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DISRUPTER SERIES: DELIVERING TO CONSUMERS

TUESDAY, MAY 23, 2017

House of Representatives

Subcommittee on Digital Commerce and Consumer Protection

Committee on Energy and Commerce

Washington, D.C.

The subcommittee met, pursuant to call, at 10:15 a.m., in Room 2322 Rayburn House Office Building, Hon. Robert Latta [chairman of the subcommittee] presiding.

Members present: Representatives Latta, Harper, Lance, Guthrie, McKinley, Kinzinger, Bilirakis, Bucshon, Mullin, Walters, Costello, Schakowsky, Cardenas, Dingell, Matsui, Welch, Kennedy, Green, and Pallone (ex officio).

Staff present: Mike Bloomquist, Deputy Staff Director; Blair Ellis, Digital Coordinator/Press Secretary; Melissa Froelich, Counsel, Digital Commerce and Consumer Protection; Adam Fromm,

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25 Director of Outreach and Coalitions; Giulia Giannangeli,
26 Legislative Clerk, Digital Commerce and Consumer
27 Protection/Communications and Technology; Bijan Koohmaraie,
28 Counsel, Digital Commerce and Consumer Protection; Paul Nagle,
29 Chief Counsel, Digital Commerce and Consumer Protection; Madeline
30 Vey, Policy Coordinator, Digital Commerce and Consumer
31 Protection; Everett Winnick, Director of Information Technology;
32 Michelle Ash, Minority Chief Counsel, Digital Commerce and
33 Consumer Protection; Jeff Carroll, Minority Staff Director; Lisa
34 Goldman, Minority Counsel; Caroline Paris-Behr, Minority Policy
35 Analyst; and Matt Schumacher, Minority Press Assistant.

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36 Mr. Latta. Well, good morning. I would like to call the
37 Subcommittee on Digital Commerce and Consumer Protection to
38 order, and the chair now recognizes himself for 5 minutes for an
39 opening statement.

40 Good morning, and welcome again to the Digital Commerce and
41 Consumer Protection Subcommittee hearing. Today's hearing is a
42 continuation of our Disrupter Series in which our subcommittee
43 explores emerging technology and all the ways innovation is
44 reshaping industries. The focus of our hearing this morning is
45 product and package delivery, and I am excited to learn about the
46 new, innovative ways businesses are interacting with consumers
47 and how technology is being leveraged to deliver goods quickly
48 and safely to consumers.

49 The U.S. e-commerce market is projected to reach \$500 billion
50 by 2018 and is expected to see substantial growth by 2020. When
51 we think of e-commerce rarely do we consider its physical
52 footprint, the process of actually fulfilling the online order,
53 and facilitating its delivery. However, my home state of Ohio
54 has become somewhat of an e-commerce hub. Ohio offers favorable
55 geographic location, a workable transportation network, a
56 business-friendly regulatory framework, and skilled laborers.
57 Because of these key items, Ohio is home to roughly 760 warehouse
58 establishments including many e-commerce fulfillment operations.

59 In today's digital, on-demand economy, consumers have come

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60 to expect flexibility and quick delivery. In fact, a 2016 survey
61 indicates that same-day delivery is a priority for consumers and
62 that consumers want to have options for where their deliveries
63 go, whether that be through their office or some other
64 personalized pickup point. Technologies such as drones and other
65 automated couriers offer innovative approaches to meeting these
66 demands. For example, drones allow fast and efficient delivery
67 because they have the ability to traverse difficult terrain, fly
68 over bodies of water, and avoid the natural traffic congestion
69 that slows traditional delivery.

70 I look forward to hearing more about the use of drones and
71 other automated delivery systems from our witnesses today and how
72 such technological advancements are being used to meet consumer
73 demands and what the safety issues are. I also look forward to
74 exploring how we as policymakers can promote innovation and
75 address any regulatory barriers.

76 Again I want to thank our witnesses for being with us today
77 as we have this discussion today. And I have a couple minutes
78 left and I recognize the vice chairman from Mississippi.

79 [The statement of Mr. Latta follows:]

80
81 *****COMMITTEE INSERT 1*****

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Mr. Harper. Thank you, Mr. Chairman, for calling today's hearing, the latest in the subcommittee's Disrupter Series, to examine the development and implementation of innovative delivery services for businesses and consumers. One aspect we will focus on is the potential commercial application of product delivery systems via unmanned aerial aircraft systems, also referred to as UAS or drones, and how to ensure the safe integration of these services into the national airspace system.

In May of 2015, Mississippi State University, which is in my congressional district, and the Alliance for Systems Safety of Unmanned Aircraft Systems through Research Excellence, or ASSURE for short, was selected by the Federal Aviation Administration to be the lead for the National Center of Excellence for Unmanned Aircraft Systems.

Mississippi State University's ASSURE is a consortium of academic institutions along with government and industry partners tasked with identifying and researching issues critical to the safe integration of UAS into the national airspace system, and developing policy recommendations on the expanding use of unmanned aircraft.

Although only 2 years old, ASSURE's UAS research is already influencing the FAA's thoughts regarding small UAS flight operation over people and property. Additionally, ASSURE is engaged in an aggressive research program to support beyond visual

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106 line of sight operations. Safety concerns regarding flights over
107 populated areas and beyond visual line of sight must be resolved
108 before safe and routine UAS delivery services are part of our daily
109 lives. And a successful business case can be made after that for
110 continued investment in this innovative idea.

111 The ASSURE UAS air to ground collision study released in
112 April is challenging previous perceptions regarding human injury
113 in the event of a small UAS impact. This project will be
114 continuing as a second phase starting in June, testing numerous
115 types of UAS and increasing the human impact component of the
116 research. I think it is crucial that we continue that.

117 I am pleased to have this hearing and look forward to hearing
118 what the witnesses have to say, and with that I yield back.

119 [The statement of Mr. Harper follows:]

120

121 *****COMMITTEE INSERT 2*****

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122 Mr. Latta. Thank you very much. The gentleman yields back.
123 I yield back the balance of my time, and the chair now recognizes
124 for her opening statement the gentlelady from Illinois, the
125 ranking member of the subcommittee.

126 Ms. Schakowsky. Thank you, Mr. Chairman. Many consumers
127 today like to have their purchases delivered directly to their
128 homes. The rise in online shopping and mobile purchases has meant
129 more business for the post office delivery workers, couriers,
130 truckers, and anyone else involved in moving goods from the
131 warehouse to the doorstep.

132 Given the rise in home delivery, it is no surprise that
133 companies are involved in this space. Today we will hear about
134 a few of those innovations, specifically drones and delivery
135 robots. I have no shortage of basic questions about the
136 technologies.

137 How does the delivery robot know when to cross the street?
138 How worried should I be about these things running into me? One
139 of my staffers saw this cooler-looking object with a flag on it
140 next to him, and it startled him, on the sidewalk. And
141 researchers and firms will continue to work through technological
142 challenges as they work to improve automation. Meanwhile,
143 Congress needs to work through the policy changes that
144 technologies like this represent.

145 This is yet another hearing in our Disrupter Series, and

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disruption can be good or bad depending on how you like the current system and what it is being replaced with. In past hearings we have weighed concerns about safety, privacy, and other protections. One topic that I don't think we hit on enough is the impact on our workforce.

It is a simple reality disruptive technologies like automation will disrupt some American livelihoods. How would we adjust if in a few years we no longer need delivery workers? This is not a hypothetical question. Today there are many workers without college degrees who used to have good jobs with decent income but now struggle with long periods of unemployment and lower earning potential. The American economy as a whole might be growing, but Americans in certain sectors feel like they are falling further and further behind.

How do we address this? Clearly, blocking the adoption of new technology cannot be a long-term strategy or solution. We need to look carefully at our education system. Are today's students acquiring skills that will be still useful as automation progresses? For Americans currently in the workforce, how do we assist worker when their existing skills fit fewer and fewer available jobs?

We need a robust system of assistance and job training to ensure that Americans can maintain a decent standard of living. We must also ensure that protections keep up with new technology.

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170 Old safeguards don't go out the window when a new technology
171 appears. Workers deserve dignity whether they work in
172 conventional delivery or work on automated delivery systems.
173 That means fair wages, a safe workplace, and the right to
174 collective bargaining.

175 Consumers need assurances of privacy, safety and fairness
176 whether they are buying a product in a store and ordering home
177 delivery by a drone or via mobile app. The challenge of adapting
178 to technological changes is by no means unique to the delivery
179 sector, but automation and delivery advances, I believe now is
180 the time to wrestle with difficult policy questions. As the
181 Subcommittee on Digital Commerce and Consumer Protection our job
182 is not to just marvel at cool new stuff, though it can be fun to
183 see what is being developed, we must get beyond the novelty factor
184 and determine the real policy issues at play and legislate
185 accordingly.

186 I look forward to hearing our witnesses' perspectives on
187 development and consumer delivery. I hope that you can provide
188 some insight as we determine how federal policy keeps up with the
189 latest technology, and I yield back.

190 [The statement of Ms. Schakowsky follows:]
191

192 *****COMMITTEE INSERT 3*****

193 Mr. Latta. Thank you very much. The gentlelady yields
194 back. The chairman of the full committee, the gentleman from
195 Oregon, will not be making an opening statement. Is there anyone
196 on our side that would like to claim his time? If not, the chair
197 would then recognize the gentleman from Massachusetts for 5
198 minutes.

199 Mr. Kennedy. Thank you, Mr. Chairman, and I want to thank
200 the ranking member Ms. Schakowsky as well for their continued
201 commitment to this series and for encouraging this conversation.
202 To the witnesses today, I greatly appreciate you taking the time
203 to join us and I hope you will bear with us as we attempt to keep
204 up with the rapid pace with which you innovate. Thank you for
205 being here.

206 Technology is in its infancy and provides a rare opportunity
207 for bipartisan agreement in supporting its growth and your
208 companies. And with increased funding for our scientists and
209 investments in STEM education, we can ensure that this critical
210 R&D continues and ultimately consumers benefit in ways that we
211 have yet to even imagine. That future is as bright as it is
212 exciting.

213 But greater AI, machine learning, and automation can bring
214 with it significant dislocation in our labor markets and with that
215 job loss, as with it comes greater social responsibility to those
216 who are left behind. That is part of the conversation that we

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217 need to be having in this subcommittee. As Congress defends our
218 small businesses and traditional industries, we need to prepare
219 for a future where drones may replace deliverymen, where computers
220 replace cashiers, where even apps may replace doctors. And that
221 is why we have to extend STEM education into every single school
222 regardless of ZIP Code, why we need to begin investing in workforce
223 programs for all ages, today not tomorrow.

224 But balancing our proud history and our bright future will
225 require vigilance and engagement at all levels of government and
226 the private sector and I would greatly appreciate hearing from
227 our witnesses about how we prepare our working families for the
228 role in which you view federal policy and helping to strike this
229 balance in encouraging you to innovate and solve challenges that
230 we have yet to even design or yet to imagine, while ensuring that
231 we remain and retain a talented, dedicated, educated workforce
232 that in fact is going to power that growth to begin with.

233 And with that I would reserve the balance of my time or yield
234 it to the ranking member of the full committee if he is ready for
235 it.

236 [The statement of Mr. Kennedy follows:]

237
238 *****COMMITTEE INSERT 4*****

239 Mr. Latta. Thank you very much. Would the gentleman from
240 New Jersey -- the ranking member of the full committee is
241 recognized.

242 Mr. Pallone. Thank you, Mr. Chairman. I don't know if I
243 can put this all in, in the time allotted, but if not I will just
244 ask you to include it in the record.

245 This hearing will explore the new and innovative ways
246 consumers will receive goods in the future and in some cases right
247 now. Today, 2-day delivery of a package is commonplace and now
248 we are seeing on-demand delivery in under an hour. These
249 deliveries are not just being carried out by people, but now also
250 by robots, and in the future drones.

251 As I have stated at past hearings regarding new technologies,
252 privacy, data security, and cybersecurity must be baked into the
253 devices and the software. We only need to look to the front pages
254 to see that cyber attack such as Russian hacking have become an
255 everyday occurrence. Creators and manufacturers of
256 internet-connected technology must take responsibility for
257 mitigating this problem.

258 This committee has had more than ten hearings as part of
259 Disrupter Series. These hearings have given members a taste of
260 the latest technologies that are changing how our economy works,
261 and this exposure is important. However, I am hoping at today's
262 hearing we can begin to discuss how these disruptions affect the

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263 American worker.

264 While no one is advocating for slowing down innovation and
265 in fact we are continually pushing for more innovation, we should
266 not forget that these new disrupters can bring challenges. As
267 policymakers we should acknowledge that some of the ways
268 industries mechanize and automate can also cause job loss or wage
269 loss, so while the national economy benefits individual workers
270 may suffer.

271 Disruption is nothing new. While the agriculture sector has
272 become vastly more productive, it now is a smaller percentage of
273 the overall workforce. And as this committee is well aware, the
274 total number of manufacturing jobs has shrunk, in part, due to
275 automation. The automation we are discussing today could, for
276 example, have an impact on truck drivers and delivery services.

277 Economists have studied long haul truck driver jobs and
278 believe these jobs are at risk as driving becomes more automated.
279 And today, 1.7 million people are employed driving these routes.
280 They are good wage jobs that will be displaced, and this hearing
281 is mostly focused on short distance delivery services, which
282 employs over one million workers, so some of these jobs are surely
283 at risk too.

284 And finally, I don't want to be an alarmist and in fact I
285 believe we as a society can meet the challenge, but we need to
286 be thinking about the potential job impacts now so we can prepare

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for the future. We need to revisit whether our education systems are preparing the next generation for the shifting workplace, we need to ensure that retraining programs are effective, and we need to invest more in research and development to ensure that the United States continues to lead the world in innovation.

It is time we try to plan ahead instead of letting ourselves be caught off guard when it is too late. And I yield back.

[The statement of Mr. Pallone follows:]

*****COMMITTEE INSERT 5*****

297 Mr. Latta. Thank you very much. The gentleman yields back
298 and that will conclude the member opening statements. The chair
299 would like to remind all members that pursuant to the committee
300 rules, all members' opening statements will be made part of the
301 record.

302 Again I want to thank all of our witnesses for being with
303 us today and taking time to testify before our subcommittee.
304 Today's witnesses will have the opportunity to give opening
305 statements followed by a round of questions from our members.

306 Our witness panel for today's hearing will include Mr.
307 Bastian Lehmann, founder and CEO of Postmates; Mr. Brian Wynne,
308 president and CEO at Association for Unmanned Vehicle Systems
309 International; Dr. Harry Holzer is a John LaFarge Jr., SJ
310 Professor of Public Policy at the McCourt School of Public Policy
311 at Georgetown University; and, Mr. Shyam Chidamber, chief
312 evangelist and senior advisor at Flirtey

313 We appreciate you all being here with us today. And we will
314 begin the panel discussion today with Mr. Lehmann and you will
315 be recognized for 5 minutes to give your opening statement. And
316 just pull that mike right up to you and thanks for being here with
317 us today.

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STATEMENTS OF BASTIAN LEHMANN, FOUNDER AND CEO, POSTMATES; BRIAN WYNNE, PRESIDENT AND CEO, ASSOCIATION FOR UNMANNED VEHICLE SYSTEMS INTERNATIONAL; HARRY J. HOLZER, JOHN LAFARGE JR., S.J. PROFESSOR OF PUBLIC POLICY, MCCOURT SCHOOL OF PUBLIC POLICY, GEORGETOWN UNIVERSITY; AND, SHYAM CHIDAMBER, CHIEF EVANGELIST AND SENIOR ADVISOR, FLIRTEY

STATEMENT OF BASTIAN LEHMANN

Mr. Lehmann. Chairman Latta, Ranking Member Schakowsky, and distinguished members of the Subcommittee of Digital Commerce and Consumer Protection, let me begin by stating that our thoughts and prayers are with the people of Manchester in the U.K. this morning.

As a co-founder and CEO of Postmates, we recognize the power of global networks to overcome intolerance and power opportunity, so it is a pleasure to join you and my distinguished co-panelists this morning for a discussion on how cutting edge technologies and innovation are transforming traditional logistics and delivery networks.

While advances made by on-demand platforms has certainly disrupted traditional models of how products and goods move across the country, it is important to start our discussion with an overview of how the nation's leading on-demand logistics

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provider, Postmates, the company I co-founded just 6 years ago, is disrupting the rate and pace at which commerce is flowing in your own backyards and districts.

When Postmates is described as a leader in on-demand delivery, we quite literally mean that. Through the tap of a button on your phone, the platform enables anyone to get anything from their neighborhoods delivered to their doorsteps in just a couple of minutes. Where some logistics companies try to build a warehouse outside of a city and funnel goods into it, we believe in a simple philosophy. Our cities, our towns, our communities, they are our warehouses. They are home to unique talents and creative expertise that craft and curate high quality products, food, and merchandise that power our economies.

We aim to understand the inventory available in each given town, index each of its product offerings, and connect you directly to that experience by having a fleet of couriers, which we refer to as Postmates, deliver this inventory. We allow you to find and order from any restaurant or store in your city.

That means in addition to delivering prepared food, the platform is also empowering everyone from public school teachers ordering supplies to their classrooms to helping families of the elderly ensure groceries or medicines are delivered to their doorsteps. And with over 65,000 active Postmates across 45 major metropolitan markets covering 200 U.S. cities, our platform

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facilitates more than two million deliveries per month. This year alone we are on track to facilitate \$1 billion worth of total goods sold on the Postmates platform. And since we started the platform, our Postmates have earned over \$300 million in income.

But just is this the beginning. The total sales of food and groceries last year in the United States alone was nearly \$1.4 trillion, but less than 1.5 percent of that was sold online or through cell phones. That includes ourselves, our competitors, even big pizza delivery companies.

With over 10,000 merchants throughout the country from major brands like Chipotle, Apple, and Starbucks to local pharmacies and corner bakeries, Postmates is able to strike both local and national partnerships that continue to power sales throughout local economies. That is the power of Postmates and the on-demand economy. With each delivery we generate critical sales for merchants in the towns each of you represent.

But that story of economic empowerment is also told through the lens of flexibility we offer our fleet of Postmates making each delivery. Currently, an independent contractor-based model provides on-demand platforms like Postmates and the couriers themselves optimal flexibility. By empowering our Postmates to control how and when they offer their service on our platform, we enable students to supplement their income between classes, aspiring entrepreneurs to save capital for new business

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opportunities, or parents to earn a little extra by completing deliveries after dropping their kids at school or soccer practice. All told, these sales and earnings are broadening the tax base which are being reinvested right back into our communities.

So we started asking ourselves a key question. Can we expand this base of earnings all while continuing to rev the engines of economic impact in your districts? How can we do right by our couriers in helping them earn higher incomes, and how can we manage the on-demand logistics in particular dense urban and suburban populations? One such way led us to an experiment with what I like to refer to as sidewalk class robotics.

As pointed out in a recent piece in the Harvard Business Review, executives have to cut through a lot of hype around automation and I quote, leaders need a clear-eyed way to think about how these technologies will specifically affect their organizations. The right question isn't which jobs are going to be replaced, but rather what work will be refined, and how. And this not need to be a terrifying exercise that evokes imagery of Terminator or a world in where an entire labor force gets displaced.

So we started looking at the trend lines to begin with a clear-eyed assessment of our landscape. We have people who use cars, bikes, scooters, motorcycles, or walk to complete a delivery and each have a different strength and suitability for different

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414 deliveries.

415 But we also noticed that in particular dense or crowded
416 clusters of downtown neighborhoods, the distance between popular
417 delivery zones and popular restaurants or stores could often be
418 quite short. While the Postmates platform is ready and equipped
419 to make deliveries, sometimes these short distance stretches
420 aren't as financially advantageous to our couriers when compared
421 to longer distance deliveries, and tips are often based on the
422 distance traveled.

423 One way to ensure the continuity of short distance deliveries
424 while reserving our hardworking Postmates for longer distance
425 deliveries has been experiencing with robots. Through
426 partnerships with robotic companies on both the east and west
427 coasts, we have started to be able to measure how robots may be
428 able to optimize delivery times when compared to current numbers.
429 Most importantly, we can focus our fleet of Postmates to complete
430 deliveries that are likely to connect them to incomes at a much
431 higher rate.

432 Our thesis is then that with both human hand and robotic
433 operators on the ground, commerce can move at even higher rates
434 with more functional ways to make deliveries in each city. In
435 the long term, this could ultimately help drive down the overall
436 costs of delivery as the supply of couriers increases. We at
437 Postmates do not see a role in which robotics will be the

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438 ultimately delivery mechanism, instead taking these incremental
439 and responsible steps to test automation without shortchanging
440 our human workforce provides us with three tangible gains.

441 Mr. Latta. Pardon me, Mr. Lehmann. If you could just, we
442 are running over right now on your time. If you want to just wrap
443 up real quick we would appreciate that. Thank you.

444 Mr. Lehmann. Absolutely. As I said, we don't believe that
445 just robots will be doing deliveries in the future, but we also
446 agree that if that happens we have to be aware of a future in where
447 we invest into STEM education, where we and Congress should and
448 must work to advance a budget which prioritizes improving STEM
449 teaching, expanding access to rigorous STEM courses, addresses
450 bias for underrepresented students in STEM, and revitalizing
451 apprenticeship programs in this country to skill up workers no
452 matter their age.

453 [The statement of Mr. Lehmann follows:]

454

455 *****INSERT 1*****

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456 Mr. Latta. Thank you very much. And Mr. Wynne, you are now
457 recognized for 5 minutes for your opening statement. Thanks very
458 much.

STATEMENT OF BRIAN WYNNE

Mr. Wynne. Chairman Latta, Ranking Member Schakowsky, and members of the subcommittee, thank you very much for the opportunity to participate in today's hearing to discuss innovative delivery systems. I am speaking on behalf of the Association for Unmanned Vehicle Systems International which represents unmanned systems in all domains. Today I will be focusing my remarks on unmanned aircraft systems, or UAS.

From inspecting pipelines to news gathering to mapping flood zones, UAS help us save time, save money, and, most importantly, save lives. It is no wonder why thousands of businesses, small and large, have already embraced this technology and many more are considering integrating it into their future operations, including for delivery.

The FAA implemented the small UAS rule, also known as Part 107, last August. It was the result of years of collaboration between industry and government that established a flexible, risk-based approach to regulating UAS. These regulations have been in effect for more than 8 months and there is strong evidence the commercial UAS market is poised for significant growth. As of this month, there are more than 120,000 UAS registrations with the FAA, the vast majority of which are hobbyists; of those, 62,000 platforms have been registered for commercial use. The FAA

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483 expects more than 400,000 UAS could be flying for commercial
484 purposes over the next 5 years, a more than six-fold increase from
485 today.

486 An economic analysis by AUVSI projects that the expansion
487 of UAS technology will create more than 100,000 jobs and generate
488 more than 82 billion to the economy in the first decade following
489 full integration into the national airspace. After witnessing
490 the growth of the industry over the last few years, under the right
491 conditions we believe these numbers could go higher.

492 Many of our members are exploring ways UAS can transport
493 goods such as household items, medical supplies, food, maybe even
494 people in the not-too-distant future. Companies such as Amazon,
495 Google, and UPS are among the major players who hope to eventually
496 launch UAS delivery services. Several companies are already
497 testing the delivery capabilities of UAS both domestically and
498 abroad, including at Mississippi State, sir.

499 We are at the dawn of a new American renaissance in
500 technology, one that deserves government attention and support.
501 In the past, government invested heavily in physical
502 infrastructure, from the nation's air traffic control system to
503 the Interstate Highway System, which ultimately had a tremendous
504 impact on commerce. The benefits, however, did not stop there.
505 Over time, the safety, security, and efficiency gains we achieved
506 as a nation have vastly outweighed those costs, and the unmanned

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507 systems industry will be no different.

508 We need a new national imperative in unmanned systems that
509 like the air traffic control system and the Interstate Highway
510 System before it create greater capacity, reduce road congestion,
511 fulfill consumer demands, and facilitate the future of commerce.
512 Industry is bringing the technology; government needs to do more
513 to support it and advance innovations such as delivery services.

514 The vital prerequisite for advancing UAS is an appropriately
515 funded FAA that can meet the IT, employment, and staffing needs
516 required for the future. The FAA needs, first and foremost, to
517 automate its UAS procedures. Automation will also be important
518 beyond Part 107 for more complex operations such as delivery
519 services. Many of its important management tools and processes
520 which facilitate safer and more seamless UAS operations currently
521 operate by manual data input or processing. The FAA also needs
522 more employees who are dedicated to future UAS rulemakings to move
523 us beyond the current regulations.

524 Industry is not relying on the FAA and government alone to
525 advance UAS. It is currently shouldering many of the R&D costs
526 to spur innovation, finding solutions to make UAS fly higher and
527 further more safely and efficiently. Industry has also been a
528 close partner with government in advancing a UAS traffic
529 management system known as UTM and in developing standards for
530 remotely identifying operators and owners of UAS.

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531 The UAS industry is primed for incredible growth thanks to
532 industry representatives and government regulators nurturing
533 innovation that helps business be competitive in the marketplace.
534 We hope that these efforts can be sustained and that we continue
535 to reach new historic milestones in integrating this technology
536 into the national airspace and pave the way for regular and
537 widespread UAS deliveries.

538 Thank you again for the opportunity. I look forward to
539 questions from the panel.

540 [The statement of Mr. Wynne follows:]

541
542 *****INSERT 2*****

543 Mr. Latta. Thank you very much. And Dr. Holzer, you are
544 recognized for 5 minutes.
545

STATEMENT OF HARRY HOLZER

Mr. Holzer. Chairman Latta, Ranking Member Schakowsky and committee members, thank you for inviting me today to share my thoughts on the new digital technologies and how they affect the labor market and the economy. I will tell you up front that I know nothing about drones, so I defer completely to my other colleagues at the table. But I know a little bit about labor markets and technology and that is mostly what I will focus on.

So I would like to make five broad points today. Point number 1, employment in trucking, courier services, and warehousing has actually been growing quite rapidly recently and relatively good jobs are being created, all of this because of growing e-commerce. A hundred thousand jobs were created just in the past year in these sectors. I believe that trend will continue for years to come as e-commerce spreads. Since the loss of delivery jobs associated with drones or even autonomous vehicles remains at least somewhat speculative in terms of its timing and magnitudes, I don't expect the employment gains in these sectors to disappear anytime soon.

Point number 2, broadly, disruptive technologies tend to raise our labor market productivity and therefore our living standards. Given how flat productivity growth has been in recent years in the overall economy, the development of technologies that

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570 enhance productivity should be welcomed. And I will say very
571 clearly it is difficult if not impossible to have strong earnings
572 growth over time for our workers if productivity growth remains
573 so weak.

574 Point number 3, periodically we have these panics in the U.S.
575 and elsewhere over mass displacements in unemployment associated
576 with new technologies -- remember the Luddites in Britain in the
577 19th century? But maybe more relevant for us, there was a large
578 automation scare in the U.S. in the late '50s and early '60s
579 because of fear that computers would take everyone's jobs. These
580 fears are almost always overblown.

581 New jobs are created when automation causes others to
582 disappear, and workers with skills that complement the new
583 technologies actually face a better labor market for their skills.
584 And what are these complementary skills? Of course, technicians
585 and engineers, but almost anyone with creative skills or social
586 and communicative skills, those workers all do better. Of
587 course, some workers are substitutes for technology, not
588 complements; they do worse.

589 Therefore, point number 4, many millions of workers in the
590 U.S. and especially less educated men have been hurt by digital
591 technologies in the past 4 decades in manufacturing and in other
592 industries as well, either when they are directly displaced by
593 these technologies or because the labor market overall has grown

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less hospitable to them. Those displaced by technologies often experience lengthy unemployment, and when they become re-employed on average they take jobs with wages 25 percent lower, and that is on average.

But more broadly, the real earnings of men with only high school diplomas or less have stagnated or even fallen over the past 4 decades, again depending on how you measure that and they have fallen behind in real terms relatively of every other major group in the labor force. And in response to these stagnating and declining wages, millions of prime-age men have left the workforce and that is terrible problem because their disappearance in the workforce hurts themselves, their families and communities, and the U.S. economy overall.

Therefore, point number 5, a range of important policies should be adopted and strengthened to help workers. The ones hurt by the new technologies, help them make adjustments in this new labor market. We need policies to ensure that workers share in whatever productivity growth is generated by these new technologies over time. And I think of those technologies broadly as falling into three buckets.

From my point of view, the most important is education and workforce development in addition to STEM education, other kinds of education in the K-12 years -- critical thinking, communication skills, et cetera -- but really helping more people get the

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618 post-secondary credentials that the labor market finds valuable.
619 We need a lot more help there.

620 Secondly, I think it is very important to maintain a robust
621 system of unemployment insurance, but perhaps one with some
622 reforms to encourage workers to build new skills and get jobs more
623 rapidly and as soon as possible. I also believe it is important
624 to talk more about wage insurance where displaced workers if they
625 take new jobs at lower wages have part of their wage loss
626 compensated, and we can talk about that.

627 And finally, the third bucket, we need to ensure that workers
628 share in the productivity gains generated. That includes
629 protections for the right to collectively bargain in the private
630 and public sectors as well as limits on anti-competitive practices
631 by employers such as the growth of noncompete clauses in their
632 contracts with worker, and happy to discuss all of this further.
633 Thank you very much.

634 [The statement of Mr. Holzer follows:]

635

636 *****INSERT 3*****

637 Mr. Latta. Well, thank you very much. And Mr. Chidamber,
638 you are recognized for 5 minutes for your opening statement.
639 Thank you very much for being here.

640 Could you -- there we go.

641

STATEMENT OF SHYAM CHIDAMBER

Mr. Chidamber. All right, let me begin again if I don't mind. Thank you, Chairman Latta. And thank you, members of the committee, to invite me to this hearing. My name is Shyam Chidamber. I am a senior advisor and chief evangelist at Flirtey, a leading drone delivery service company.

In my allotted time I would like to do two things, give you a very brief history of our remarkable company and share with you our perspective on drone technology and where it is going. Flirtey is a startup company that has its roots in Sydney, Australia. In 2013, we began testing textbook delivery at the University of Sydney. Our goal was for students to place the orders using a smart phone app and receive their books within minutes at their current GPS location anywhere on campus.

We are now an American company headquartered in Reno, Nevada. We were chosen by Y-Combinator, the famous Silicon Valley business incubator; have collaborated at NASA; the University of Reno; Virginia Tech; The Johns Hopkins Medical Center. We have been funded by venture capitalists like Menlo Park Venture, Qualcomm Ventures, and several others. About a quarter of our workforce are U.S. veterans and we employ young graduates from engineering schools who want to change the world through innovation.

Over the last 24 months we have achieved several major

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666 milestones in U.S. aviation history. Here are a few: 1), in July
667 2015, we made the first FAA approved drone delivery on U.S. soil.
668 We delivered essential medicines to patients at a free medical
669 clinic in southwestern Virginia in collaboration with NASA
670 Langley, which our CEO Matthew Sweeny referred to as our Kitty
671 Hawk Moment.

672 In June 2016, we conducted the first Ever Ship to Shore to
673 Ship transport of medical supplies, simulating the applicability
674 of drones to emergency medical situations in the aftermath of a
675 natural disaster. Appropriately enough, this was conducted in
676 Cape May, New Jersey, a few miles from the bullseye of Hurricane
677 Sandy.

678 I have a short video to play. If we can play that I think
679 you will appreciate the small example.

680 [Video shown.]

681 Mr. Chidamber. Hopefully that gives you a little idea.

682 In 2016, we made the first FAA approved delivery to a suburban
683 home in Reno, Nevada. Partnering with 7-Eleven, we delivered
684 over-the-counter medicine, food, and drinks to wonderstruck
685 customers. Most of all we are delighted that our historic drone
686 delivery in Wise, Virginia, has been recognized by the Smithsonian
687 Air and Space Museum with an exhibit that will be opening soon.
688 We are a genuine American success story.

689 Most people are no doubt familiar with the military

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690 applications of drone technology. But I am here to suggest to
691 you that drones are a game changing commercial and civilian
692 technology, one I believe can save lives and enhance lifestyles.
693 Let me share two examples.

694 Imagine an elderly woman who lives by herself homebound
695 during a snowstorm. She finds to her dismay that she just ran
696 out of her insulin medication. The snowstorm has raged all night,
697 her driveway is not clear, and the roads are impassable. She can
698 pull out her cell phone and order her insulin refill from a
699 pharmacy and have it delivered by a Flirtey drone that takes off
700 from the pharmacy, flies using GPS and hovers close to her front
701 stoop and delivers a packet of lifesaving insulin. As Doc says
702 in Back to the Future, Roads? Where we are going we don't need
703 roads.

704 Think of the handyman who fixes roofs for a living. Instead
705 of climbing a rickety ladder placed against a mossy gutter, he
706 pilots a drone over your roof, takes vivid HD pictures that you
707 can both see on an iPad. It is quick, easy, efficient, safe, and
708 more reliable. You have firsthand proof of the damage of your
709 roof, the handyman has to carry less hazard insurance, he can
710 inspect more roofs, and earn more money.

711 Mr. Latta. Pardon me, if you could also wrap up. We are
712 over about a minute on your time there.

713 Mr. Chidamber. Sure.

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714 Mr. Latta. Thank you.

715 Mr. Chidamber. This future has been made possible by
716 simultaneous advances in multiple technologies -- GPS, batteries,
717 avionics, materials, smart phones, 3-D printing, just to name a
718 few. The age of fast, efficient, safe, low cost, last mile
719 delivery using drones is at hand. There are some technical
720 challenges in drone design, battery capacity, and safety systems
721 that remain but these are being addressed. It is only a question
722 of time before we solve them.

723 So we at Flirtey ask you to imagine a future where in the
724 event of a natural disaster like Hurricane Katrina, drones deliver
725 urgent medical supplies, food, and water to those in need.
726 Imagine a future where you can order anything you like online and
727 have it reliably delivered to you within a few minutes if not a
728 few hours. Imagine a future where you can order food and have
729 it delivered directly to your location within minutes. That
730 future is at hand. Thank you.

731 [The statement of Mr. Chidamber follows:]

732

733 *****INSERT 4*****

734 Mr. Latta. Well, thank you very much. And again, thank you
735 to all of our witnesses for your testimony today. This will now,
736 we will proceed into the question and answer portion of the
737 hearing. I will begin the questions by recognizing myself for
738 5 minutes.

739 And Mr. Wynne, in your testimony you touched on how
740 commercial drones use, offer societal and economic benefits.
741 Would you please explain the benefits and how commercial drone
742 use provides them?

743 Mr. Wynne. Well, we are starting today under Part 107
744 regulations with largely vertical infrastructure inspections.
745 That is because under the rule we have to keep drones within visual
746 line of sight. That is offering tremendous safety benefits right
747 away in industries such as cell towers, the mobile cellular
748 industry cell tower inspections and wind tower inspections and
749 so forth. People used to climb, you know, up on these towers.
750 Now they don't have to. They can execute their jobs with this
751 technology standing on the ground. Lots of different public
752 safety applications for the search and rescue is very large among
753 them, et cetera.

754 As we get permission to fly having demonstrated the safety
755 of the technology in use in the national airspace system, as we
756 have the ability to fly more complex operations, we will be able
757 to do more things and create even greater value. And that is a

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758 progressive process. I think we have picked probably the most
759 challenging and most complex operation of all, delivery of
760 something in a congested airspace in an urban area, for example,
761 but we will get there.

762 Mr. Latta. Let me ask you if I can follow up with you, when
763 you are talking about the visual line of sight how far are you
764 talking then that you are in that visual line of sight, the
765 distance?

766 Mr. Wynne. Well, with my eyes or yours, sir? It depends
767 on the size of the drone if I am not wearing my glasses.

768 Mr. Latta. Or binoculars.

769 Mr. Wynne. We have to keep the drones under 400 feet, or
770 400 feet vertical of whatever it is we are inspecting either
771 laterally or above the structure, so we will call it under, you
772 know, 400 feet.

773 Mr. Latta. All right. Well, thank you very much.

774 Mr. Lehmann, if I could turn to you, could you explain how
775 your platform Postmates chooses to complete deliveries? And one
776 of the things, or some of the questions, you know, the technology
777 we talked about a little bit earlier about being able to cross
778 the street when it gets to its delivery point, if you could kind
779 of go into that, explain how that all works and functions?

780 Mr. Lehmann. Yes. There we go, sorry for that. Of course,
781 if you -- I mean, first of all, our humans probably do it just

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782 like we all do, so they watch the traffic lights. And maybe it
783 is surprising to hear, but the sidewalk class robots do it in a
784 very similar way. They are equipped with sensors, ultrasonic
785 sensors, LiDAR sensors. They can be connected to the smart grid
786 of a city, but by the sensors alone they are able to read traffic
787 lights. They see humans walking on the street, they see other
788 objects, and they behave accordingly. They travel at roughly
789 four miles an hour.

790 Mr. Latta. And how many do you have out right now that you
791 are testing?

792 Mr. Lehmann. There is a few dozen that we are testing with
793 on the east coast and on the west coast, and slightly more on the
794 west coast. We are partnering, in total, with four companies and
795 we are working on our own solution in-house as well.

796 Mr. Latta. Thank you.

797 Mr. Chidamber, if I can turn to you, in your testimony you
798 mentioned about Flirtey's FFA approved delivery of medicine to
799 a clinic in Virginia. Would you explain again how the medicine
800 delivery for your FAA approved drone was made? Again, was that
801 line of sight or how did you get that to that delivery?

802 Mr. Chidamber. Yes. We did do the line of sight kind of
803 delivery at Wise, Virginia. It was under controlled conditions
804 obviously. There was complete line of sight during the time of
805 travel. The Flirtey drone took off from Lonesome Pine Airport,

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806 which is a small county airport, and the medical camp was in a
807 fairgrounds which is about a mile and a half away. So there is
808 a clear line of sight standing on top of the roof to see the entire
809 flight as it progressed, so there was somebody watching the drone
810 the entire time.

811 Mr. Latta. And so as you said it was, you say, about a mile
812 and a half that --

813 Mr. Chidamber. Yes.

814 Mr. Latta. Okay, and then also how high did the drone go
815 then?

816 Mr. Chidamber. It is about 3-400 feet.

817 Mr. Latta. 3-400 feet.

818 Mr. Chidamber. Yeah, exactly.

819 Mr. Latta. Well, thank you very much. And I will yield back
820 the balance of my time and will recognize the gentlelady from
821 Illinois, the ranking member of the subcommittee, for 5 minutes.

822 Ms. Schakowsky. Thank you so much. As we have heard from
823 our witnesses today, automated delivery has the potential to
824 create new jobs for some people. For example, it is likely there
825 will be more jobs for people who work in engineering and customer
826 service, and new business opportunities could be created if
827 delivery services become cheaper and faster and more widely
828 accessible.

829 But with automation as with other shifts in the job market

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830 there are winners and losers. So Dr. Holzer, you wrote in your
831 testimony and you said it today that millions of workers have
832 already been hurt by technological change in the past 4 decades.
833 I wonder if you could expand on that a little bit.

834 Mr. Holzer. In the last 4 decades we have had two very
835 powerful forces affecting the U.S. labor market, technology as
836 well as globalization. On average, the technology has done more
837 to substitute for less educated workers especially in old
838 fashioned production jobs on assembly lines as well as clerical
839 workers in offices. And since that is a fairly routine kind of
840 work historically done by less educated workers, the machines
841 could do that more efficiently in globalization as well.

842 But this has been a good period for people that have
843 post-secondary education. As I said before, anyone with
844 communication skills, problem solving skills, et cetera, comes
845 out better in this process. I think, you know, the other thing
846 to remember is that as you suggested all of these technologies
847 lower costs, therefore lower prices to consumers. They have more
848 money to spend. They spend more sometimes in those sectors and
849 elsewhere and new jobs get created that way as well. But there
850 is no guarantee that everybody's wages will go up instead of down.
851 It is usually a mix.

852 Ms. Schakowsky. Let me ask you a real-world question. Will
853 workers who have gone to community colleges or universities be

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854 affected differently than those who have not? Are we going to
855 have to expand educational opportunities?

856 Mr. Holzer. No one knows for sure, but our best guess is
857 that it will because artificial intelligence will enable these
858 machines to do more and more. Not just the routine work on
859 assembly lines, but work that professionals have done, everything
860 from finance and accounting to law and medicine.

861 So it will likely expand up the ladder. We will therefore
862 need -- what happens is that we will need to invest more in training
863 people in those complementary skills that the machines don't do.
864 And so in all these sectors there will have to be adjustments made
865 and students will have to invest in different kinds of education
866 than they did in the past.

867 Ms. Schakowsky. Let me ask you about geography a little bit.
868 Some experts have pointed out that the benefits of technological
869 change accrue disproportionately on our country's coasts;
870 meanwhile, jobs in rural areas and Middle America are being lost
871 to automation. I am wondering if you have done new research on
872 that.

873 Mr. Holzer. I have. I would put it slightly differently.
874 I think that workers in large metropolitan areas, even those
875 internally like Chicago and Cincinnati, have done very well.
876 When they have lost manufacturing jobs or similar, they have often
877 gained in health jobs, education jobs, et cetera. I think it is

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878 more in the smaller metro areas and smaller towns -- Allentown,
879 Pennsylvania; Dayton, Ohio; places like that -- that you haven't
880 seen the new jobs replace the ones that have been lost.

881 So there we have two choices. Number one, we can help
882 workers relocate from those locations to where the jobs are, but
883 not everybody is going to relocate; and number two, there are
884 things we can probably do to help generate more economic activity
885 in those locations. And I think we should be thinking about some
886 of those kinds of strategies.

887 Ms. Schakowsky. Well, that is really where I wanted to go.
888 How can we help assure that new opportunities are created by
889 automation and that they are accessible to all workers across the
890 country?

891 Mr. Holzer. So as I indicated in my comments I see three
892 broad strategies here essentially, education, unemployment
893 insurance/wage insurance, and also making sure the workers share.
894 When you are talking about these smaller towns in rural areas
895 internally, jobs aren't there at all. But even here, you know,
896 e-commerce for instance has the potential to bring more jobs to
897 those areas, right. People can do coding and other kinds of
898 e-commerce work even when the physical product and locations
899 aren't there, or warehouses and trucking if these products are
900 going to be delivered to these smaller towns in rural areas at
901 least on the short term.

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902 Before the drones and the autonomous vehicles there will at
903 least be -- there can be some new job creation there as well. So
904 I think we need to think creatively about what kinds of jobs can
905 be encouraged in some of these locations and at what kinds of
906 wages, again while we help people have the mobility, some of them,
907 to move to where the job growth is.

908 Ms. Schakowsky. Thank you very much. I yield back.

909 Mr. Latta. Thank you very much. The gentlelady yields back
910 and the chair now recognizes the gentleman from Mississippi, the
911 vice chairman of the subcommittee, for 5 minutes.

912 Mr. Harper. Thank you, Mr. Chairman, and thanks to each of
913 you being here today on this very important and interesting topic.

914 And Mr. Wynne, it is good to have you back. The last time
915 that you testified during the subcommittee's hearing on the
916 evolving use of drones, we talked about the UAS Center of
917 Excellence, its research, and FAA's road map for integrating UAS
918 in the national airspace system. Following up on that
919 discussion, what areas of research do you believe that the ASSURE
920 program should be focusing on to more rapidly implement routine
921 UAS package delivery system?

922 Mr. Wynne. The ASSURE program is very broad in its scope
923 doing a lot of different work that is really important to get to
924 more complex operations. I think that one of the biggest
925 challenges we need to solve is detect and avoid technologies.

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926 Pilots today, myself included, we use -- if we are not, you know,
927 in the clouds, we are literally -- it is our responsibility to
928 see and avoid other aircraft. That is harder to do when you are
929 not on the aircraft.

930 So we are developing technologies for see and avoid, well
931 clear standards, et cetera, et cetera, all of that work is being
932 led by the Center of Excellence. It is being distributed through
933 some of the best minds in the country and a lot of collaboration
934 going on. So I would choose that as probably one of the seminal
935 technologies that is being developed today.

936 Mr. Harper. Okay. And obviously those that are flying
937 private aircraft, commercial, they have to know that something
938 is in that space, and then I guess the drones themselves need to
939 be able to realize that they are both in the same zone; is that
940 what you are referring to?

941 Mr. Wynne. That is exactly right, sir. I mean we are
942 talking about smalls, today under 55 pounds, small UAS.
943 Ultimately, there will be aircraft of all sizes and there are
944 aircraft of all sizes already that fly in all areas of the
945 airspace. So, you know, there are different kinds of rules above
946 18,000 feet in Class A airspace than we would need below 400 feet
947 where there is very little traffic.

948 But the drones themselves need to be able to automatically
949 adjust to one another and they need to be able to adjust to anything

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950 not performing in the system, or not participating in the system
951 such as an EMS helicopter or potentially an air applicator for
952 agricultural purposes.

953 Mr. Harper. You know, we certainly know that the drone
954 delivery business idea is not just limited to the United States
955 and we have been advised that the ASSURE program has been contacted
956 by other countries asking for information on its research. How
957 important is regulatory, cross-border harmonization to the drone
958 delivery business?

959 Mr. Wynne. It is very important. The UTM system, unmanned
960 aircraft system traffic management that ultimately we are
961 developing and I think the United States has, through NASA and
962 the FAA, has been leading on, ICAO, the International Civil
963 Aviation authority or organization in Montreal, recently launched
964 an initiative with NASA. They recognize many member states. The
965 ICAO recognized that they don't want to do this all themselves.
966 So I think U.S. leadership is going to be critical in getting this
967 done, but clearly there will be contributions from all over the
968 world. This is a global phenomenon, this technology, but I think
969 we are now in a place where we can lead.

970 Mr. Harper. Mr. Chidamber, do you see differences between
971 how the United States treats commercial drone delivery and how
972 drone deliveries are treated in other countries, and with that
973 is the U.S. ahead or behind other countries in the drone

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974 marketplace?

975 Mr. Chidamber. On the regulation side, I think the FAA has
976 been slower than their equivalent authorities in other parts of
977 the world. I am thinking particularly of New Zealand where we
978 actually deliver Domino's Pizza in New Zealand, in Auckland,
979 actually. Approvals came faster. It was based on risk
980 assessment. Not, you know, just the aircraft, but who is running
981 the aircraft, what controls are there and so on.

982 So a risk-based analysis of approvals is probably what we
983 would require and I think the FAA is heading in that direction.
984 We would like to see them go faster towards that goal and I think
985 we will get there.

986 Mr. Harper. And you think the risk assessment is key to
987 this?

988 Mr. Chidamber. Absolutely, yes. I mean I think the threat
989 from perhaps a hobbyist is greater than a legitimate operator who
990 is running a business and making deliveries for medicine or pizza
991 or whatever it might be. That person is going to be carrying
992 insurance, carrying, you know, it is their brand. They have got
993 to protect all of that.

994 So a legitimate business which is operating under the
995 confines of the rules of the land are going to be quite cognizant
996 of all of these things and safety is a big issue for them.

997 Mr. Harper. Thank you very much. My time has expired. I

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998 yield back.

999 Mr. Latta. The gentleman yields back. The chair now
1000 recognizes the gentleman from Texas for 5 minutes.

1001 Mr. Green. Thank you, Mr. Chairman. I didn't know I was
1002 coming up that quick. I want to thank both Chairman Latta and
1003 Ranking Member Schakowsky for having this hearing today.

1004 Ensuring the safety of our constituents has and will continue
1005 to be our top priority. Although automation technology has
1006 potential for massive benefits to society including the disabled
1007 and elderly, like all groundbreaking technology there are risks
1008 to some parts of society that need to be considered and I look
1009 forward to talking about this with our experts.

1010 Automated delivery of goods has been talked about as a way
1011 to help mitigate the last mile problem, the inefficiency of
1012 carrier trucks delivering goods short distances and individual
1013 consumers. However, in cities like I represent in Houston, part
1014 of which I represent, distance frequently can be quite long. My
1015 first question I would like to ask the panel, do you see this
1016 affecting the use of automated delivery technology and if so, how?
1017 Any response? No?

1018 Mr. Lehmann. I can take it. From Postmates' perspective
1019 we believe that the short range deliveries are what we can conquer
1020 first and where we can experiment first with our delivery robots.
1021 They are predominantly designed for sidewalks.

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1022 Mr. Green. Okay. Dr. Holzer, in your testimony you talk
1023 about how disruptive technology has the potential to affect the
1024 labor market, especially the trucking and delivery courier
1025 industry. I would like to ask the whole panel their thoughts
1026 about what industries would be disrupted by this technology and
1027 where they see new labor trends developing as a result.

1028 And let me just say, in the Houston area I have watched in
1029 the last 4 years Amazon come in and build a huge warehouse near
1030 our intercontinental airport because of air transport, but they
1031 still have to get those packages out. And how would that disrupt
1032 these labor trends? It seems like it would just expand it unless
1033 they send out those drones from their warehouse, using Amazon as
1034 an example.

1035 Mr. Lehmann. I think there is if I may, I think there are
1036 two trends that are important to distinguish here. On the one
1037 side you have clearly a company like Amazon that gets more
1038 sophisticated with their delivery infrastructure and they want
1039 to optimize for their hub and spoke model that works very well
1040 for them, centralized warehouses, fast delivery from these
1041 warehouses into metropolitan areas.

1042 But I believe it is important to recognize and I would like
1043 the panel to recognize that there are companies out there that
1044 specifically work on providing local retailers with technologies
1045 to compete with these sorts of infrastructure. Postmates for

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1046 example allows local retailers to offer Amazon-like services and
1047 deliveries right from their retail stores.

1048 So we are envisioning a role that is a lot more decentralized
1049 where you have a thriving local community. It is a different
1050 approach than that of Amazon, but we believe in thriving local
1051 economies and we believe in a healthy local economy in
1052 communities.

1053 Mr. Chidamber. May I add to that?

1054 Mr. Green. Yes.

1055 Mr. Chidamber. I completely agree with that statement,
1056 because a small business area with a drone delivery capability
1057 can compete more effectively with the large chains. So there is
1058 a whole competitiveness issue here that new technology brings to
1059 small players in the market.

1060 The second point I want to make is about productivity, which
1061 I think the good professor on my right hand side said that earlier.
1062 Drones particularly can increase blue collar productivity and,
1063 you know, a roofer, a delivery person can make more deliveries
1064 per day doing those sorts of things. Their pay will go up. It
1065 is the productivity problem that these things will address and
1066 that is the important thing to remember.

1067 Mr. Green. Okay. Thank you, Mr. Chairman. I will yield
1068 back.

1069 Mr. Latta. Thank you very much. The gentleman yields back

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1070 and the chair now recognizes the gentleman from New Jersey for
1071 5 minutes.

1072 Mr. Lance. Thank you very much, Mr. Chairman, and good
1073 morning to the distinguished panel.

1074 Mr. Lehmann, you state in your testimony with more than
1075 65,000 active Postmates across 44 metropolitan markets covering
1076 300 U.S. cities, our platform facilitates more than two million
1077 deliveries per month. Does that mean you are currently in major
1078 cities or are you in rural areas as well?

1079 Mr. Lehmann. Both. We are in major metropolitan areas.
1080 We would consider Los Angeles a major metropolitan area and then
1081 we have suburbs that we cover as well. We are in the OC, yeah.

1082 Mr. Lance. Are you located throughout New Jersey, the state
1083 I represent in Congress?

1084 Mr. Lehmann. We are, yes.

1085 Mr. Lance. Thank you.

1086 To Flirtey, I am interested in your testimony. I was very
1087 interested to hear that you conducted the first ever Shore to Ship
1088 to Shore transport in New Jersey, and I appreciate your
1089 highlighting the significance of the location considering what
1090 occurred in 2012 regarding Superstorm Sandy, a devastating event
1091 for the region of the country, part of which I represent.

1092 Many lost electricity for between 1 and 2 weeks. Many of
1093 the roads were impassable with fallen trees, power lines, and

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1094 debris. Had this technology been available then, how do you think
1095 it would have helped to mitigate the prolonged hardships many in
1096 New Jersey and in New York and Connecticut faced?

1097 Mr. Chidamber. Thank you for that question. I think it
1098 would have been invaluable if you had drones by the shore which
1099 could, you know, the roads were impassable, as you remember, to
1100 get to the spot, but there were first responders who were already
1101 there. And if there were people who required medical assistance
1102 and they required medication of some sort, it would be tough for
1103 them to get that medication bussed in or trucked in from somewhere.
1104 Similarly, even simple things like potassium permanganate to just
1105 keep the water clean or anything like that, those things could
1106 have been brought from a boat alongside, you know, the waterway
1107 and a drone could have shipped it over.

1108 So a number of things like that would have been possible,
1109 so absolutely. I think drones would have been very, very helpful
1110 if you had it deployed against Sandy, and I am so sorry that we
1111 were not able to do it.

1112 Mr. Lance. Thank you. Let's hope that this type of natural
1113 disaster does not occur again, but obviously natural disasters
1114 will occur and we are always interested in advanced technology.

1115 Mr. Lehmann, in your testimony you mentioned sidewalk class
1116 robotics. Can you please explain to me at least what you mean
1117 by that?

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1118 Mr. Lehmann. Literally it is I would say everything under
1119 the size of a refrigerator robot that is driving itself on the
1120 sidewalks and streets of a city.

1121 Mr. Lance. Thank you. This is a fascinating topic and I
1122 am sure that as we progress the work of the distinguished members
1123 of the panel will lead to greater protection and greater service
1124 for the American people. I yield back the balance of my time.

1125 Mr. Latta. Thank you. The gentleman yields back and the
1126 chair now recognizes for 5 minutes the gentleman from Vermont.

1127 Mr. Welch. Thank you, Mr. Chairman. I thank the panel. I
1128 want to ask your thoughts about privacy concerns. I mean with
1129 all these drones flying around they have a mission to do, maybe
1130 a deliver a package, but they are also capable obviously of
1131 collecting data. They are also capable of taking photographs.
1132 They are also capable of doing things that some people may regard
1133 as an invasion of their personal privacy.

1134 Mr. Wynne, is that at all a concern in your organization?

1135 Mr. Wynne. Of course, sir. Everyone is in favor of
1136 privacy. The organization that I represent worked very, very
1137 hard in the NTIA process for civil liberties groups under the
1138 initiative from President Obama to discuss privacy to come up with
1139 guidelines. Those guidelines are in effect for the industry.

1140 I would say that in terms of delivery, the amount of data
1141 that is required just to conduct that operation is probably

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1142 already stretching the -- I would say creating opportunities for
1143 large chip manufacturers to try and figure out how to process that
1144 data. And so collecting additional data that is not related to
1145 the mission is probably less of a concern, but all of the companies
1146 involved are sensitive to the fact that they need to be focused
1147 on whatever it is that they are doing.

1148 Mr. Welch. So tell me, what do you think should be the heart
1149 of guidelines to protect privacy? And this would be from
1150 companies that are utilizing drones to be more productive, but
1151 also private individuals using drones.

1152 Mr. Wynne. Well, I think it pertains to the way we collect
1153 data in general, and I use, you know, in that process there were
1154 many ubiquitous technologies that we are already looking at such
1155 as facial readers, license plate readers, facial recognition
1156 technology, et cetera, where the question is what are you doing
1157 with that data; how is that data stored for what length of time,
1158 et cetera, et cetera; how is it protected, so all of those
1159 questions pertain.

1160 As it relates to individual use of drones, clearly that is,
1161 you know, I think we are focusing on trying to educate people about
1162 safe and responsible flight. Responsible flight means you are
1163 not annoying people, you are not doing things that are already
1164 against the law, or utilizing this technology to break the law
1165 that pertain to the use of any other data collection.

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1166 Mr. Welch. Okay. Mr. Lehmann, how about you? Do you see
1167 privacy as a legitimate concern among the public as to needing
1168 some regulation and guidelines that are required of folks using
1169 drones for otherwise legitimate purposes?

1170 Mr. Lehmann. Thank you for the question, Representative
1171 Welch. We do not use drones currently, but on the platform, on
1172 the Postmates platform itself, we obviously take data privacy very
1173 seriously. I can give you an example. The entire communication
1174 between you and the Postmate who would do the delivery on his
1175 behalf is anonymous. The data, even the phone numbers and the
1176 addresses of the addressee, for example, are disguised so that
1177 no party can see the other party's private information.

1178 Mr. Welch. Okay. Dr. Holzer, or Mr. Holzer?

1179 Mr. Holzer. I am sorry, what question?

1180 Mr. Welch. Well, your thoughts on privacy. That is a
1181 concern that a lot of people contact, I think, a lot of us about.
1182 People like the opportunities that drones can provide, but it also
1183 can be an invasion of privacy if done improperly.

1184 Mr. Holzer. In all honesty I don't -- I haven't thought a
1185 lot about the privacy implications so I will pass on that and defer
1186 to my colleagues.

1187 Mr. Welch. Okay.

1188 Mr. Chidamber. Privacy is a legitimate concern. Most
1189 people don't want their privacy invaded. Drones and particularly

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1190 companies like ours which have drone delivery services recognize
1191 that completely and regard the information, we keep it only for
1192 the purposes of flight planning and those sorts of things and it
1193 is completely encrypted. It is just another set of files on a
1194 computer which are protected by encryption algorithms and the
1195 usual things that go with it.

1196 Mr. Welch. Okay, thank you very much. I yield back.

1197 Mr. Latta. The gentleman yields back and the chair now
1198 recognizes the gentleman from Kentucky for 5 minutes.

1199 Mr. Guthrie. Thank you. Thank you, Mr. Chairman, and I
1200 thank the witnesses for being here.

1201 I just want to -- there is a recently joined with Congressman
1202 Aguilar to form a commercial e-commerce committee or caucus, and
1203 our districts are centers for e-commerce. With UPS World Port
1204 next to my district, a lot of people in my district are involved
1205 in e-commerce. Amazon is a big player in Kentucky as well, among
1206 others, so there is lots going on and it is exciting times.

1207 And I was just -- Mr. Wynne, when we talk about package
1208 delivery with unmanned vehicle systems, what areas of the country
1209 or where particularly are these being really tested or do you see
1210 them working? And there are actually some of them in progress
1211 right now and working. What kind of area, where do you see most
1212 of the commercial testing being done and why do you think that
1213 is?

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1214 Mr. Wynne. Well, of course there are the test centers that
1215 are around the country. I think, really, there are six test
1216 centers where some of that is being done. There is a lot of beyond
1217 visual line of sight being done in some of the test centers because
1218 they are specifically set up to not only conduct those missions,
1219 but also to collect the data that we need in order to demonstrate
1220 that this can be done safely and effectively.

1221 I think where the initial deliveries will probably occur will
1222 be in less risky airspace, less congested airspace. There are
1223 some delivery companies already that are doing last mile types
1224 of operations out in rural areas that save a little bit of wear
1225 and tear on their trucks. So it is not just from a warehouse to
1226 a delivery site, it might be from a truck to a delivery site as
1227 well.

1228 And again in those instances we might be out in very
1229 uncongested airspace where again we are able to learn in that
1230 environment and then ultimately bring the data that we have
1231 collected to the FAA and demonstrate this can be done in more
1232 complex airspace.

1233 Mr. Guthrie. That is interesting, because you do think of
1234 it being urban or suburban, but you could take it to parts of my
1235 district that have a town or a city and deliver out from there
1236 to -- you are right. There are a lot of miles traveled to get
1237 to certain areas of my district that are less populated. I

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1238 appreciate that.

1239 So Mr. Lehmann, when we think about delivery service do we
1240 think of food or product, or we talked about pharmaceuticals. You
1241 indicate in your testimony that your platform offers much more
1242 than that. Can you explain how your platform has helped everyone
1243 from teachers to the elderly?

1244 Mr. Lehmann. Thank you. It does that on both sides of the
1245 platform. I will give you an example. We are delivering each
1246 month from roughly 60,000 local merchants throughout the United
1247 States. Around 70 percent of the platform is prepared food, but
1248 you will find 30 percent of the two million deliveries across a
1249 wide range of retail categories -- supermarkets, hardware stores,
1250 electronics, so customers really use the Postmates app for a wide
1251 range of access to goods.

1252 On the other hand, you have a very vibrant fleet of Postmates.
1253 Everyone from a artist -- you can be a Postmates in a couple of
1254 minutes. If you had a postmates.com/fleet, you can sign up. As
1255 long as you pass the background check you are good to go. And
1256 that is how we enable additional income in this country.

1257 Mr. Guthrie. Well, thank you very much.

1258 And Dr. Holzer, my other role in Congress I am the chairman
1259 of the Subcommittee on Higher Ed and Workforce, and it is so
1260 interesting some of the things you are talking about. What you
1261 see over time is that automation has replaced routine work, but

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1262 now when I visit companies and move forth they are using automation
1263 because they can't find work. So self-ordering at a restaurant
1264 -- you just see it all the time -- unmanned, a lot of trucking
1265 companies are interested in unmanned vehicles because they can't
1266 find truck drivers.

1267 And in areas that, you know, maybe in restaurants it is lower
1268 income, but I know in one area where I am starts in the mid-40s
1269 and it is not like you have to go to 2 years to get a degree. It
1270 is a 4- or 5-week truck driving school. So you said the policies
1271 need to be adopted on trainings there and that is what we focus
1272 on.

1273 What kind of things do we need to get the market working where
1274 we have jobs that actually pay pretty well, but we can't get people
1275 to get to the retraining to get into the workforce? It is a big
1276 question, I know, in 48 seconds.

1277 Mr. Holzer. Okay. You know, I think we need to make our
1278 higher ed institutions, and here community colleges are very
1279 important, make them more responsive to the labor market. I mean,
1280 as you know, right now many community colleges, the public
1281 institutions, if they get the same subsidy from the state no matter
1282 what, they don't really have to worry about the labor market very
1283 much.

1284 A lot of states are moving towards making that money more
1285 conditional on outcomes. I would like to make them more

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1286 conditional on employment outcomes of the students there, along
1287 with some extra resources to make sure that these institutions
1288 for instance can cover the equipment costs, which are very high,
1289 and all the support services you need like the career counseling,
1290 labor market information, to sort of reduce the gap between those
1291 institutions and the jobs.

1292 Of course the other important strategy here is work-based
1293 learning like apprenticeship, and I think we can do a lot more
1294 to encourage, to help and assist and financially incentivize more
1295 employers to create apprenticeships and other modes of work-based
1296 learning for workers. But this way you are bringing the labor
1297 market and the education closer together.

1298 Mr. Guthrie. Okay, thank you. My time has expired. I
1299 would love to go further, but my time has expired.

1300 Mr. Latta. Well, thank you very much. The gentleman's time
1301 has expired and the chair now recognizes the gentleman from
1302 California for 5 minutes.

1303 Mr. Cardenas. Okay. Thank you for not taking some of my
1304 time away since Mr. Guthrie went over on his time. Thank you,
1305 Mr. Chairman.

1306 My first question is for Mr. Wynne. In your prepared
1307 statement you cite an economic analysis by AUVSI that projects
1308 that the expansion of UAS technology will create more than a
1309 hundred thousand jobs -- it is good to hear -- and generate more

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1310 than 82 billion to the economy -- again good news. Could you
1311 describe some of the types of jobs that might be created?

1312 Mr. Wynne. Well, let's start with the remote pilots. We
1313 have certificated 40,000 of those since August of last year. That
1314 is probably double the number of manned pilots that we have
1315 certificated under Part 61, so we have a lot of people coming to
1316 the workforce. Some of them are 4,000-hour pilots from the
1317 military. Some of them are people that are straight out of
1318 community college that are getting their training through
1319 community colleges. So they are out there now flying under Part
1320 107; that is very, very good news.

1321 The design elements of the solutions that are coming to
1322 market through the air side alone, although we represent all
1323 things unmanned, are just many, many of the different technologies
1324 that my colleague from Flirtey mentioned are converging here in
1325 a very, very explosive way, a very positively explosively way.
1326 So there is engineering of course, but there is an entire market
1327 that developed in a cell phone arena that is worth \$4 billion now
1328 for cell phone repair.

1329 Imagine that you know with millions of drones what kind of
1330 a market we are going to create for drone repair, for example,
1331 for more expansive platforms. So there are many, many different
1332 jobs out there that will essentially enable this technology
1333 solution going forward.

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1334 Mr. Cardenas. Thank you. And when it comes to the pilots,
1335 how long is the training roughly? I mean what kind of training
1336 required for them to be licensed to do this job?

1337 Mr. Wynne. The only requirement for flying Part 107 today
1338 is a knowledge-based test that is administered by the FAA. As
1339 a Part 61 pilot and existing pilot, there is a slightly different
1340 route that also involved demonstrating a certain amount of
1341 knowledge.

1342 What is happening in the marketplace is that groups that are
1343 standing up their own training programs to give pilots stick and
1344 rudder experience. Some of that is being done in our test
1345 centers, for example. You know, some of our organizations that
1346 want to fly over people recognize that there is additional risk
1347 associated with that.

1348 It can be done under waiver, in Part 107 under a waiver, but
1349 they need to bring people to the table who know what to do in
1350 certain circumstances where there is additional risk and how to
1351 mitigate that risk, so those training programs are actually being
1352 developed based on the operations that are required.

1353 And in some instances, I will take a utility company. That
1354 utility company might want to see additional training before they
1355 are going to let someone fly near and do inspections of one of
1356 their substations, for example. So we are in the process in AUVSI
1357 of getting those remote pilots together and looking at how do we

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1358 develop that process of training pilots.

1359 Mr. Cardenas. Okay, thank you. Well, this next question
1360 goes to all of you, whoever would like to answer it. Many national
1361 infrastructure and transportation technology achievements have
1362 been made possible in the past by a government investment, for
1363 example, Congress's \$25 billion authorization to construct an
1364 Interstate Highway System.

1365 So what is the role of government investment in the
1366 advancement of automated technology, any kind of partnership
1367 going on? Our university grants, I mean can we take credit for
1368 something?

1369 Mr. Holzer. I will only talk about the employment side.

1370 Mr. Cardenas. Okay.

1371 Mr. Holzer. And all of the jobs that you mentioned will
1372 require some new training and the jobs created actually are much
1373 broader. And Mr. Wynne talked about the jobs directly associated
1374 with this technology, but as prices and costs come down the entire
1375 retail sector could expand. And as I said, consumers will have
1376 more income to spend so they can spend that economy wide.

1377 So the whole range of jobs will require skilled workers and
1378 public investments. We have got to make sure those public
1379 investments are efficient and done well, but there is already a
1380 large public role in higher education and workforce development,
1381 and I think it was very important that that role continue as we

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1382 make those services more effective as well.

1383 Mr. Wynne. And I will specifically say UTM is extremely
1384 important, unmanned aircraft system, traffic management system.
1385 That is going to require, it is going to require R&D. That R&D
1386 is largely being done, initiated inside of NASA. It is now being
1387 done in conjunction with the FAA and in collaboration with
1388 industry.

1389 So, but that requires some investment on the part of the
1390 government. And it is much like when we established the air
1391 traffic control system in the mid-'30s and late '30s, it is going
1392 to require some leaning in by the government.

1393 Mr. Chidamber. If I may, and I have two examples. Flirtey
1394 was given space in the engineering lab at the University of Reno
1395 when we couldn't afford rent and that was possible because the
1396 people in the university and the people in the government made
1397 that possible. And now we recruit people from a graduate program
1398 and an undergraduate program in drone engineering from that very
1399 school, you know, so we have repaid it many times over already.

1400 Similar situation in Virginia Tech, without Virginia Tech
1401 we could not have done the first drone delivery in Wise County
1402 in Virginia 2 years ago, and that is because Virginia Tech
1403 supported us, helped us; helped us in testing. It was part of
1404 the UAV test facilities that had been set up by the FAA and because
1405 of all of that we were able to do what we did and grown from there.

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1406 Mr. Cardenas. Thank you, Mr. Chairman.

1407 Mr. Latta. Thank you very much. The gentleman's time has
1408 expired. The chair now recognizes the gentleman from West
1409 Virginia for 5 minutes.

1410 Mr. McKinley. Thank you, Mr. Chairman, and thank you again
1411 for another very interesting panel and discussion. You are never
1412 short of vision on where you want to take this.

1413 I am intrigued with it because I get, Mr. Lehmann, your first
1414 -- I can remember 60 years ago we used to have couriers deliver
1415 groceries in our small community, so it is not something new. It
1416 is just you are apparently doing it in a more proficient way. It
1417 didn't last very long, but it was an interesting concept to have
1418 groceries delivered 60 years ago.

1419 But I want to focus more on the consumer protection part of
1420 this. I am curious from the panel what regulations or rules are
1421 out there now to control what can be delivered using a drone or
1422 a courier for that matter? Can they -- because I am interested
1423 in liability with it and also for consumer protection because we
1424 have got a drug problem in this country that is pretty severe.
1425 Not pretty severe, it is severe.

1426 And could we be -- are you able now, under your rules are
1427 you able to deliver products from one household to another using
1428 a courier or using a drone? Is there a rule on that?

1429 Mr. Lehmann. On the Postmates platform currently that is

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1430 not possible. The use of the couriers is tied to a purchase in
1431 a retail store that we enable on our platform. But just as a
1432 broader question, I believe that there are many better ways to
1433 disguise the delivery of drugs, for example, than to do it on
1434 platforms that use a lot of technology where it is difficult to
1435 disguise the identities of everyone involved.

1436 Mr. McKinley. But if this is the advent of what we are going
1437 to see more of, do we have a role here for government on consumer
1438 protection to develop some standards or things that you cannot
1439 whether it is drugs, shipping across state lines that maybe would
1440 be inappropriate, weapons that could be shipped from it could be
1441 a retail store to a home and not being under control; is that
1442 possible now that that could happen that you could ship a weapon?

1443 Mr. Lehmann. Not on the Postmates platform, our terms in
1444 services wouldn't allow that. But we operate under the federal
1445 and the state laws of each of the states, municipalities, and
1446 communities that we are operating in.

1447 Mr. McKinley. Are there any standards by which you ship or
1448 is that just something you all set? Are there standards set by
1449 the government about what can be shipped by courier or by a drone?
1450 Are there any standards out there by the government?

1451 Mr. Chidamber. I do not believe there are any special, I
1452 don't think there are any special new guidelines that have been
1453 issued by the government, but I think the rules that apply to all

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1454 couriers, all other transportation mechanisms like FedEx or UPS,
1455 all those things still apply.

1456 Mr. McKinley. Let me find out more about that because I am
1457 curious about that. I think the concept is very interesting. It
1458 has been around for a long time, but with the advent of some of
1459 the other activities that have been going on, the bad actors out
1460 there, I am just concerned about it.

1461 Now from also a standpoint of intrusion, would drones into
1462 a community maybe per acre perhaps, is having access to five drones
1463 in an acre that is acceptable? Is that something or is it 20
1464 drones per acre that come in? Where does it stop and where do
1465 we intrude on people's privacy of sound, because these things
1466 aren't necessarily quiet. So if we reach that point that we have
1467 this proliferation, are we starting to have a problem for people
1468 and their privacy in their residential area?

1469 Mr. Chidamber. Would you like to take that first?

1470 Mr. McKinley. What is the appropriate level of drone
1471 activity in a community? Is it 10 per acre, 1 per acre?

1472 Mr. Wynne. I think you are raising a very interesting
1473 question, sir. I don't have an answer to that question because
1474 we are nowhere near that level of adoption and I think it is
1475 appropriate that we think about that. I will tell you this, that
1476 you know as the driver of an electric vehicle that makes zero
1477 noise, which I thought was good for my neighborhood, there are

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1478 people in the neighborhood who are concerned about me running over
1479 their children because they won't hear it coming. I haven't done
1480 that yet. I am not aware of that ever happening with an electric
1481 vehicle.

1482 And I can tell you that you know the noise that a drone makes
1483 is largely a function of what the quality of its propellers. So
1484 I look at this from the standpoint of I represent an industry that
1485 is dedicated to getting this technology into the mainstream and
1486 creating value for society as well as economic business, economic
1487 opportunity for that society, so I think you know that can't be
1488 done without it being done sustainably. We have to consider the
1489 kinds of questions that you are raising and I think it is very
1490 appropriate that we do that.

1491 Mr. McKinley. Well, thank you very much. I yield back.

1492 Mr. Latta. Thank you. The gentleman yields back and the
1493 chair now recognizes the gentleman from Florida for 5 minutes.

1494 Mr. Bilirakis. Thank you. Thank you, Mr. Chairman. I
1495 appreciate it.

1496 Mr. Chidamber, in your testimony you mentioned the two-prong
1497 mission of the FAA to promote safety in air commerce and also to
1498 foster air commerce in the United States. So do you believe the
1499 FAA is fulfilling its full mission?

1500 Mr. Chidamber. I believe the FAA is doing remarkably well
1501 in its safety mission, for sure. We have the safest, most crowded

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1502 airspace in the world, no question about that. Thanks to the FAA
1503 they are making sure it is the safest place on the planet to fly
1504 aircraft. On the part of air commerce, I think that has not been
1505 of equal emphasis at this point. Certainly with respect to
1506 unmanned air vehicles they are making clear steps in that
1507 direction.

1508 Mr. Bilirakis. What do they need to be doing, in your
1509 opinion?

1510 Mr. Chidamber. There are three basic areas where we would
1511 like to see speedier approvals for trials and for eventual
1512 dissemination of this sort of technology. We need to be able to
1513 fly beyond visual line of sight. We need to be able to fly over
1514 people. And we need to be able to have one operator control
1515 multiple drones. Right now those three things are not on the
1516 cards yet.

1517 So gradually we have to get there in terms of allowing for
1518 experimentation, proving, data gathering, and then eventual, you
1519 know, release of those things as a standard operating procedure.
1520 So those things need to happen.

1521 Mr. Bilirakis. Okay. You also mention in your testimony
1522 that in June of 2016, Flirtey highlighted other benefits of its
1523 commercial delivery system with the delivery of medical supplies.
1524 Can you discuss the extent of the demonstration like how many
1525 deliveries in how many hours, the maximum weight they can handle,

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1526 et cetera? If you can elaborate on that I would appreciate it
1527 very much. It is very interesting, yes.

1528 Mr. Chidamber. Sure. You are referring to the one in Cape
1529 May, New Jersey, I take it?

1530 Mr. Bilirakis. Yes, yes, yes.

1531 Mr. Chidamber. What was happening was there was a boat off
1532 on the water and from there a drone took off and landed on land.
1533 There was a doctor who was collecting samples, biological samples,
1534 so the weight of it was not that much. We can carry up to about
1535 seven or eight pounds in terms of payload, so it was well
1536 underneath that.

1537 So the drone that takes off, goes back to the boat where
1538 presumably a -- it was a simulation, mind you. So presumably on
1539 the other side tests can be performed, let's say, you know, is
1540 somebody affected with malaria and things of that nature and you
1541 could then ship back medication which the doctor could then
1542 administer to the patient and people like that. That was the
1543 simulation that was done.

1544 There is a few things here that was significant. Dr. Amukele
1545 from Johns Hopkins, who conducted the medical practice of it, he
1546 is interested in looking at blood samples and what happens to blood
1547 samples if you ferry them by drone. Do they spoil, do they change,
1548 I mean is it affected? And we have been doing tests on all of
1549 these sorts of things and we are happy to report that a lot of

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1550 medical samples can indeed be delivered using drone without any
1551 detriment to their medical condition.

1552 Mr. Bilirakis. Well, that is good news. What other ways
1553 in examples could this benefit the public when, you know, natural
1554 disasters or terrorist attacks may happen? Give me some other
1555 examples how this would benefit the public.

1556 Mr. Chidamber. Food, medicine, water, cell phones, any
1557 number of things of that sort. I mean the heartrending scenes
1558 that we saw from Katrina when there were signs being painted on
1559 top of roofs saying I need medicine, I don't have it and there
1560 is water everywhere, nobody can get to that person. That sort
1561 of stuff can be avoided. Whatever that person needs, if they are
1562 in contact with someone a drone can bring it over to them exactly
1563 where they are which is remarkable. I think we could have saved
1564 lives in Hurricane Katrina for sure if you had drones deployed
1565 there.

1566 Mr. Bilirakis. And you said they could carry up to 7 to 8
1567 pounds; is that right?

1568 Mr. Chidamber. Yes, and the payloads are increasing
1569 everyday as the technology gets better.

1570 Mr. Bilirakis. Okay, so fascinating, thank you very much.
1571 Well, let's see, I have 22 seconds, quickly, Mr. Chairman. Mr.
1572 Wynne, can you please provide us with some example of what the
1573 companies are doing as far as testing with regard to the delivery,

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1574 please?

1575 Mr. Wynne. I mentioned that some of the delivery companies
1576 are already doing deliveries from their trucks in rural areas,
1577 so that is already happening. There are places in Africa where
1578 medical supplies have been delivered. I don't remember if it was
1579 Flirtey or not.

1580 Mr. Chidamber. No, it wasn't.

1581 Mr. Wynne. But a number of companies --

1582 Mr. Chidamber. It was a competitor.

1583 Mr. Wynne. -- have been doing that. I beg your pardon.

1584 [Laughter.]

1585 Mr. Chidamber. A nameless competitor.

1586 Mr. Wynne. I am in the unenviable position of being able
1587 to root for everyone to win.

1588 Mr. Bilirakis. It is always good to have competition to
1589 bring the prices down.

1590 Mr. Wynne. Yeah, and I think right now those are the most
1591 obvious. Probably the one that captures my attention is that we
1592 have, you know, Global Hawk, which is a fairly sizeable platform
1593 that does hurricane, early detection of hurricanes off the east
1594 coast of Africa, 32, 36-hour endurance that literally flies out
1595 of Wallops and, you know, for NOAA. So that is beyond visual line
1596 of sight and, you know that is the kind of work that can be done
1597 that quite literally, you know, the Jim Cantores of the world are

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1598 really excited about.

1599 Mr. Bilirakis. Very good. Thank you, Mr. Chairman. This
1600 is a great hearing, I appreciate it. I yield back.

1601 Mr. Latta. The gentleman's time has expired and he yields
1602 back. The chair now recognizes the gentleman from Pennsylvania
1603 for 5 minutes.

1604 Mr. Costello. Thank you, Mr. Chairman.

1605 Last session in Congress I had the distinction of serving
1606 on the Transportation Committee, specifically the Aviation
1607 Subcommittee, and paid close attention to the FAA regulations as
1608 well as what I would say is a bit of a hands-off approach to UAVs.
1609 And it has been very interesting to see just how rapidly this
1610 sector of the economy has embraced UAVs as a delivery system and
1611 I think very clearly that is going to continue. It obviously
1612 raises questions related to jurisdiction and what kind of
1613 regulatory framework we need, how much more intense it might need
1614 to be or how light it should remain. So my questions relate to
1615 the waivers granted by FAA for commercial use of unmanned systems.

1616 Mr. Wynne, I would ask you, related to the waiting line for
1617 waivers do you think it is still too long? I mean obviously you
1618 would like to get same-day approval, but share with me your
1619 experience there as well as how we might be able to streamline
1620 authorizations, develop best practices -- which I think is
1621 emerging -- and ensure that the FAA's designated test sites are

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1622 used effectively.

1623 Mr. Wynne. We recently launched the Remote Pilots Council
1624 to gather those pilots that are starting to fly under Part 107,
1625 have been for the last 8 months. In nine cities around the country
1626 we met with folks. The FAA participated in all of those meetings
1627 which was a sign of their collaborative attitude.

1628 And the biggest complaint of course, and that is what pilots
1629 do when we get together and we complain about the FAA, the biggest
1630 complaint, discussion point was how long it takes to get a waiver.
1631 No one was surprised by that and the FAA is, I think, making good
1632 efforts to try and reduce those times.

1633 And sir, you will recall that we had the same problem with
1634 333 exemptions back when that was the only way to fly commercially,
1635 but what happened over time was the swim lanes as it were what
1636 was required in order to get a waiver, what was required to get
1637 a 333 exemption became clearer and clearer and that process got
1638 almost batch processed after a while.

1639 As I indicated in my written testimony, we really need to
1640 automate this process. The FAA agrees we need to automate this
1641 process and they are making best efforts to do that. The waiver
1642 process should be much faster than it is today and as we go forward
1643 I think we will be.

1644 Mr. Costello. Do you want to compare that to other
1645 countries? And Mr. Chidamber and anyone else, if you want to

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1646 weigh in after Mr. Wynne sort of comparatively looks at how other
1647 countries address the issue.

1648 Mr. Wynne. Anecdotally, there are places where it is less
1649 restrictive in -- but I think generally speaking that it not
1650 necessarily in urban areas or congested airspace. So I think we
1651 are doing fine under Part 107. I think if we have got the ability
1652 to get the ability to do more things under waivers and ultimately
1653 we can fly over people, which is the next stage in the regulatory
1654 process we are going to continue to lead in this country.

1655 Mr. Chidamber. I agree with Mr. Wynne completely. The FAA
1656 has made huge strides. When we did our first thing in 2015, we
1657 placed our requirements with the FAA. I think it was in February
1658 of 2015, it was only in June or July that we got the waiver. Now
1659 it is much faster, all of these things are faster.

1660 To address your question about how it is in other places,
1661 I think Australia and New Zealand are the two countries which have
1662 really been further ahead than everybody else in this matter.
1663 When we did our test with Domino's in Auckland, I think the waivers
1664 were got within 24 to 48 hours which is a lot faster than what
1665 it is here, but so we should get faster as well.

1666 Mr. Costello. Help me understand, Mr. Wynne, major
1667 companies have begun testing the capabilities of unmanned systems
1668 to deliver products and packages, how big would the products be
1669 or packages be? Like look ahead 10 years, 20 years, where do you

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1670 think -- at some point in time, logically, it will sort of manifest
1671 itself to the maximum physical size. What do you think that looks
1672 like? What do you think the future holds?

1673 Mr. Wynne. I don't have a good way to answer that question
1674 because Uber Elevate just came out with a platform that you could
1675 get in and fly autonomously and they are wanting to operationalize
1676 that in 5 years, which is, you know, taking this technology and
1677 super-sizing it in some respects.

1678 But I think I backup from an economics point of view and say
1679 the vast majority, an astonishingly high percentage of packages
1680 delivered in this country are under five pounds. Congressman
1681 Price, when I was testifying before Appropriations Committee on
1682 Transportation last week, asked me to speak to congestion and
1683 capacity. We have enormous amounts of capacity below 400 feet,
1684 whereas we have very little capacity on the roads today.

1685 Mr. Costello. Right.

1686 Mr. Wynne. And with e-commerce continuing to advance there
1687 will be more and more trucks on the road delivering five pounds
1688 or less packages, which I think we could deliver when the airspace
1689 is empty at night for noise abatement reasons. So I think that
1690 it balances out at some point, but I think there is an enormous
1691 opportunity just up to five pounds.

1692 Mr. Costello. Thank you. I yield back.

1693 Mr. Latta. Well, thank you very much. The gentleman yields

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1694 back the balance of his time. And seeing that there are no other
1695 witnesses, or members asking questions to our panel today, I want
1696 to thank you again for being with us today, again very, very
1697 insightful.

1698 And pursuant to committee rules, I remind all members that
1699 they have 10 business days to submit additional questions for the
1700 record and I ask that witnesses submit their response within 10
1701 business days upon receipt of those questions. And, without
1702 objection, the subcommittee stands adjourned.

1703 [Whereupon, at 11:55 a.m., the subcommittee was adjourned.]

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