AI Dash Cam Benchmarking

STRATEGY ANALYTICS
Research, Experts, and Analytics

INTRODUCTION

- AI dash cams help prevent accidents by reducing distracted driving and other risky road behaviors. The cameras are mounted on the windshield and use artificial intelligence to detect unsafe driving behaviors and road conditions. Once detected, the cameras notify drivers with in-cab audio and visual alerts to help drivers modify their behaviors.

- Strategy Analytics undertook an independent evaluation of three leading AI dash cam providers (Motive, Lytx, and Samsara) on behalf of Motive. Strategy Analytics benchmarked performance across the following four criteria, which Motive has identified as essential when considering which AI dash cam to purchase:
  - Accuracy and speed of alerts
  - Image/video quality
  - Alerting style
  - Hardware design

- Strategy Analytics, Inc. is a global leader in supporting companies across their planning lifecycle through a range of syndicated and customized consumer and market research solutions. Strategy Analytics' multi-discipline capabilities include industry research advisory services, consumer insights, user experience design and innovation expertise, mobile consumer on-device tracking and business-to-business consulting competencies. Strategy Analytics has domain expertise in smart devices, connected cars, intelligent home, service providers, IoT, strategic components and media.

- This report covers the following:
  - AI Performance Evaluation and Methodology
  - Image and Hardware Quality Comparison and Methodology

TABLE OF CONTENTS

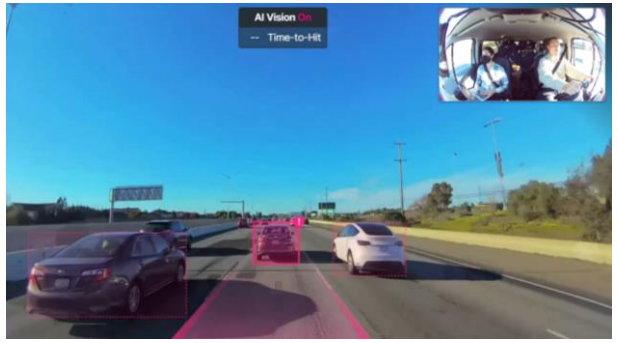
AI Performance Benchmarking

INTRODUCTION

- Strategy Analytics conducted a technical performance benchmark of AI dash cams from January 31 – February 2, 2022
- The following three AI dash cams were evaluated simultaneously:
  - Motive DC-54
  - Lytx Drive Cam SF300
  - Samsara HW-CM32
- All three dash cams were newly purchased
- The position of the dash cams was rotated each day
  - At the start of each day, each dash cam was calibrated before any tasks were performed
- Each dash cam was evaluated for the following unsafe behaviors. Behaviors were chosen because they were deemed most risky:
  - Making a phone call
  - Sending a text message
  - Using a cell phone on lap
  - Close following
  - Not wearing a seat belt

METHODOLOGY

- Over the course of three days Strategy Analytics spent approximately 10 hours driving on public roads in California to gather data
- All tasks were undertaken using out of box settings
  - Some tasks had to be enabled using the dash cam dashboard
- Tasks were undertaken during the following conditions:
  - Daytime (10 attempts per task)
  - Dusk (3 attempts per task)
  - Nighttime (10 attempts per task)
- For each task, Strategy Analytics measured the following two metrics:
  - Success rate: whether the dash cam detected the event occurring
  - Time: if successful, the amount of time it took the dash cam to alert the driver
  - Note: each attempt was marked as a failure if the dash cam had not notified the driver after 30 seconds



SUMMARY RESULTS

The chart below shows the alert success rate and average time for alerts to trigger:

	# of Tests	Motive	Lytx	Samsara
Overall	**342**	**89% (9.5 sec)**	**61% (14.6 sec)**	**15% (20.4 sec)**
Texting	69	100% (7.1 sec)	100% (12.8 sec)	14% (12.6 sec)
Phone call	69	94% (11.0 sec)	54% (14.0 sec)	0% (n/a)
Phone in lap	69	78% (10.5 sec)	42% (18.0 sec)	16% (13.8 sec)
Close following	69	72% (11.8 sec)	42% (7.2 sec)	42% (26.0 sec)
Seat belt use	66	98% (8.2 sec)	68% (20.2 sec)	5% (15.9 sec)

SUPPORTED CLAIMS

- Based on this research, Strategy Analytics supports the following claims for Motive:

The Motive AI Dashcam successfully detected unsafe driving behavior 89% of the time, higher than Lytx (61%) and Samsara (15%).

and

"Best performing AI dash cam"

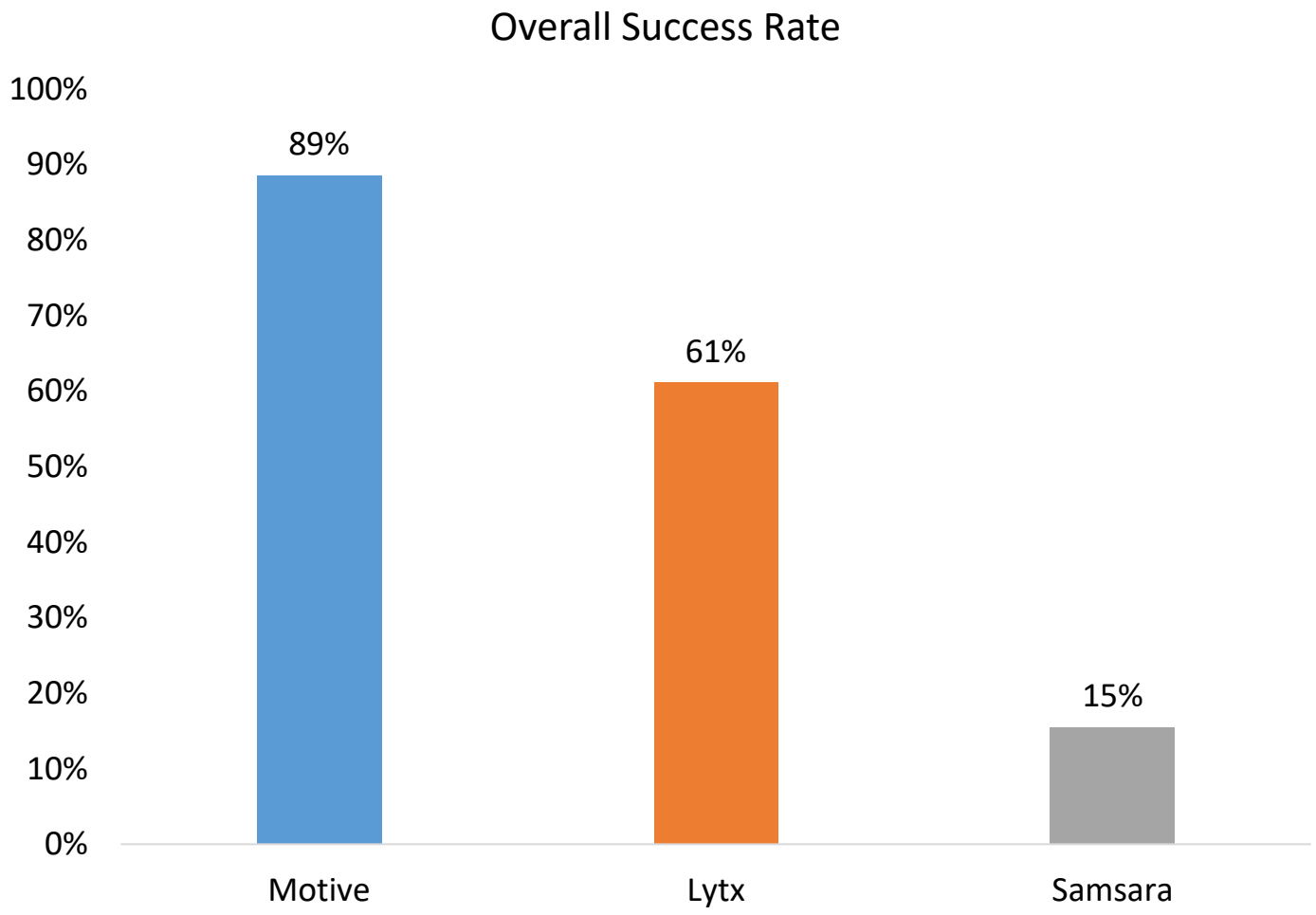
and

"Most accurate AI dash cam"

and

"Fastest AI dash cam"

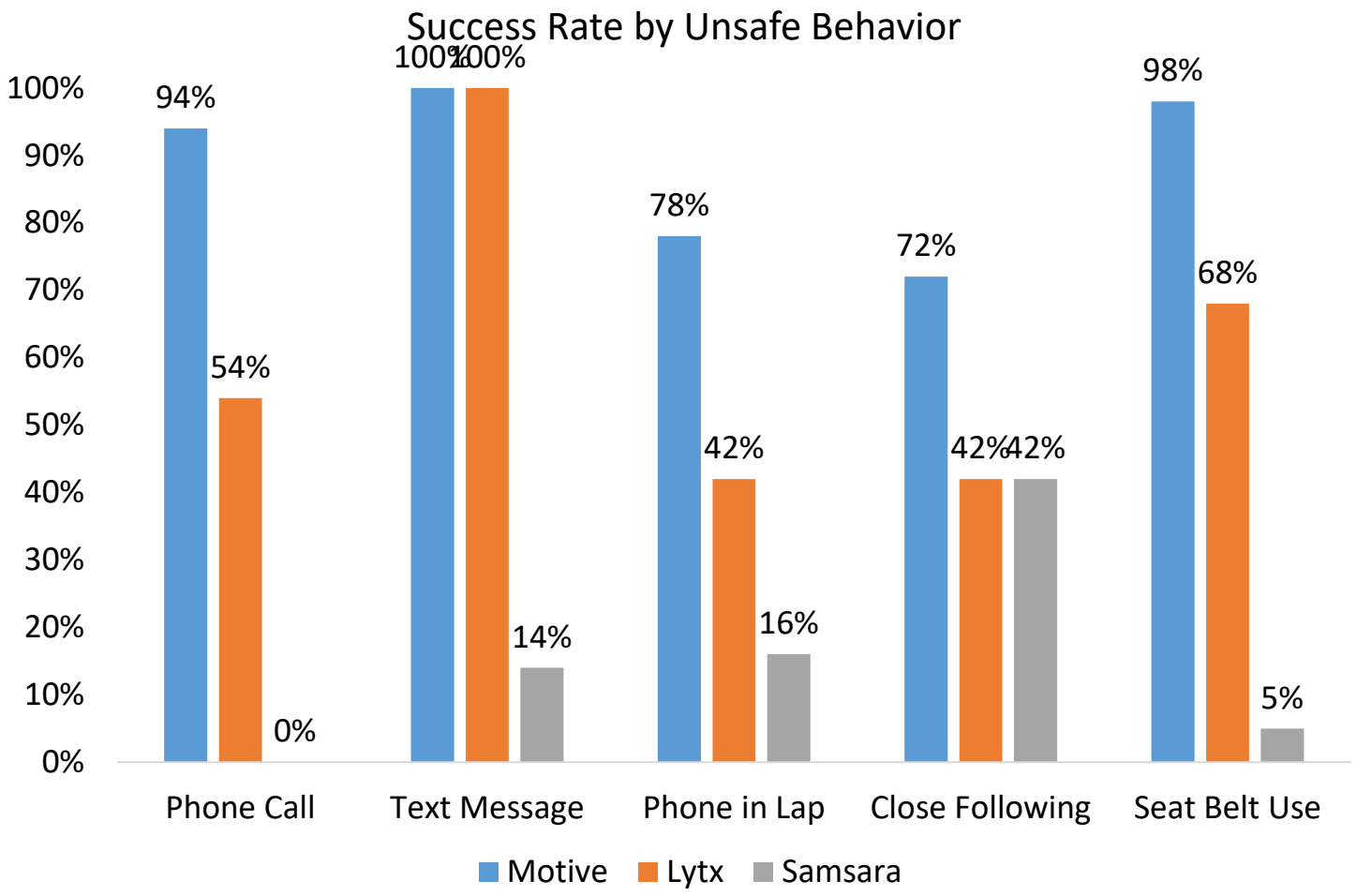
OVERALL SUCCESS RATE



- Motive achieved a considerably higher success rate than both Lytx and Samsara across all tasks combined
  - Motive successfully detected 303/342 actions – an 89% success rate
  - Lytx successfully detected 209/342 actions – a 61% success rate
  - Samsara successfully detected 53/342 actions – a 15% success rate

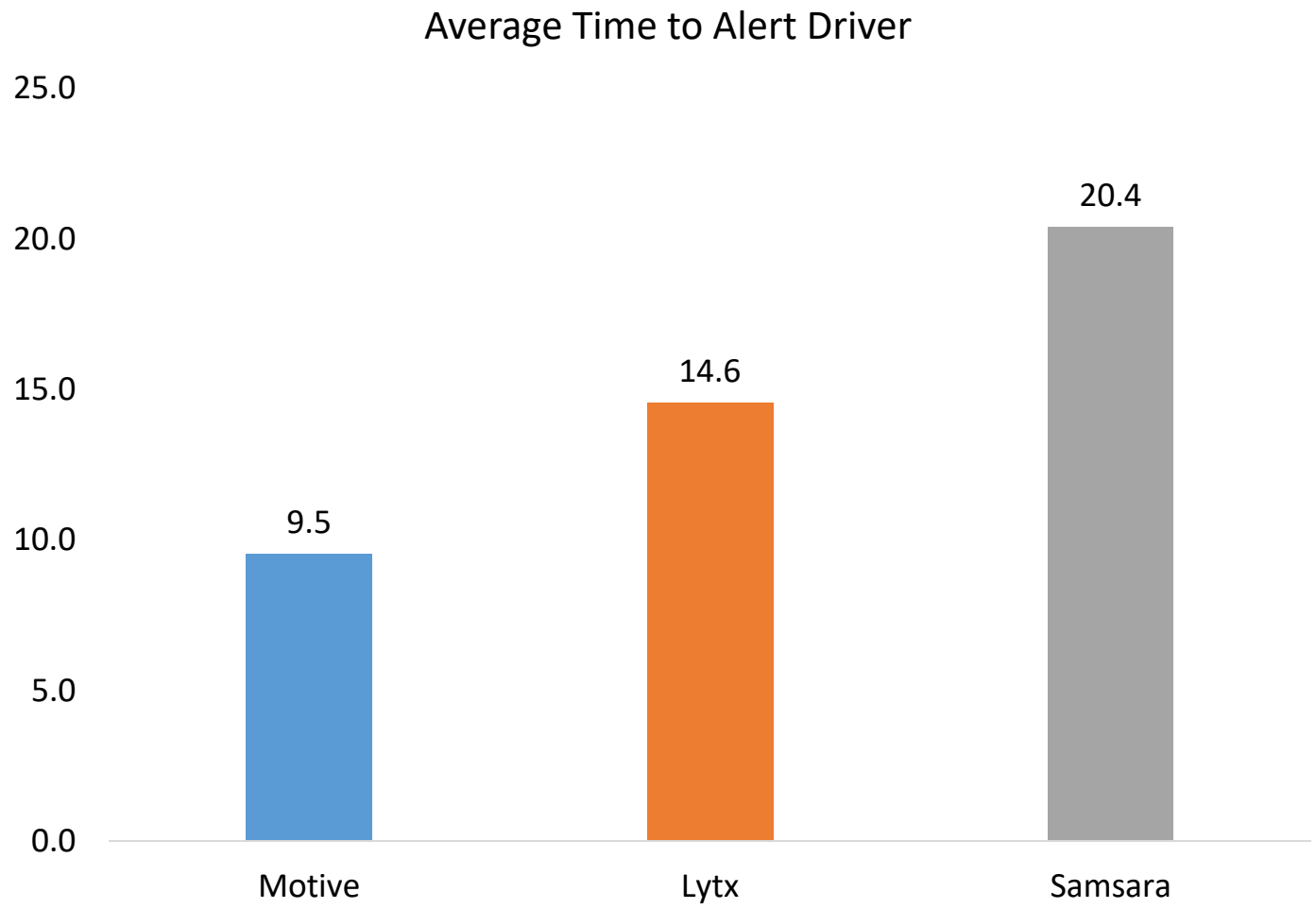
Overall success rate across all tasks combined

SUCCESS RATE BY UNSAFE BEHAVIOR



- Motive had high success rates across all tasks
- Motive had a higher success rate than both Lytx and Samsara for 4/5 tasks:
  - Phone call – 94%
  - Phone in lap – 78%
  - Close following – 72%
  - Seat belt use – 98%
- Motive and Lytx both achieved a 100% success rate for detecting text messaging

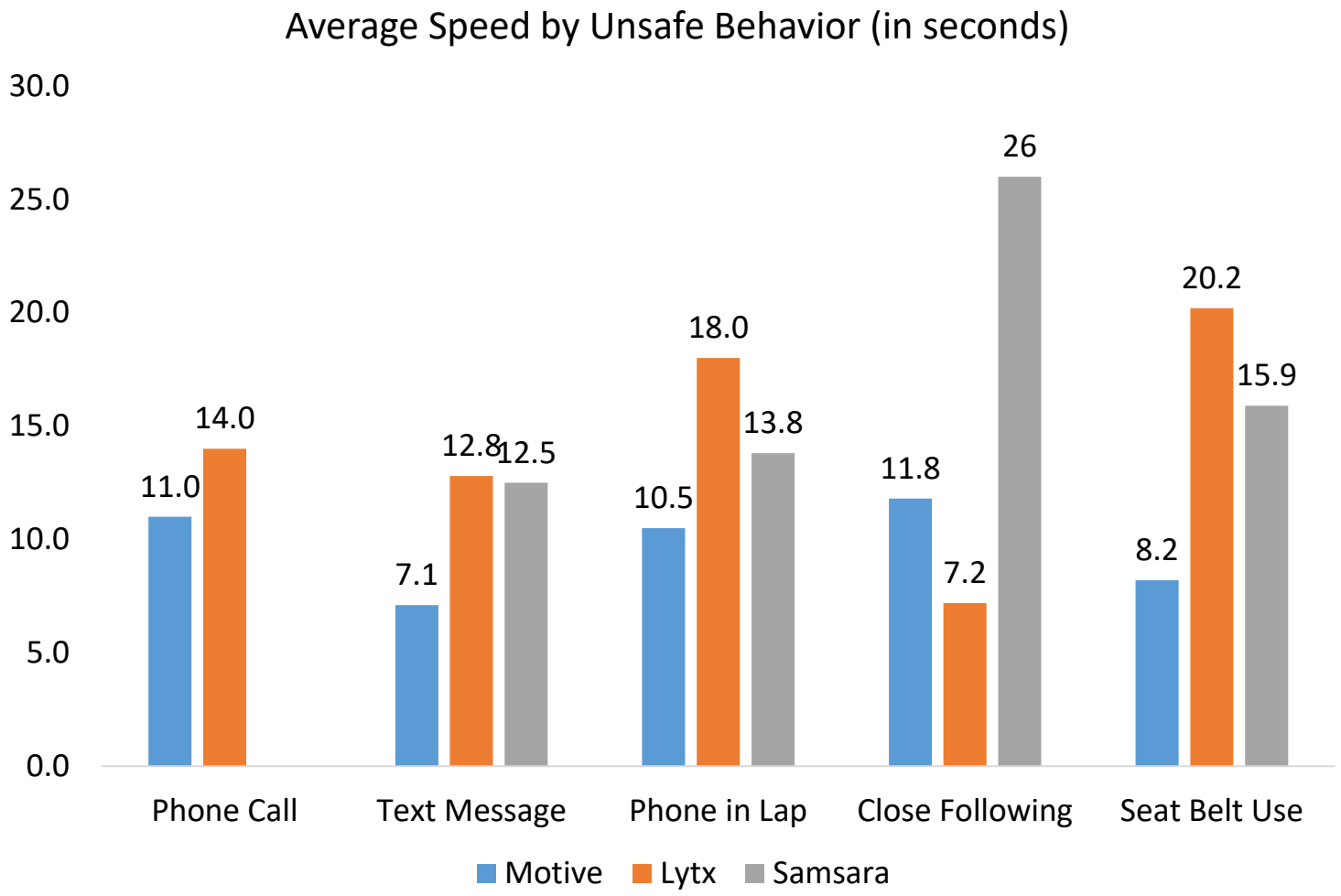
OVERALL SPEED



- Motive alerted the driver faster than Lytx and Samsara on average across all successful tasks
  - Motive took an average of 9.5 seconds to provide an alert
  - Lytx took an average of 14.6 seconds to provide an alert
  - Samsara took an average of 20.4 seconds to provide an alert

Average time to alert driver across all successful tasks combined

AVERAGE SPEED BY UNSAFE BEHAVIOR



- Motive was fastest to alert the driver across 4/5 tasks:
  - Phone call – 11.0 seconds
  - Text message – 7.1 seconds
  - Phone in lap – 10.5 seconds
  - Seat belt use – 8.2 seconds
- Lytx was fastest to alert for close following – an average of 7.2 seconds
  - Motive had an average time of 11.8 seconds for close following

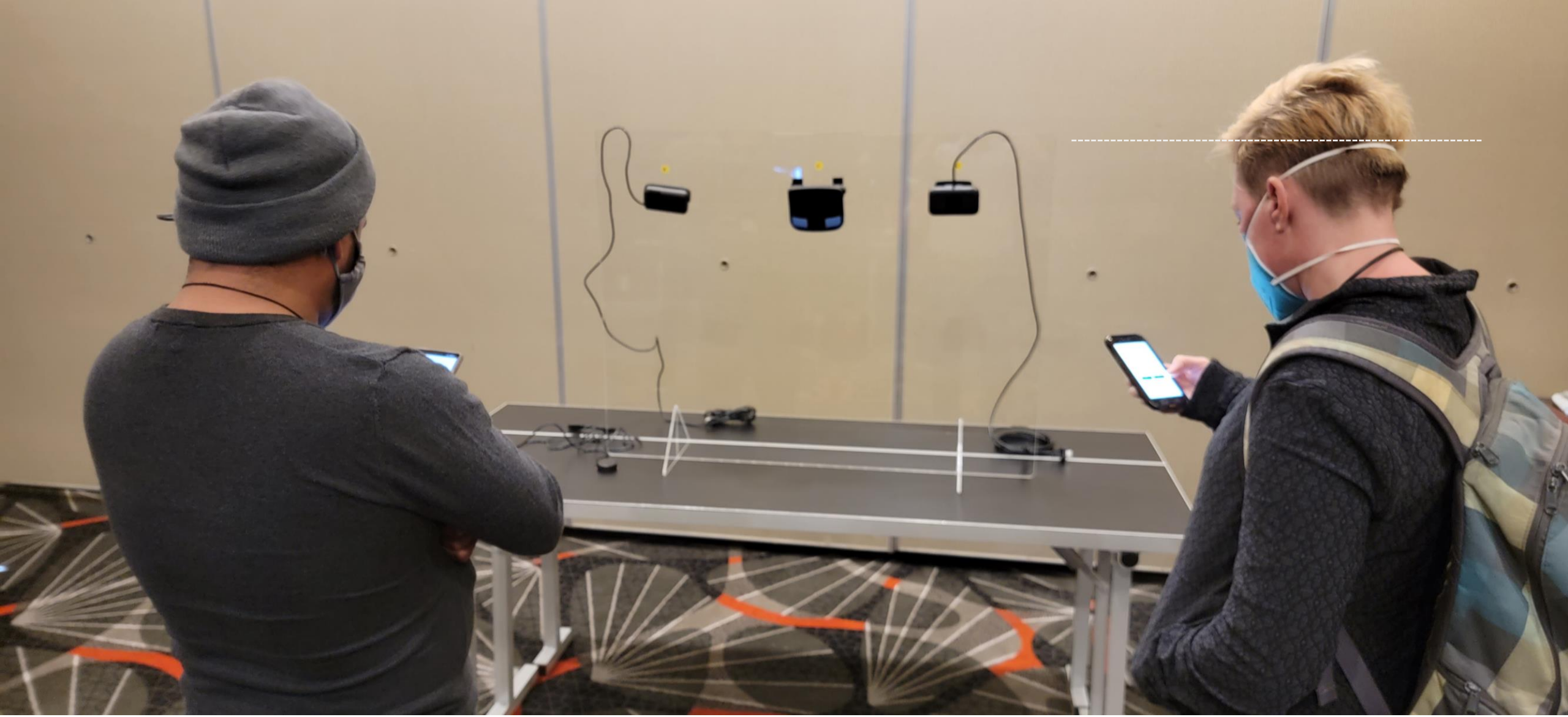


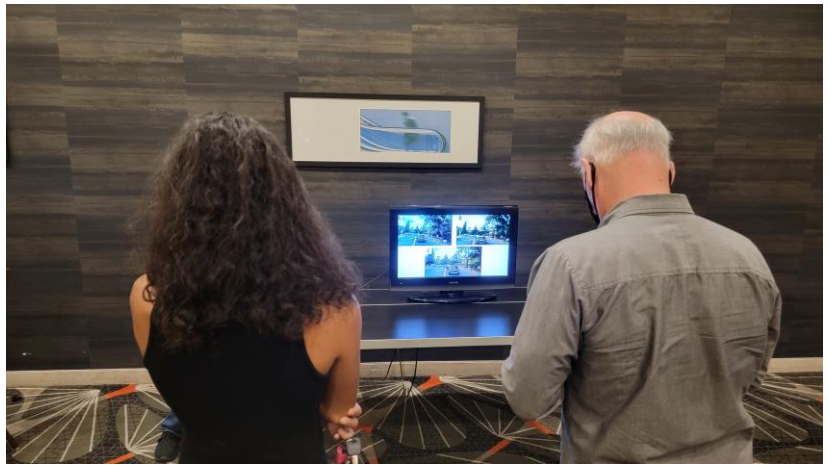
Image and Hardware Quality Comparison

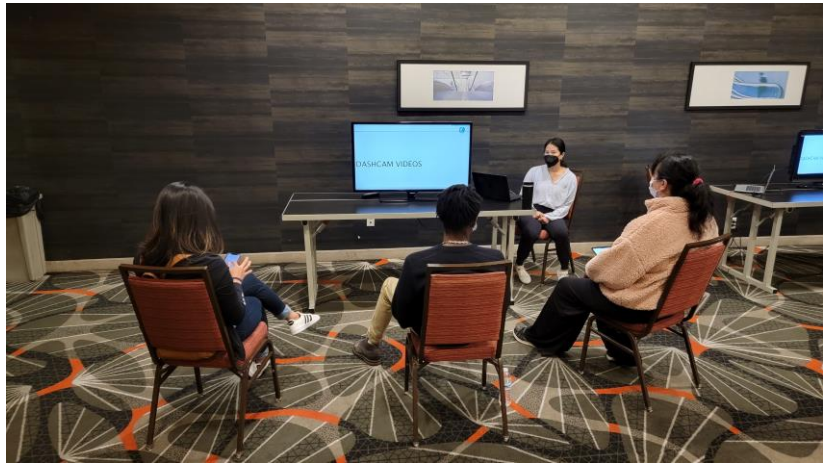
INTRODUCTION

- Strategy Analytics conducted a ‘blind’ user performance benchmark of AI dash cams

- The following three AI dash cams were evaluated by 202 drivers:
  - Motive DC-54
  - Lytx Drive Cam SF300
  - Samsara HW-CM32

- The goal of this study was to benchmark user preference for the following aspects of AI dash cams:
  - Video quality
  - Image quality
  - Field of view
  - Alerts
  - Hardware





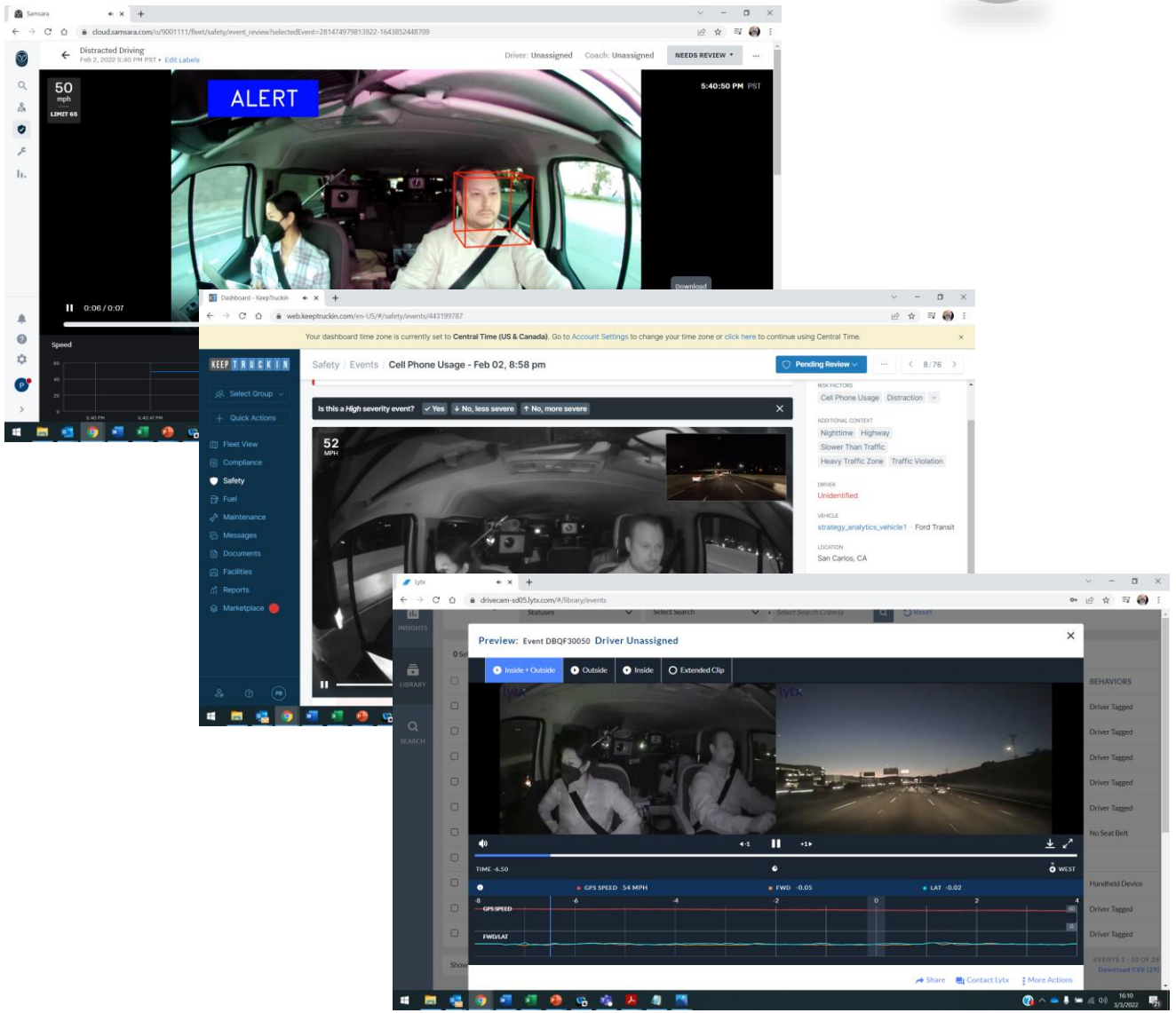
METHODOLOGY (1)

- Strategy Analytics selected video and images that were captured by the AI dash cams as part of the technical performance benchmarking
- Strategy Analytics also recorded the different types of alerts made by each device
- Over a period of four days (February 15-18, 2022), 202 consumers, all drivers, assessed the quality of the videos, images, alerts and hardware produced by each of the three AI dash cams
  - To eliminate bias, any branding relating to the devices was covered or removed and everything was only identified by letter (A, B, C)
  - The order of exposure was randomized
- Participants went through four stations to provide assessments of different scenarios in the following order:

Station One: Videos	Station Two: Images	Station Three: Alerts	Station Four: Hardware
• Outside camera: daytime • Outside camera: dusk • Outside camera: nighttime • Inside camera: daytime • Inside camera: dusk • Inside camera: nighttime • Outside camera: field of view • Inside camera: field of view	• Outside camera: daytime • Outside camera: dusk • Outside camera: nighttime • Inside camera: daytime • Inside camera: dusk • Inside camera: nighttime	• Distracted driving alert • Close following alert • Seat belt use alert	• Style & design • Quick capture button

METHODOLOGY (2)

- Where available, each video and image used was selected from the same scenario
- Due to what each dash cam captured/didn't capture during the technical performance benchmarking, this wasn't always possible, and so videos and images were selected that Strategy Analytics felt best represented each type of scenario
- For each video shown, the video was downloaded directly from each dash cam's online dashboard. Videos were not altered in any way. The length of each video shown was dependent on the length of video provided by each online dashboard.
- Images were obtained by taking a screenshot from the video
- Alerts were captured by filming the dash cams during the technical performance benchmarking
- Hardware was assessed by placing the dash cams on a clear plastic screen to simulate a windshield



METHODOLOGY (3)

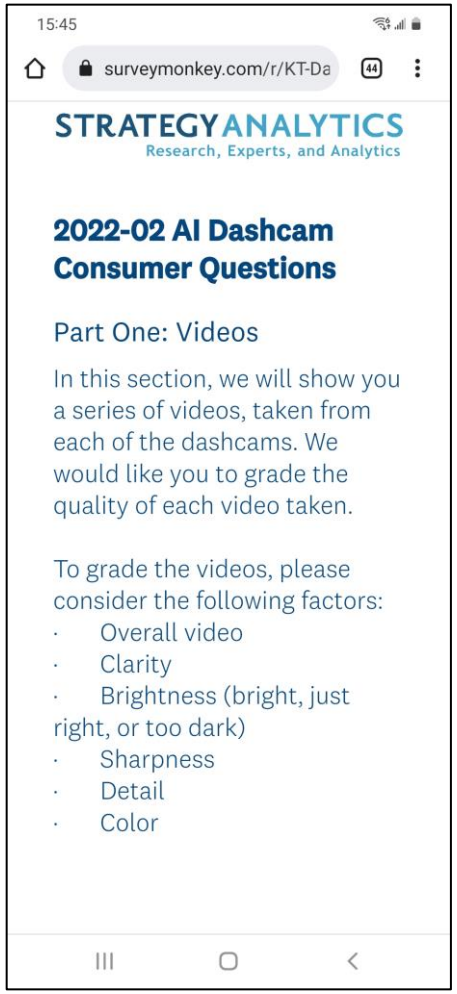
- All participants recruited drive a vehicle on a regular basis
  - Male 43% / Female 57%
  - 18-24: 9%
  - 25-34: 25%
  - 35-44: 26%
  - 45-54: 16%
  - 55+: 24%

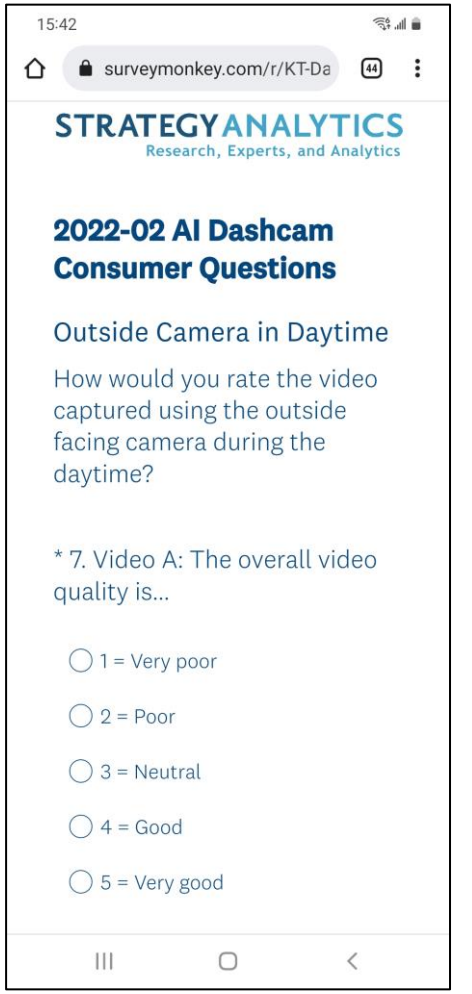
- Moderators guided participants through each station
- Participants completed forms on their phone via an online survey hosted by Survey Monkey
- Participants took around 30 minutes to complete the full set of evaluations

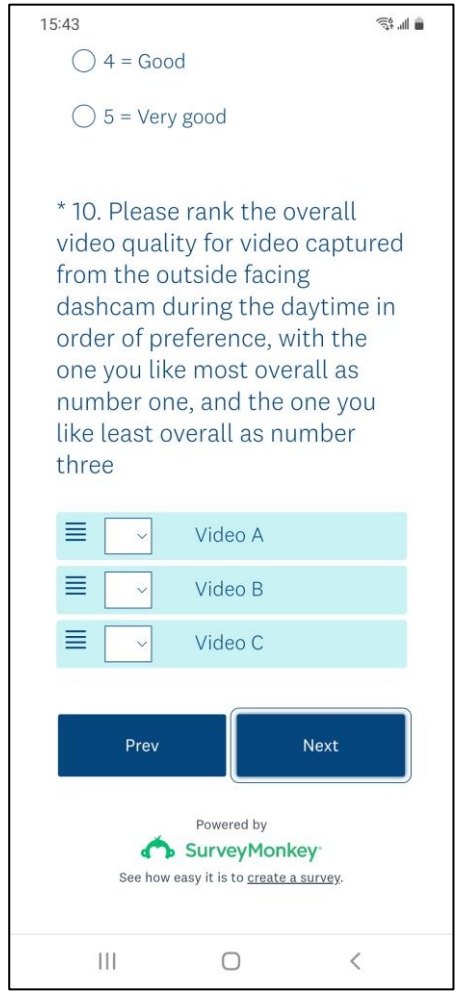
METHODOLOGY (4)

- Participants were shown each video, image and alert separately and asked to rate them on a 5-point Likert scale, where 1=Very Poor and 5=Very good
- Participants rated each video and image based on **overall quality**
- Alerts were rated for the **visual notification** and **audible notification**
- Hardware was rated for **style & design** (1=Hate the style/design to 5=Love the style/design) and **overall size** (1=Too small, 3=Just right, 5=Too large)
- The quick capture button was rated for it being **easy to use** and liking the **placement/position** on a scale of 1=Strongly disagree to 5=Strongly agree

- After rating each set of videos, pictures, alerts and hardware, participants were asked to rank them in order of preference







SUPPORTED CLAIMS

- Based on this research, Strategy Analytics supports the following claims for Motive:

"AI dash cam that captures the best videos and images"

and

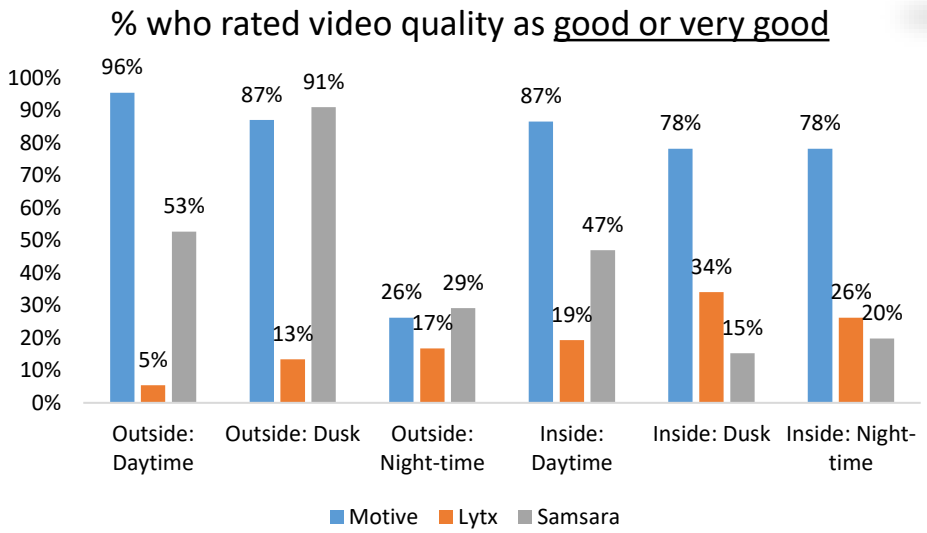
"Most preferred AI dash cam for style and design"

and

"Most preferred AI dash cam for driver alerts"

VIDEO QUALITY

- 5/6 Motive videos were rated as good or very good by at least 75% of participants
  - The only video Motive did not rate highly for was outside nighttime



- Majority of participants rated Motive videos as most preferred for 4/6 scenarios:
  - Outside daytime – 80%
  - Inside daytime – 76%
  - Inside dusk – 75%
  - Inside nighttime – 74%
- Motive was also most preferred for outside nighttime by 42% of participants

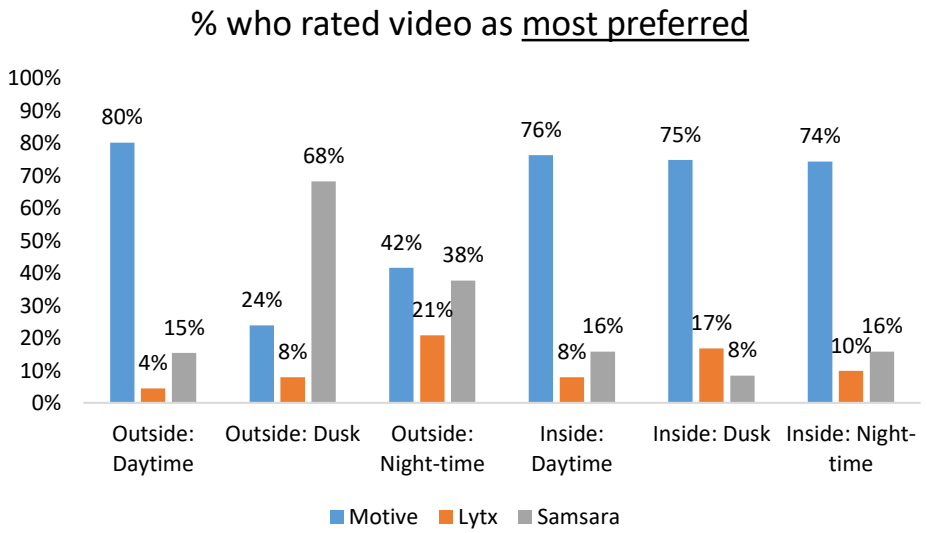
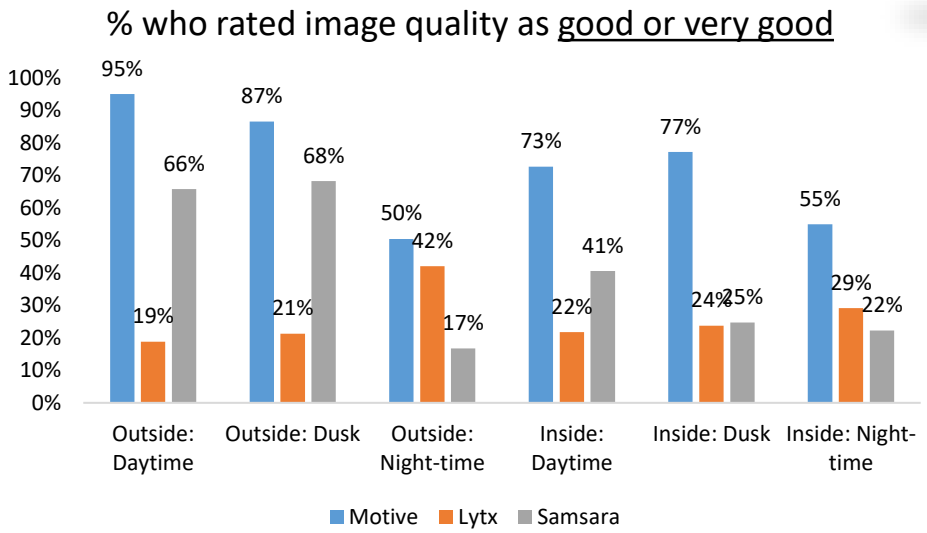
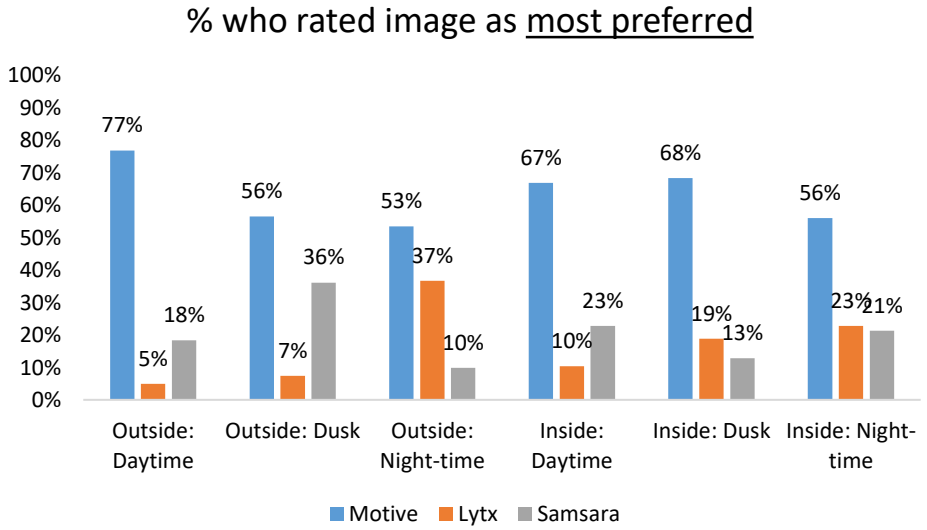


IMAGE QUALITY

- 6/6 Motive images were rated as good or very good by at least 50% of participants
  - More participants rated each Motive image as good or very good than the image from the other dash cams assessed

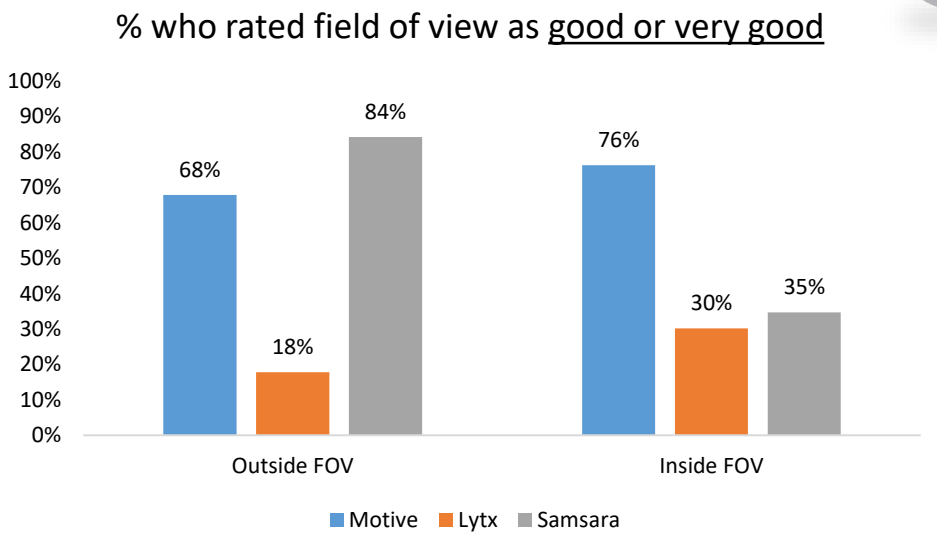


- Majority of participants rated Motive images as most preferred for 6/6 scenarios:
  - Outside daytime – 77%
  - Outside dusk – 56%
  - Outside nighttime – 53%
  - Inside daytime – 67%
  - Inside dusk – 68%
  - Inside nighttime – 56%

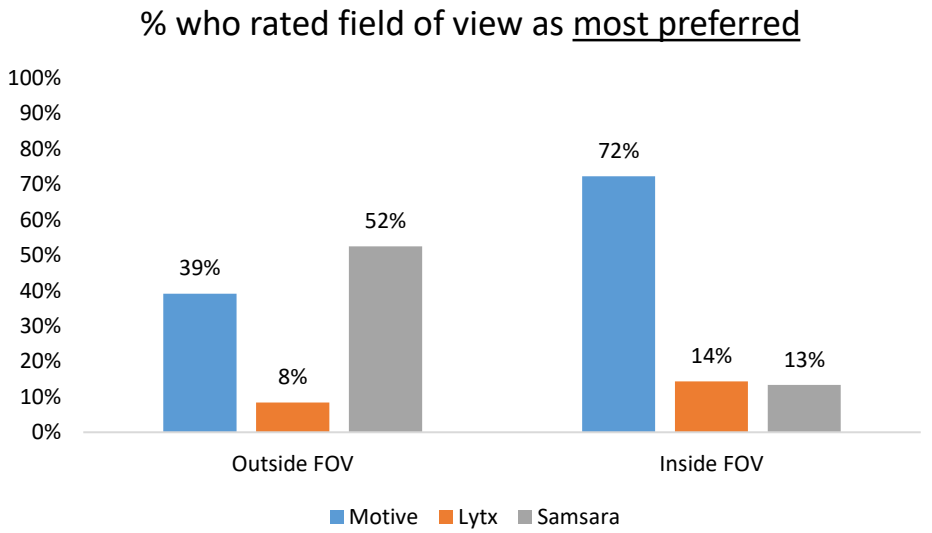


FIELD OF VIEW

- 76% of participants rated Motive field of view for inside camera as good or very good – considerably higher than other cameras
  - 68% of participants rated Motive field of view for outside camera as good or very good – less than Samsara (84%) but higher than Lytx (18%)

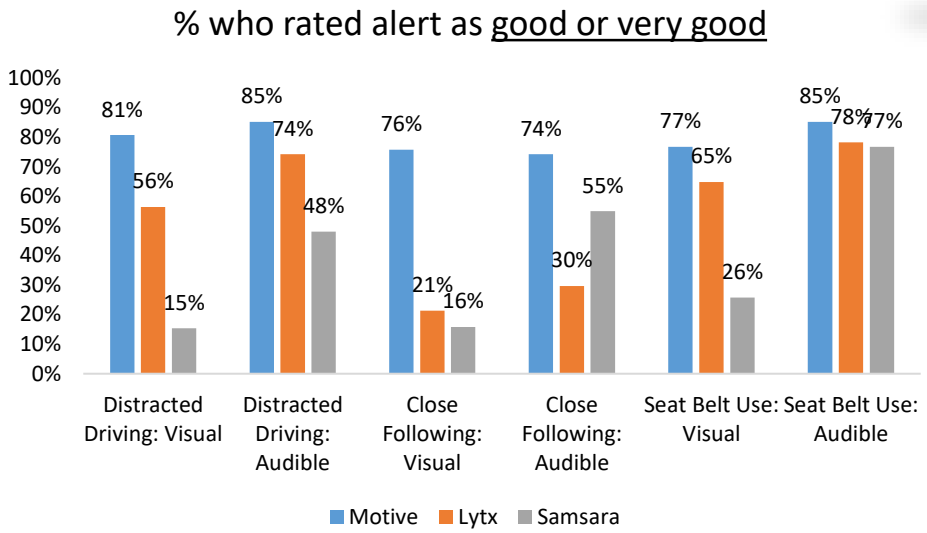


- 72% of participants rated Motive field of view for inside camera as most preferred
  - Samsara was rated as most preferred for outside camera field of view (52%), with Motive coming in second

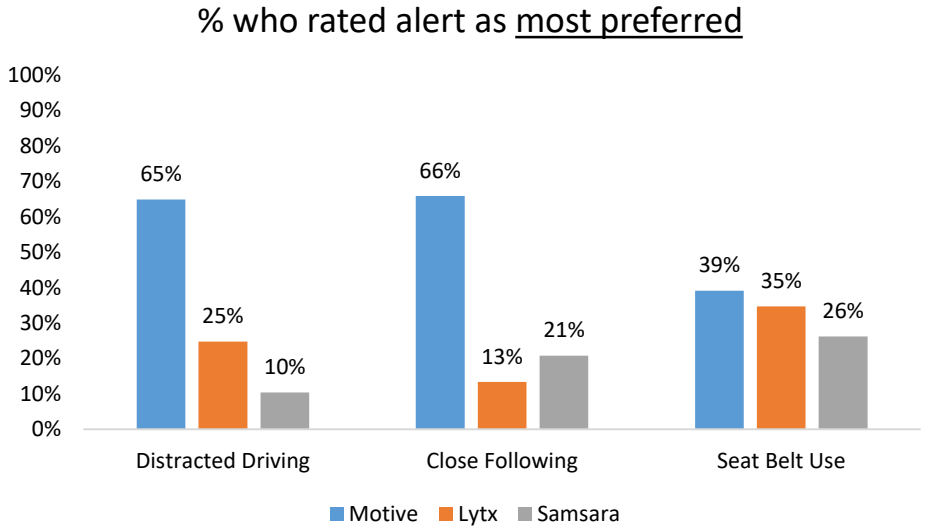


ALERTS

- All Motive alerts – both visual and audible – were rated as good or very good by at least 74% of participants
  - More participants rated each Motive alert as good or very good than any alert from competitive dash cams

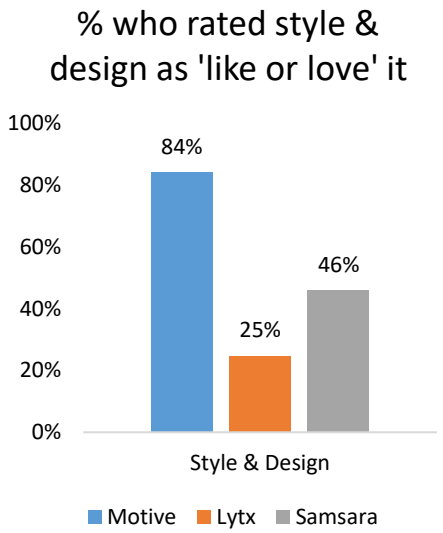


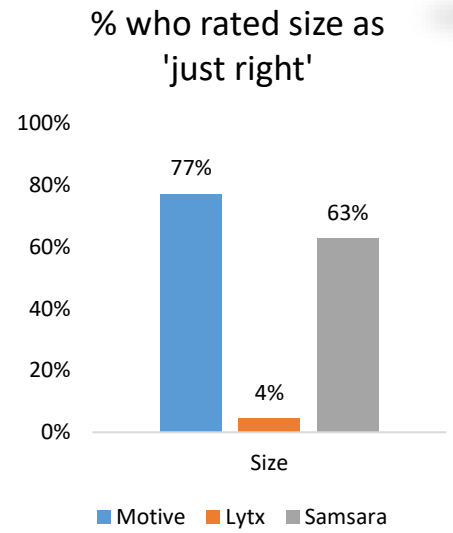
- Majority of participants rated Motive alerts for distracted driving (65%) and close following (66%) as most preferred
  - Motive was also most preferred for the seat belt use alert (39%), but only marginally ahead of Lytx (35%)



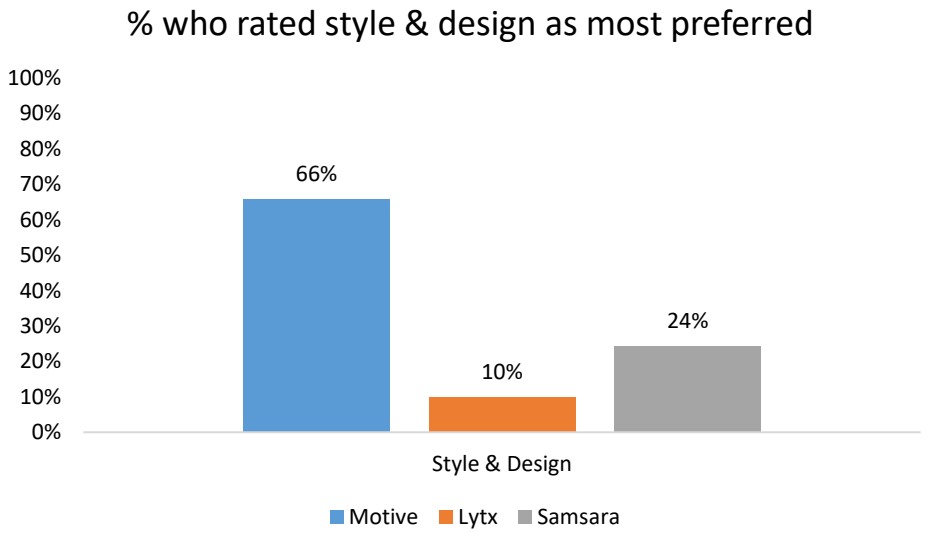
HARDWARE

- 84% of participants either ‘liked or loved’ the style & design of the Motive dash cam – considerably higher than competitive dash cams
- 77% rated the size of the Motive dash cam as ‘just right’



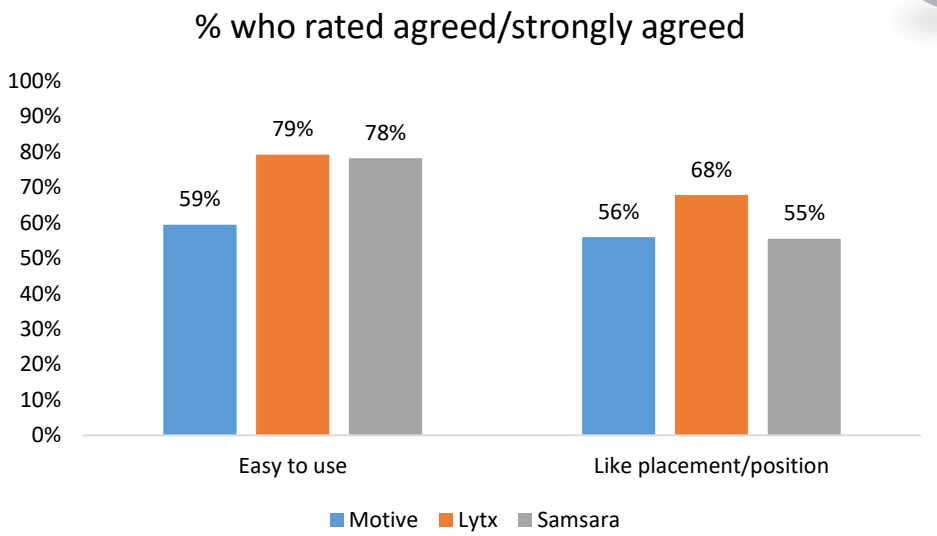


- 66% of participants rated the Motive dash cam as most preferred for style & design

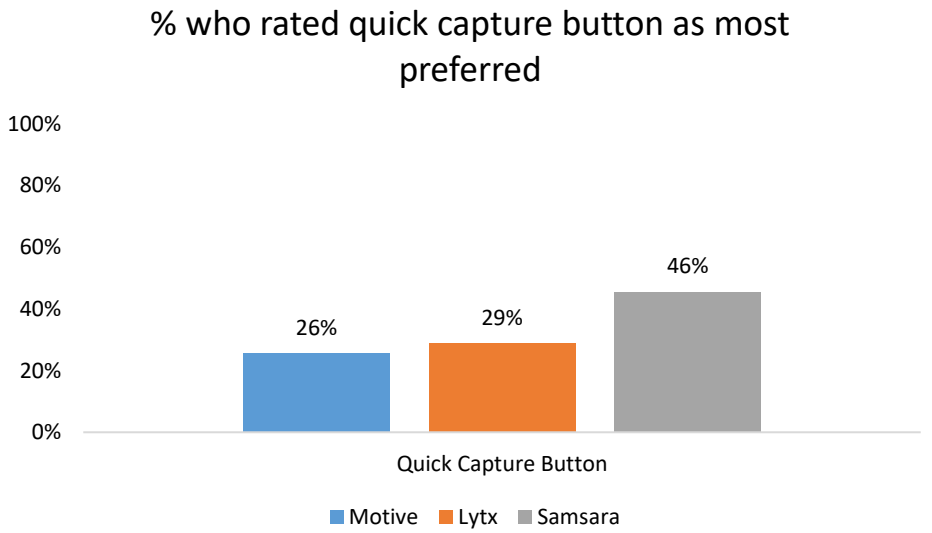


QUICK CAPTURE BUTTON

- 59% of participants agreed or strongly agreed that the Motive quick capture button was easy to use – lower than both Lytx and Samsara
- 56% agreed or strongly agreed that they like the position/placement of the Motive quick capture button – lower than Lytx (68%)



- 26% of participants rated the Motive quick capture button as most preferred – the lowest of the three dash cams evaluated
  - Samsara was rated as most preferred for the quick capture button by 46% of participants



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Publication Date: April 15, 2022