Policy Board Meeting
July 25, 2023
I. Introductions/Roll Call
II. Approval of the May 30, 2023 Meeting Minutes
III. Reports
IV. Old Business
V. New Business
   A. OWP Work Element Presentation: Autonomous Vehicle Planning Study
HART Autonomous Vehicle Study

Dr. Roger B. Chen, CEE Department
Preston Garcia, UROP Fellow
Cody Tallman, MSCE Candidate (former)

University of Hawaii at Manoa
7/25/2023
Motivation

• Smart Mobility and Transportation in the News
  • “Self-driving vans will deliver Walmart groceries” – AZCentral (2019)
  • “HART hopes Riverwalk is the magic link for its Tampa AV pilot” – Tampa Bay Times (2021)
  • “How driverless cars will change our world” – BBC (2021)

• Autonomous Vehicles (AVs) = SOLUTION(?) to: (i) Access for Mobility Constrained Households, (ii) Compliment Transit and (iii) Promote Sustainability and Livability Goals.

□ Transportation Scenario Planning and Analysis for emerging mobility contexts requires information on who (household) uses them, when they are used, where they go and how they are used.
Background and Current Study

• Literature has many hypotheses – the AV future is still open!

• Agreed upon future scenarios from literature:
  • AVs promise movement without people (empty vehicles allowed)
  • AVs promise more “intelligent” travel patterns
  • AVs promise support for transit operations; many fleet dispatch models developed recently in the past 5 years.

• Current Study Focus: impacts on household operations
  • Household Perspective: Household Fleet Travel/Activity Pattern
    • Easily Generate Household Travel Patterns with AV availability
    • Identify realistic AV travel patterns adopted by households
Study Framework and Approach

(Oahu Household Survey)

Observe Daily Pattern
- Completed Schedule
- Geocoded Activity Locations

Network Performance
- Travel Times
- Travel Distances

Roger’s AV Model
- VRP: Based on Pick-up and Delivery Problem with Time Windows (PDPTW)
- Solution with VRP Heuristics for PDPTW (… based on Household Activity Pattern Problem formulation - HAP)

Generated (and Observed) AV Patterns for each household

Feedback from Humans
- Voting
- “Explore Heuristics”

Feasible Generated Patterns and Calibrated Heuristic Parameters

OMPO TDFM
(Start)
(Finish)
Observed Pattern for Household A

HH VEHICLE 1
Departed: 13:50
Arrived: 18:30

HH VEHICLE 2
Departed: 12:00
Arrived: 18:00

Home

Total Travel Time: 130 mins (2.2 hrs)
Total Parked Time: 150 mins (2.5 hrs)

HH Totals:
Total Travel Time: 260 mins (4.4 hrs)
Total Parked Time: 380 mins (6.3 hrs)
Generated (Solution) Pattern for Household A

AUTONOMOUS VEHICLE 1
Departed: 11:00
Arrived: 18:30

Total Travel Time: 130 mins (2.2 hrs)
Total Idle Time: 290 mins (4.8 hrs)

HH Totals:
Total Travel Time: 130 mins (2.2 hrs)
Total Idle Time: 290 mins (4.8 hrs)
Observed Pattern for Household B

Home

Total Travel Time: 16 mins
Total Idle Time: 6 mins

HH VEHICLE 1
Total Travel Time: 10 mins
Total Idle Time: 688 mins (4.8 hrs)

HH VEHICLE 2
Total Travel Time: 16 mins
Total Idle Time: 6 mins

HH Totals:
Total Travel Time: 26 mins
Total Parked Time: 701 mins (11.7 hrs)
Generated (Solution) Pattern for Household B

AUTONOMOUS VEHICLE 1

TheBus 84

TheBus 84/84A Bus Stop

TheBus 84A

Home

HH Totals:
Total Travel Time: 16 mins
Total Idle Time: 688 mins (11.5 hrs)
Oahu Household Travel Survey 2012

• **Generated AV HH Travel Patterns for Sample**
  - 4,001 Households
  - 3,120 Households with auto-based modes in their daily pattern
  - 143 Households with invalid TAZ in Trip Data – missing or not in Oahu
  - **2,976 Households for Analysis**

• **Rail Scenario**
  - Households with auto-based and an express bus route modes in travel day
  - 56 Households
  - Rail station locations considered in choice set for HHs taking express transit
  - System Alignment completed to Civic Center
How did improvements vary across households?
Summary of Findings

• **Relative change from observed patterns across heuristics**
  • N1 and the CW saw positive improvements (lower travel times) on average
  • H2 and H3 saw travel time increases, on average
  • All heuristics saw decreases in the number of vehicle required, except for the CW.

• **Relative changes vary across households, with respect to travel time and number of vehicle required.**
  • Larger households benefited more from having an AV available.
  • HHs with higher annual income ranges, benefited less.
  • HHs with more resources (vehicles, workers, etc.), benefited less.
  • HHs in East Honolulu and Wai'anae benefited more.
Relative Improvement

\[
\text{Relative Improvement} = \text{Travel Time Observed} - \text{Travel Time Solution}
\]
Relative Improvement
= NVEH Observed – NVEH Solution
Future Work

• **Integration with the TDFM?**
  • TDFM currently uses synthetic patterns generated by statistical simulation methods
  • Examine results with households forecasted to use Rail System

• Closer examination of *Time Windows* and *Activities Duration* generation
  • Mandatory (work, medical, class) vs Discretionary (shopping, eating-out, etc.)

• How to incorporate sharing of AVs among households in a community?
• How to generate non-observed activities to fill in the idle time?
• **Which activities require a person present?**

• Other Related Ongoing Work
  • Central System Fleet Dispatching to compliment Transit Systems
  • Measuring Jobs Accessibility of Households
Thank you

Roger Chen (rbchen@hawaii.edu)
Requested Action: Approve the report as evidence the work was carried out, submit the final report to USDOT for approval, and incorporate study findings into the transportation planning process.
V. New Business – Transportation Improvement Program (TIP) FFYs 2022-2025 Revision 15 Amendment
Revision 15 Amendment (major changes)

- Removal of 3 projects as the scope of work will be combined into other projects

- Modifications to 4 existing projects

- Addition of 6 new projects from the Oahu Regional Transportation Plan (ORTP)
Key Requirements

• Title VI/Environmental Justice (T6/EJ) Analysis

• Intergovernmental Review (IGR) and Public Review

• Financial Plan

• Consistency with the ORTP
**Title VI/Environmental Justice (T6/EJ) Analysis**

- Assesses the impact of projects in minority and low-income communities
- Ensures there are no significant differences between T6/EJ and Non-T6/EJ communities

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* For the OC16 Honolulu Rail Transit Project, TOD boundaries were the specific geography
Intergovernmental Review (IGR) and Public Review

• Total Comments: 13 (Public: 12; Agencies: 1)
  • Comments/Questions: 2
  • Support: 9
  • Oppose: 2
Financial Plan (Fiscal Constraint)

- Demonstrates projects can be implemented using committed, available, or reasonably available revenue sources

### Revenue: FFYs 2022-2025 (x1000)

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### Expenditures: FFYs 2022-2025 (x1000)

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Consistency with the Oahu Regional Transportation Plan (ORTP)

- New projects are evaluated based on the goals and objectives of the ORTP
- All 6 projects received the same scoring for safety and system preservation

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<tr>
<th>Rank</th>
<th>Project #</th>
<th>Project Name</th>
<th>Agency Responsible</th>
<th>Estimated Total Project Cost</th>
<th>Total Evaluation Score</th>
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<td>OS-23-68</td>
<td>Kamehameha Highway (Route 80), Bridge Rehabilitation, NF Kaukonahua (Karsten Thot) Bridge</td>
<td>HDOT</td>
<td>$30,912,000</td>
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Removed Projects
TIP FFYs 2022-2025 Revision 15 Amendment

• OS63 Traffic Counting Stations at Various Locations, Oahu

  • Request to remove this project as the scope of work will be reduced and combined into the statewide traffic counting stations program (S23)
TIP FFYs 2022-2025 Revision 15 Amendment

- OS-22-62 Farrington Highway (RTE 93) Sidewalk Improvements, Hakimo Rd OS-22-62 to Nanakuli Ave, MP 6.89 to MP 5.06

- Request to remove this project as the scope of work will be covered in OS-21-53 Farrington Hwy Widening, Helelua St to Mohihi St
TIP FFYs 2022-2025 Revision 15 Amendment

• OC29 Federal Lands Access Program (FLAP)

  • Request to remove this project due to security concerns expressed by the Navy over the alignment within their Right-of-Way which involved bicycle and pedestrian improvements along Richardson Road to improve access between the Aloha Stadium Rail Station and the Arizona Memorial

  • Instead, the City will include bicycle and pedestrian improvements on the east side (Mauka) of Kamehameha Hwy as part of the Aloha Stadium (Halawa) Rail Station Multimodal Access Improvements project
TIP FFYs 2022-2025 Revision 15 Amendment

Existing Projects
TIP FFYs 2022-2025 Revision 15 Amendment

• OS80 Traffic Signal Modernization Program, Various Locations
  • Request to add ADVCON funds for PE and CON in FFYs 2025-2027
  • Request to add additional CON funds in FFYs 2024-2027 to include the acceleration of multiple phases of implementation
  • Request to add STBG funds for PE1/PE2 in FFYs 2024-2026
  • Estimated total project cost will increase from $9.5M to $81.5M due to the accelerated implementation over 4 years instead of 10+ years
TIP FFYs 2022-2025 Revision 15 Amendment

- OS-21-53 Farrington Highway (RTE 93) Widening (Helelua St to Mohihi St) & Sidewalk (Hakimo Rd to Nanakuli Ave) Improvements

  - Request to adjust ADVCON funds in FFYs 2025-2027 since CON is deferred

  - Request to defer and increase CON funds from FFY 2024 to FFY 2026 as the project will include the additional scope of work in OS-22-62 Farrington Hwy Sidewalk Improvements

  - Estimated total project cost will increase from $34.5M to $51.5M due to the additional sidewalk improvements
TIP FFYs 2022-2025 Revision 15 Amendment

• OC25 Transportation Alternatives Program (MPO)
  • Ala Wai Bridge Project
    • Request to add CON and INSP funds per updated cost estimate
    • Request to defer PE2 due to the City’s Div. of Purchasing delays
  • Rail Station Multimodal Access Improvements - Halawa (Aloha Stadium) Station and Waiawa (Pearl Highlands) Station
    • Request to add and transfer funds to FTA, and add PE2 and INSP phases
  • Estimated total project cost will increase from $51.1M to $66.4M due to the updated cost estimate for the Ala Wai Bridge Project
TIP FFYs 2022-2025 Revision 15 Amendment

• OC13 Bus and Handi-Van Acquisition Program
  
  • FFYs 2022-2023: Request to revise EQP funds
  
  • FFY 2024: Request to remove and replace EQP funds
  
  • FFYs 2024-2027: Request to add Low or No-Emission funds for EQP

• Request to revise the INSP phase to OPER phase per the City’s Dept. of Budget and Fiscal Services request

• Estimated total project cost will increase from $229.2M to $383.3M due to the City anticipating applying for additional FTA grants in FFYs 2024-2027
TIP FFYs 2022-2025 Revision 11 Amendment

New Projects
TIP FFYs 2022-2025 Revision 15 Amendment

• OS-23-65 Farrington Highway (Route 93), Bridge Rehabilitation, Mailiili Stream Bridge
  • Description: Rehabilitate Mailiili Stream Bridge
  • Funding sources: Bridge Formula Program Funds
  • Estimated total project cost: $14.2M
• OS-23-66 Interstate Route H-2, Panakauahi 3-144 and 4-144 Culvert Rehabilitation
  • Description: Rehabilitation of seven 144" culverts under H2
  • Funding sources: Bridge Formula Program Funds
  • Estimated total project cost: $13.0M
TIP FFYs 2022-2025 Revision 15 Amendment

• OS-23-67 Interstate Route H-3, Luluku Culvert Repair, Vicinity of Interstate Route H-3 (MP 8.67) and Likelike Hwy
  • Description: Replacement and upgrade of culvert beneath the H-3 service road in Luluku
  • Funding sources: National Highway Performance Program Funds
  • Estimated total project cost: $6.0M
TIP FFYs 2022-2025 Revision 15 Amendment

• OS-23-68 Kamehameha Highway (Route 80), Bridge Rehabilitation, NF Kaukonahua (Karsten Thot) Bridge
  • Description: Rehabilitate Karsten Thot Bridge
  • Funding sources: Bridge Formula Program Funds
  • Estimated total project cost: $30.9M
**TIP FFYs 2022-2025 Revision 15 Amendment**

- **OS-23-69 Kamehameha Hwy (Route 83), Rehabilitation, Waimea Stream Bridge**
  - Description: Rehabilitation of Waimea Stream Bridge
  - Funding sources: Bridge Formula Program Program Funds
  - Estimated total project cost: $5.6M
TIP FFYs 2022-2025 Revision 15 Amendment

- OS-23-70 Likelike Highway (Rte 63), Tunnel Rehabilitation, Wilson Tunnels
  - Description: Rehabilitation of Wilson Tunnels on Likelike Highway, Route 63
  - Funding sources: National Highway Performance Program Funds
  - Estimated total project cost: $47.3M
Requested Action: Approve TIP FFYs 2022-2025
Revision 15 as presented
V. New Business – Oahu Regional Transportation Plan 2050 Update on Vision, Goals, Objectives, and Review of Recent Plans and Policy Documents
# O‘ahu Regional Transportation Plan

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*Note: The images above represent the timeline and progress of each section of the O‘ahu Regional Transportation Plan from 2023 to 2026.*
Overview – Vision and Goals

**Purpose:** Guide ORTP direction based on established plans and community engagement

**Highlighted Tasks:**
Synthesize vision, goals, objectives
  - Inventory established plans
  - Community engagement

**Immediate Next Step:**
Develop performance measures to gauge progress toward ORTP vision/goals/objectives
Vision and Goals Planning

- **Vision**
  - Informed by community values

- **Goals**
  - Achievable realization of vision

- **Objectives**
  - Specific targets to reach goals

- **Performance Measures**
  - Quantifiable metrics to determine progress
2050 Vision and Goals Inputs

- Literature Review
- OMPO CAC
- ORTP Working Group
- Agency Interviews & Transportation PMs Cohort
- Youth Outreach (e.g. Waiwai Fellowship)
Literature Review Highlights

• Increase transportation safety for disproportionately impacted populations as kūpuna, keiki, and those that walk and bike.
• Increase renewable fuel use and electric vehicles.
• Increase usage, reliability, and efficiency of active and public transportation.
• Focus on transportation equity such as affordability, mobility considerations and transportation access.
• Maintain and preserve transportation systems such as roads, sidewalks, and transit vehicles.
Engagement Highlights

• There was an overwhelming concern for improving the safety of the transportation system especially for pedestrians, bicyclists, and vulnerable populations.

• Participants were very supportive of improving the connectivity of active and public transportation.

• Discussion regarding improving transportation resiliency specifically related to population growth and sea level rise.

• Affordability for travelers as well as financial feasibility of the system
Conclusions - reflect the social, cultural, economic, and environmental shifts made in our community…

- Put **people** at the heart of the Plan goals
- Take a more assertive stance on **safety**
- Elevate **resiliency** of the system
- Reflect our kuleana and commitments made to the **environment**
2045 Vision Statement

In 2045, O‘ahu’s path forward is multimodal and safe. All people on O‘ahu can reach their destinations through a variety of transportation choices, which are reliable, equitable, healthy, environmentally sustainable, and resilient in the face of climate change.
2050 Vision

In 2050, O‘ahu’s transportation network serves the economic, social, and cultural lives of all people who live and visit the island with safe, reliable, and affordable multi-modal travel choices. The network is equitably maintained and operated, resilient to the effects of climate change, and upholds our community’s commitments to culture and the environment.
Safety – assertive stance

2045 ORTP
Goal 1: Improve the safety of the transportation system.

2050 ORTP
Goal 1: Increase transportation safety for all people.

Or

Goal 1: Reduce serious injuries and traffic deaths to zero.
Multimodal, with focus on increasing travelers

**2045 ORTP**
Goal 2: Support active and public transportation.

**2050 ORTP**
Goal 2: Enhance the transportation network to increase active and public transportation.
Equity – non-negotiable statement

2045 ORTP
Goal 3: Promote an equitable transportation system.

2050 ORTP
Goal 3: Provide an equitable and affordable transportation system.
Resiliency – greater acknowledgement of change upon us

2045 ORTP
Goal 4: Improve the resiliency of the transportation system.

2050 ORTP
Goal 4: Adapt Oʻahu’s transportation network to be resilient to the effects of climate change
Maintenance and Preservation – emphasize responsibility to system preservation

2045 ORTP

Goal 5: Preserve and maintain the transportation system.

2050 ORTP

Goal 5: Invest in maintenance to preserve transportation facilities.
Reliability & Efficiency – stronger aspiration

2045 ORTP
Goal 6: Support a reliable and efficient transportation system.

2050 ORTP
Goal 6: Provide a reliable and efficient multimodal transportation system.
Environment – support collective commitment

**2045 ORTP**

Goal 7: Improve air quality and protect environmental and cultural assets.

**2050 ORTP**

Goal 7: Achieve state and county commitments to the environment and culture in the development, maintenance, and operation of the transportation system.
Your questions, initial responses?
Next Steps

• Present update to Policy Board (July 25)
• Revisit TAC for endorsement of plan vision and goals (August 11)
• Revisit Policy Board for approval of plan vision and goals (August 29)

• Ongoing
  • Develop additional background information
  • Begin building objectives and performance metrics to measure success
  • Community engagement
We value your time and input.
Mahalo.
VI. Invitation to interested members of the public to be heard on matters not included on the agenda
VII. Announcements
VIII. Adjournment