal. The majority of zip codes (56%) within the city preferred longitudinal seating, but five zip codes (94116, 94144, 94124, 94132, and 94129) preferred Transverse.



Survey results by Zip code; green zip codes preferred longitudinal and red zip codes preferred Transverse

Preferences for interior color schemes were nearly equally spread between three color choices: Standard (30%); Black (29%); and Red (28%). The fewest rated the Brown interior #1 (10%).

Preferences for exterior vehicle design clearly identified Skyline #1 as the preferred choice with 49% rating it #1.



Respondent Demographics

Respondents were regular Muni riders with 80% riding at least once per week and more than 50% reported riding 5 days a week or more. Most respondents reported using Muni for daily activities, primarily commuting to work. Open ended comments indicated not having a car. Over 40% reported an average commute time between 20-30 minutes and more than 33% were N Judah riders.

Respondents ranged in age from <18 to 75+, with 49% of participants between the 25 and 44. 57% of respondents were male. More than 6% reported an annual household income of less than \$15,000, and nearly 36% of respondents reported incomes of \$100,000 or more.

Of the 6% of respondents who reported having a disability, 219 indicated that they traveled with a cane, walker or similar mobility aid, and 32 indicated traveling with a wheelchair, scooter or similar mobility aid. A total of 271 indicated "Other" with open ended responses including motion disorder, spinal issues, knee pain, HIV/AIDS and height limitations.

Other Considerations

Outreach meetings were held with EMSC, which indicated a preference for longitudinal seating and took a motion to recommend it to the full CAC. MAAC members and ILRC/Transit Justice representatives also preferred longitudinal seating to improve the movement of disabled passengers throughout the vehicle. These stakeholders stated that wider aisles are a priority for ease of movement for those requiring mobility assistance. ILRC took an official position that they do not support the installation of any stanchions that will impede the access or free movement of any person to move around the LRV with or without any kind of mobility device.

In addition to customer preferences, the interior seating arrangement affects future policy decisions. A transverse seating arrangement would all but eliminate the possibility of allowing bicycles on these next generation LRVs.

Recommendation

Staff recommends with the longitudinal interior design both to ensure future capacity for growing ridership and to allow for the possibility of a future policy decision about bicycles. In addition, staff recommends moving forward with the Standard interior color scheme and the Skyline #1 exterior design. For additional reference, please see the technical perspective on the staff recommendation attached from Transit Director John Haley.

Enclosures: Technical LRV Memo LRV Survey Questionnaire



Date: November 21, 2014

To: Ed Reiskin Director of Transportation

> Candace Sue Director of Communications

John Haley John Haley From: Director of Transit

Subject: LRV4 Design Review

We conducted a Design Review session this week to formalize the design of the key systems with Siemens project staff. While we covered the eleven systems, the majority of public focus is on the interior design and operators cab. We have met with 250-A leadership and provided them a fact sheet on the features of the operating cab. Several operators were active participants in the review this week. There will be multiple opportunities for the operators to influence the design of the cab over the next several months by cooperating in the design review using the mock up cab coming to finalize the layout, controls and features they are interested in without impacting the delivery schedule.

It is our intention to direct Siemens to design car interiors with longitudinal seating for the following reasons:

- 1) Weight Savings- Longitudinal seating means a lighter car primarily due to less steel that will allow us to achieve our target weight. The weight of the car is critically important as a heavier car causes more stress on track, creates additional noise and vibration and accelerates the wear on the LRV trucks. A heavier car also creates a more uneven ride for our passengers, particularly through switches or rail junctions.
- 2) Energy Efficiency- The car is designed to use less energy than our current vehicle. It features an energy management system designed to use less power by using energy efficient components, LED light components and allowing us to turn the cars off while in the yard to use no power except for the emergency circuits on the radio,

GPS and ATCS. We maximize the benefits of this with a lighter car. Energy use is also enhanced by the lower weight.

- 3) Helps reduce travel time More open space reduces dwell time for vehicles as passengers get on and off. This is accomplished by the wider aisles and offset stanchion placement improving passenger flows to the doors.
- 4) Maintenance efficiencies- The longitudinal system has less components to maintain and clean. There will be fewer fasteners to inspect, less components to clean, and allow more room for the mechanics to perform removal and replacement of components without reaching over the seats or standing on them risking injuries due to poor access.
- 5) Superior accommodations for disabled riders, greater aisle width (54" vs. 32'), plus the smooth flooring provides easier movement of wheelchair patrons providing an interior path to the center section multi-purpose area if more access is required. Longitudinal also allows for the ability to offset the stanchions adding more grab handles for rider comfort and support improving passenger safety.
- 6) Design flexibility-Allows for four multi-purpose spaces and space provides opportunity to replace leaning pads with flip seats if desired.
- 7) Schedule Adherence- This is a standard design for Siemens cars and can be accommodated fully within the proposed schedule without additional cost or engineering needed.
- 8) Opportunity to review Bicycle Policy-

This design allows us to work with the key stakeholders to consider actions necessary to re-evaluate our current practice of restricting bicycles to folding models. The four multi- purpose areas allow the conveyance of full size bicycles, strollers, and shopping carts used by our senior passengers without impeding flow with the wider aisles.

We believe that longitudinal seating is the correct interior configuration for this historical procurement.

Welcome to the Muni Metro Light Rail Train Survey!

The San Francisco Municipal Transportation Agency (SFMTA) has ordered a brand new fleet of Muni trains and we want your input! Up to 260 new light rail vehicles are coming and we need your input to guide our design decisions.

Please take this brief 10 minute survey. We'll use your feedback to inform the design of our new light rail fleet.

For more information about the future light rail trains, please visit: www.muniforward.com/newtrains. We appreciate your feedback and participation!

About the Current Vehicles

This section asks questions about the current light rail vehicle layout and rider experience.

1. When do you have the most difficulty moving around on the light rail vehicles?

- C Getting on or off the train
- C Getting to or from my seat
- C Getting in and out of my seat
- C Reaching grab bars/handles/straps
- O Never have difficulty moving on light rail vehicles
- Other (please specify)

2. On the current vehicles, are there enough:

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree	N/A
Seats	O	0	C	C	0	0
Handles/Grab Bars/Straps	O	\odot	O	O	0	\circ
Spaces to stand	0	O	O	C	0	\odot
Spaces for mobility devices	O	\odot	O	O	0	\circ
Storage space (for strollers, luggage, etc.)	O	0	O	O	0	0
Adequate lighting	C	\odot	O	O	O	C
Maps and information	0	\odot	O	C	0	\odot

3. If a very full vehicle pulls up to the stop or into the station, what are you most likely to do?

\odot	Board	and	find	standing	room
---------	-------	-----	------	----------	------

- O Wait up to 5 minutes for the next one
- O Wait up to 10 minutes for the next one
- O Wait up to 15 minutes for the next one
- O Walk instead
- C Ride a Bike instead
- C Take a taxi instead
- O Drive instead
- Other (please specify)

About the New Vehicles

This section asks questions about elements for the new light rail vehicles. We will do our best to include as many of your favorite features as possible!

4. How important are the following elements to the inside of the new vehicles:

	Not Important	Not Very Important	Somewhat Important	Extremely Important	N/A
Overall exterior appearance	0	O	O	O	O
Overall interior appearance	O	O	Õ	O	O
Interior color scheme	0	C	O	0	O
Floor-to-ceiling poles	0	O	Ō	O	O
Seats that face forward	0	C	C	O	O
Additional space for mobility devices	O	C	O	C	O
Overhead grab bars	0	C	C	O	O
Handles on seats	0	O	O	O	O
Standing space	0	C	O	0	O
Leaning areas	O	O	Õ	O	O
Seating arrangements for 3+ riders	O	C	C	O	0
Bike storage	O	O	Õ	O	O
Storage for luggage and strollers	0	C	C	0	0
Digital route/system maps	O	O	Õ	Õ	O
Printed route/system maps	0	C	O	0	O
Wide aisle for fast loading and unloading	O	C	O	O	C

5. When standing on a moving light rail vehicle, what makes you feel most secure? Rank, using 1 for Most Secure and 5 for Least Secure.

-	Floor-to-ceiling poles
•	Overhead grab bars
•	Padded space to lean against
•	Handles on seats
	Overhead grab straps

The photos below show two interior layout options being considered by SFMTA. Layout #1 is called Longitudinal - with seats parallel to the tracks (facing toward the inside of the vehicle). This gives passengers more room to stand and move about the vehicle. Layout #2 is called Transverse - with seats perpendicular to the tracks. This gives passengers more seats that face the front or back of the vehicle. Please select your favorite below the photos.





6. Which do you like best?

-

These photos show the four interior colors being considered by SFMTA: Standard, Black, Red and Brown.

The selected color will appear on the floor, ceiling, seats and pads of the new vehicles. Rank your favorites below the images, using 1 for your favorite and 4 for your least favorite.









ate f	the interior colors above, using 1 for your favorite and 4 for your least favorite Standard (first image)
•	Black (second image)
-	Red (third image)

These photos show the exterior variations being considered by SFMTA: Gate, Presidio, Skyline #1 and Skyline #2

The Gate and Presidio have a more squared front (mask) shown in the first two photos. The Skyline has a more sloping front (mask) shown in the last two photos. Rank your favorites below the images, using 1 for your favorite and 4 for your least favorite.





FMTA	- Muni Metro Light Rail Vehicle Design Survey
8. Rate t	he exterior variations above, using 1 for your favorite and 4 for your least favorite.
•	Gate (first image)
•	Presidio (second image)
	Skyline #1 (third image)
	Skyline #2 (fourth image)

About Your Ride

•

•

This section has questions about your average trip on Muni Metro.

9. How often do you ride Muni?

10. Do you primarily work in San Francisco or outside the city?

11. W	/hen you ride Muni, what is the main purpose of the trips you take?
C	ommute to work
W	/ork-related business
P	ersonal business (appointments, etc.)
S S	chool/University
S	hopping
R	ecreation/Entertainment/Restaurant
🗌 Vi	isit friends or family
М	edical
D	on't know
□ o	ther (please specify)
12. 0	n average, how long is your one-way commute within San Francisco?
13. W	/hich Muni Metro line do you use most often?

- O J Church
- C K Ingleside
- C L Taraval
- O M Ocean View
- N Judah
- C S Castro Shuttle
- O T Third Street
- C Muni Metro line (unable to specify)
- O Don't know
- Other (please specify)

14. On an average Muni Metro ride, do you usually:

- O Sit from start to finish
- O Sit once a seat opens up
- Sit, lean or stand using a mobility device
- Stand because there's no room to sit
- C Stand because I prefer to stand
- C Lean

Tell us about you!

The questions below are optional but answering them will help us better understand your needs. Any information collected will only be used for this survey and no information will be shared.

15. What is your age?

•

16. What gender are you?



17. What is your average annual household income?

18. Do you have a disability?

- C Yes (please answer question #19)
- O No (skip to question #20)

19. Please indicate which of the statements below may apply to you (check all that apply):
I have low vision
I am blind
I travel with a service animal
I am hearing impaired
I travel with a cane, walker, or other similar mobility aid
I travel with a wheelchair, scooter, or other similar mobility aid
I hae a cognitive impairment
Other (please specify)
20. What is your home zip code? 21. How did you hear about the survey?

22. Please share any other thoughts you have about the design of the proposed Muni light rail vehicles.