Mountain View Automated Guideway Transit Feasibility Study

Community Meeting September 25, 2017

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Agenda

- Presentation
- Questions and Answers Session
- Moderated Discussion: Issues/ Trade-Offs

Purpose of Meeting

- Present Findings of Evaluation
  - Highlight key parameters of Evaluation Criteria
  - Educate on potential service levels and infrastructure tradeoffs
- Feedback
  - Community feedback from key issues/ trade-offs discussion

Introduction

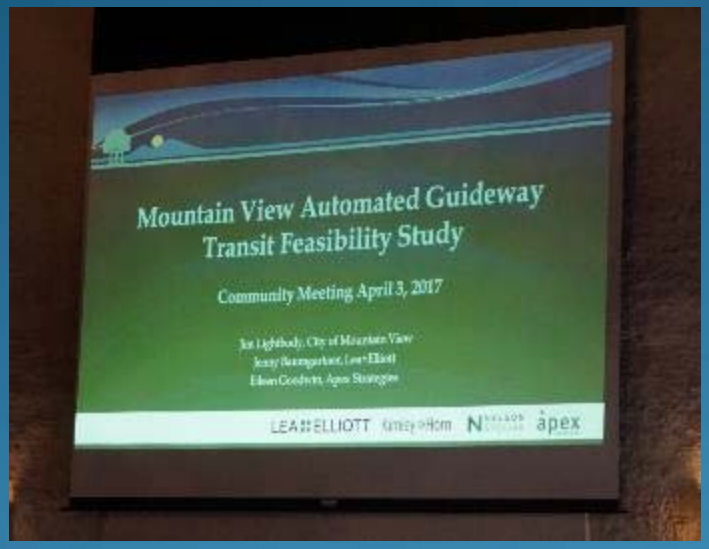
- Purpose of Study
  - The Challenge
    - Employment and housing growth
    - Caltrain rider growth
    - Achieving city goals for mode shift
  - The Goal
    - Determine the feasibility, and impacts/benefits of Automated Guideway Transit (AGT)
    - How would AGT be integrated into community over time

Issues/Trade-offs

- Passenger Experience
  - Vehicle size
  - Type and frequency of service
- Infrastructure
  - Community impacts
- Technology Maturity
  - Current cost and future evolution of technology
  - Expandability/Adaptability

Previous Outreach Meeting

- Purpose: Presented study and Automated Guideway Transit (AGT) types and engage community with respect to study objectives and AGT system characteristics



Previous Outreach Meeting

- Technology
  - Nothing intrusive
  - Frequent service and smaller vehicles especially in the residential areas
  - Land use consideration, concern about where the land will come from
- Priorities/Considerations
  - Weighing “fast service” versus “adaptable”
  - Need to prioritize
- Goals and Values
  - Adaptable, expandable to connect multiple points in Mountain View and beyond
  - Compatibility with multimodal transportation—i.e. bikes, personalized transportation
  - First and last mile connectivity is important

AGT Technologies

Bombardier: APM - Phoenix Sky Harbor

Singapore Cable Car (Sentosa, Singapore)

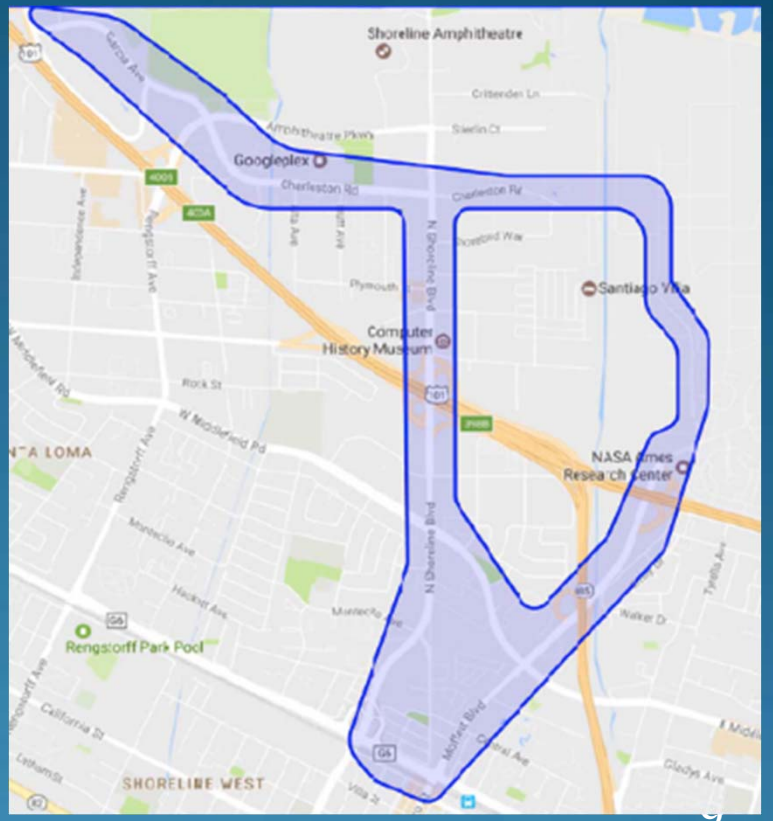
Ultra Global: Heathrow PRT

Navya: M City, University of Michigan

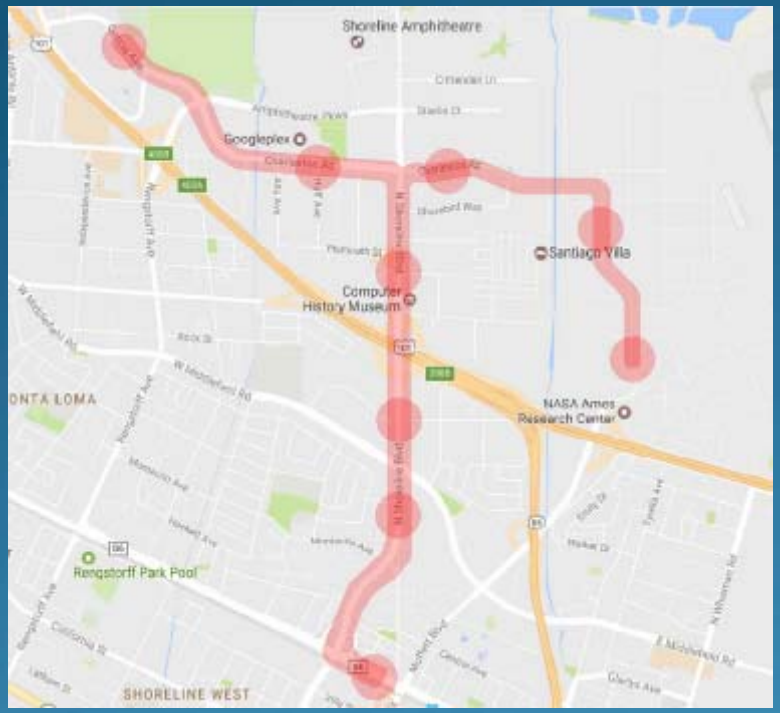
- Aerial Cable
- Automated People Mover (APM)
- Automated Transit Network (ATN)
  - Group Rapid Transit (GRT)
  - Personal Rapid Transit (PRT)
- Autonomous Transit (AV)

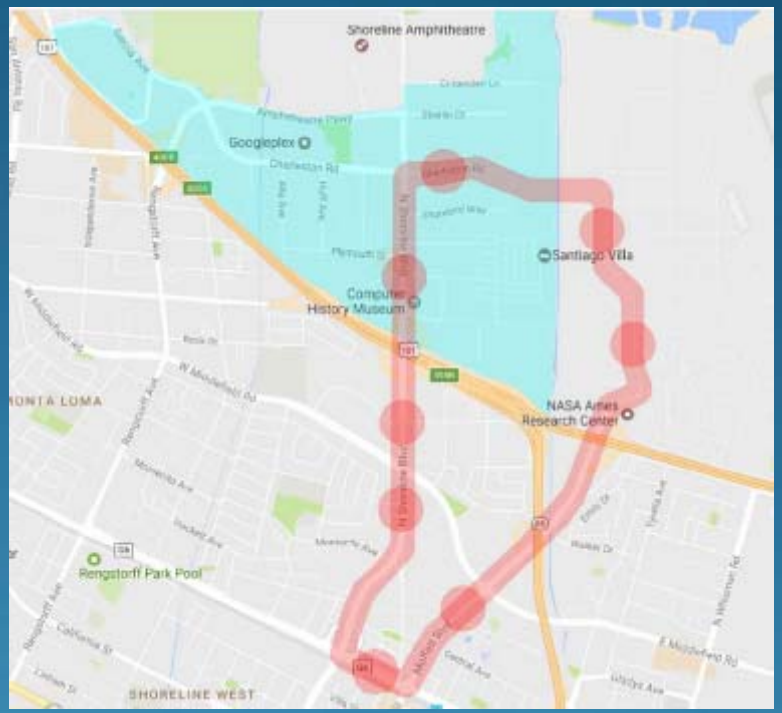
Candidate Corridors

- Connect key nodes
  - Downtown Transit Center
  - North Bayshore
  - Moffett Field and NASA
- Representative alignments
  - Potential service areas
  - Physical/environmental limitations



Representative Alignments





Evaluation Criteria

CATEGORY	CRITERIA	
Operations	1	Ability to serve market demand estimate
	2	Flexibility in service / responsiveness to daily demand
Financial and Economic	3	Financial feasibility
	4	Ability to add stations to serve existing or new developments
Neighborhood Connectivity and Impact	5	Ability to extend the system
	6	Possible impact on neighborhoods
Customer Experience	7	Provides convenient and high-level service
System Delivery	8	Integration into Transit Center
	9	Ability to fit within the local environment
	10	Adaptability of infrastructure
Technology Development	11	Level of technology maturity

Findings and Issues/Trade-offs

- Methodology
- Findings focus on 3 main areas of issues and trade-offs
  - Passenger Experience
  - Infrastructure
  - Technology Maturity
- Generate discussion and get feedback

Methodology

- Technology simulations to estimate operational characteristics
  - Inputs: Representative alignment, station locations, dwell times, vehicle/passenger comfort parameters, bikes on vehicles
- Demand: Peak loading at Transit Center (Caltrain and VTA LRT connecting to AGT)
  - Peak 10 min period: 330 passengers at Transit Center
  - Daily Ridership: 4,000 to 9,000 passengers

Passenger Experience

- Vehicle size: Small vs. Mid vs. Large Vehicles
- Smaller vehicles with higher frequency vs. Larger vehicles with lower frequency
- Flexible, more personalized point-to point service vs. higher capacity, typical transit service
- Sharing vehicles: Personal vs. Group
- Meeting needs of all riders: ability to accommodate bikes, ADA, etc.

Operational Information

	Aerial Cable	APM	ATN (PRT/ GRT)	AV
				
Vehicle Capacity (passengers)	14 – 32	80	3 / 21	10 – 20
Travel Time To N. Bayshore* (min)	11	7	6 / 7	6 – 7
Frequency To N. Bayshore*	30 sec – 1 min	4 min	10 sec / 45 sec	30 sec - 1 min
Operating Fleet	22 – 48	8 x 2-car trains	135 – 140 / 25 – 30	35 – 80
Ability to use same technology for North Bayshore network			✓	✓

*N. Bayshore – Shoreline/Charleston station
VALUES ARE HIGH-LEVEL ESTIMATES ONLY

Passenger Experience

- Meeting needs of all riders
  - Ability to accommodate bikes, ADA, etc.
- Evacuation: Emergency walkway availability

Source: liftblog

Source: OSU

Source: Traffic Technology Today

Infrastructure

- Privacy vs. Visual impacts
- Intermittent Towers/structures vs. Consistent Column/viaduct structure
- Reduced traffic congestion and traffic calming vs. Visual impacts of structures

Community Impact

- Noise
  - Aerial Cable: Continuous, regular sound
  - APM/ATN/AV: Intermittent as vehicle passes
- Visual
  - Aerial Cable: Intermittent Towers
  - APM/ATN/AV: Consistent Columns
- Privacy
  - Aerial Cable: Operation over private property
- Environmental




Community Impact

- Technologies incorporated into community
  - Potential to extend beyond the Transit Center to N. Bayshore connection
  - Infrastructure renderings:

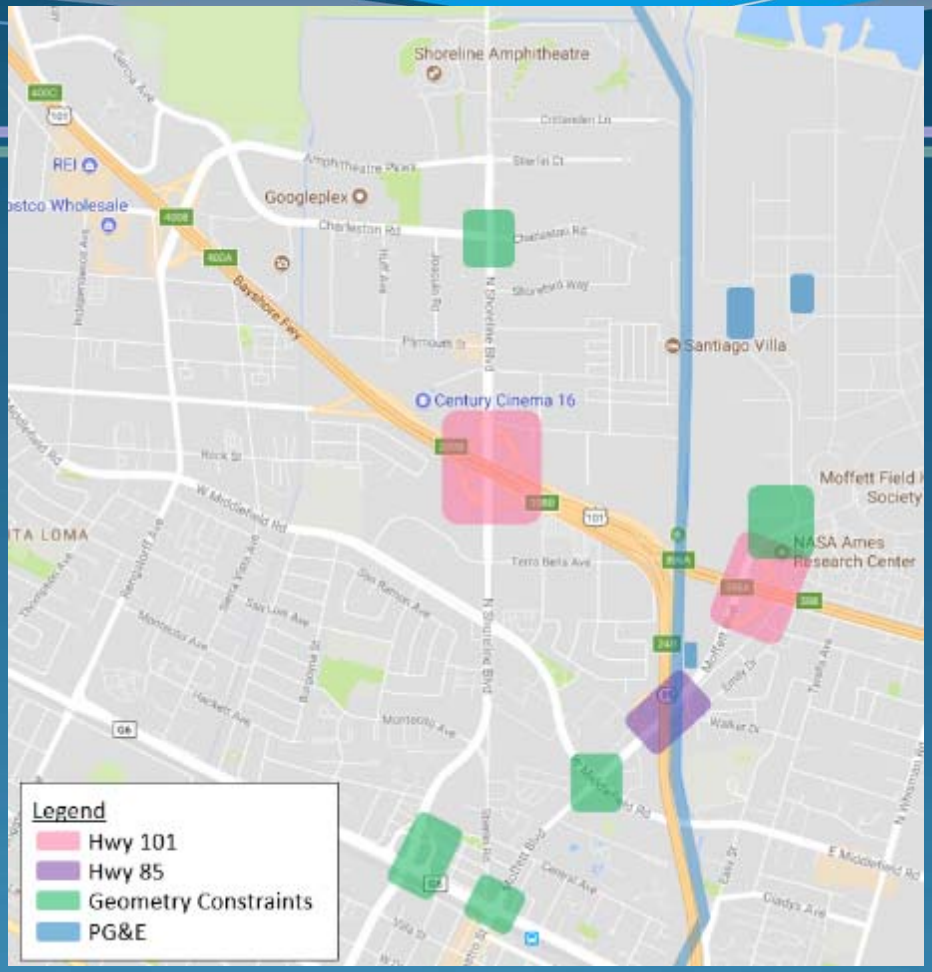
Automated People Mover

Autonomous / Group Rapid Transit

Aerial Cable Transit

Source: Kimley-Horn

Corridor Challenges



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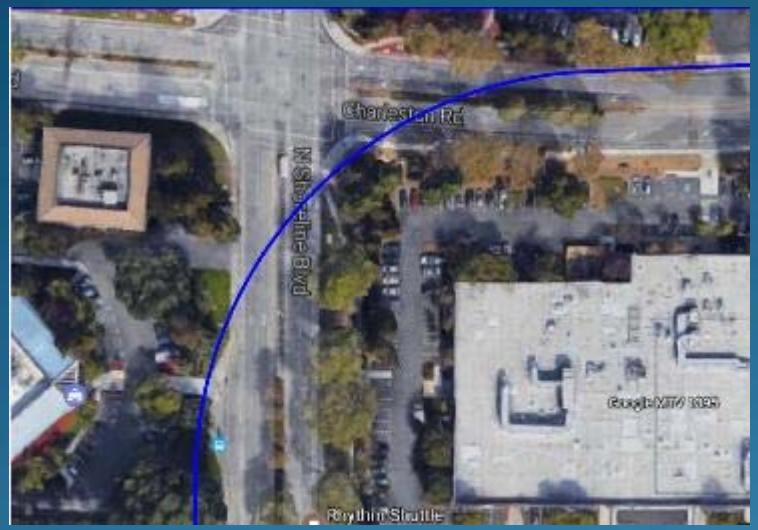

Example of an APM system making a 330 ft turn on Charleston Blvd and Shoreline Blvd

Example of an ATN system making a 100 ft turn on Charleston Blvd and Shoreline Blvd

Key Areas:

- 101 and 85
- Shoreline/ Central Expy Way
- Geometry Constraints
- PG&E

Technology Maturity

- Cost vs. Evolving Technology/Risk
- Install/build now (dedicated guideway) vs. Wait for Autonomous Transit technology to mature (allowing semi-exclusive or exclusive roadway lanes with crossings)

Preliminary Estimated Cost

	Aerial Cable	APM	ATN (GRT)	AV
				
Capital Cost (per mile)	$35M - $50M	$130M - $195M	$85M - $130M	$85M - $135M
O&M Cost (per year)	$6M - $8M	$11M - $17M	$6M - $8M	$5M - $8M

- Capital Cost Estimate
  - Systems: Vehicles, guidance, power, communications, train control, etc.
  - Facilities: Civil works for stations, guideway, maintenance facility
- O&M Cost Estimate
  - Annual cost to operate and maintain the system (staff, central control operators, parts and consumables, etc.)

* VALUES ARE IN 2017 USD

Expandability and Adaptability

- Extending System or Adding Midline Stations
  - Aerial Cable: Very difficult
  - APM, ATN, AV: Possible; pre-planning minimizes impact
- Adapting facilities for other technologies
  - Aerial Cable: Not possible
  - APM, ATN, AV:
    - Guideway structures: can be re-used for equal or smaller technologies
    - Stations: may need re-designing to meet operations of different technologies

Next Steps

- Council Study Session – October 17
- Finalize Evaluation and Study Results
- Report to Council in early 2018

Questions and Answers

- ?

Discussion

- Issues/Trade-Offs
  - Passenger Experience
    - Vehicle size
    - Frequency of service
  - Infrastructure
    - Community impacts
    - Representative routes
  - Technology Maturity
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Thank You!

- Website: https://MountainViewAGTFeasibility.com