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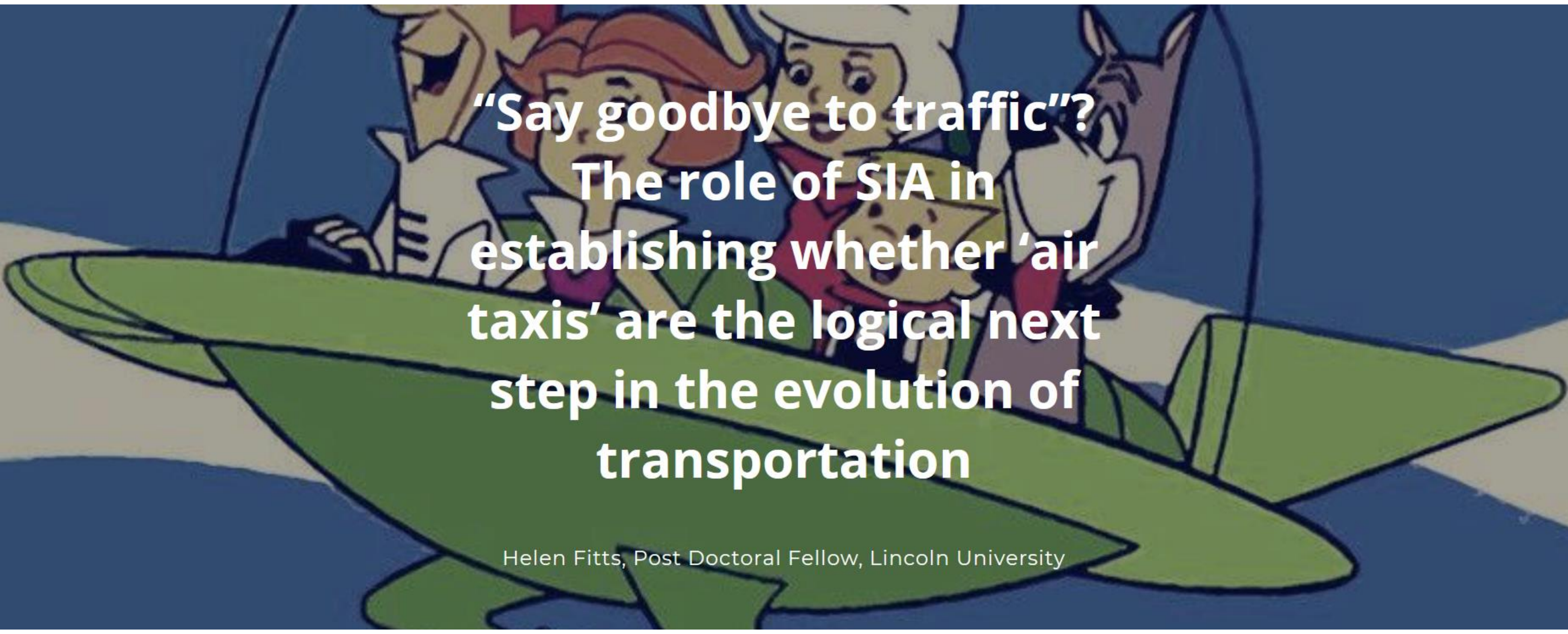

"Say goodbye to traffic"? The role of SIA in establishing whether 'air taxis' are the logical next step in the evolution of transportation

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Introducing Air Taxis

The idea of zipping to work, or whizzing to the beach, in an electric, driverless helicopter taxi might sound like science fiction. However, several companies are developing technology that aims to make this scenario a reality *(Cora, 2019; Opener, 2019; Volocopter, 2019)*. For example, California-based company Kitty Hawk and New Zealand operator Zephyr Airworks are testing a vehicle they describe as an 'air taxi'—and have affectionately named 'Cora' *(Cora, 2019)*. While the vehicles being tested are exciting from technological and experiential perspectives, we really should be considering the potential impacts of such transformative technology. The pictures painted by technology developers are of clean, quiet electric flight, open to everyone, never stuck in traffic, and revolutionising everyday travel.

But here's the rub: transport systems are just not that simple.

Impacts of travel

Transport is critical to almost everything we do. It influences where we are able to live and work, the opportunities that are open to us and those that are closed, and the social networks that we are able to establish and maintain. Consequently, when we change how we get around, we change how society works.

Back in 1932, HG Wells noted that we really should have anticipated the consequences of travel by motorcar:

See how unprepared our world was for the motorcar. The motorcar ought to have been anticipated at the beginning of this century; it was bound to come. It was bound to be cheapened and made abundant. It was bound to change our roads, take passenger and goods traffic from the rails, alter the distribution of our population, congest our towns with traffic. It was bound to make it possible for a man to commit a robbery or murder in Devonshire overnight and breakfast in London or Birmingham. Did we do anything to work out any of these consequences of the motor car before

they came? Not much. We did nothing to our roads until they were choked. We did nothing to adjust our railroads to fit in with this new element in life, until they were overtaken and contemplating the possibilities of bankruptcy. We have still to bring our police up to date with the motor bandit. *(Wells, 1932)*

Over 85 years later, we are still grappling with issues of congestion, population distribution (think: housing affordability), and environmental degradation that are inherently linked to private motor vehicle travel. As we face a whole raft of new transport innovations, from electric scooters to automated flying taxis, it is appropriate to ask whether we can apply what we know about how transport and society interact to consider which new technologies to prioritise and what kinds of impacts we may have to accommodate or mitigate.

Induced demand

A key principle to explore here is induced demand. Induced demand, in a very simple sense, refers to the idea that when we make it quicker and easier to travel, people travel more (for a more detailed discussion of induced demand see Schneider, 2018). This idea has most commonly been applied to road traffic and the construction of new road capacity *(Downs, 1962; Dunkerley, Laird, & Whittaker, 2018; Litman, 2019)*. Particularly, it has been recognised that when a new road is built (or an existing road improved) to ease congestion, an increase in vehicles travelling on that route often results *(Dunkerley et al., 2018)*. This increase in vehicle travel is thought to stem from travellers changing their travel choices in response to quicker and easier travel. Indeed, it is often reported that individuals spend a relatively fixed amount of time per day travelling, and when travel speeds increase, rather than spending less time travelling, people typically travel further *(Bleijenberg, 2017; Marchetti, 1994; Zahavi, 1979)*.

In a practical sense, when congestion is high, travellers may choose to forego trips rather than battle traffic, to choose nearby destinations rather than more distant ones (such as local shops rather than larger malls), to use active or public transport rather than experience the stress of driving, or to avoid peak-hour travel *(Litman, 2019)*. All of these strategies reduce peak traffic volumes, but when congestion reduces, they can easily be reversed. Anthony Downs, one of the early pioneers of the idea of induced demand wrote:

We thus arrive at the paradoxical conclusion that the opening of an expressway could conceivably cause traffic congestion to become worse instead of better, and automobile commuting times to rise instead of fall! *(Downs, 1962, p. 405)*

Could air taxis induce demand?

Cora is currently a test vehicle, but is claimed to be “the beginning of a journey towards everyday flight, where air travel will be woven into our daily lives” *(Cora, 2019)*, and a promotional video suggests that “ultimately, in the decades to come, there will be tens of thousands of these aircraft” *(Cora, 2018)*. Other companies make similar claims. It seems relevant, then, for impact assessors to ask what kind of demand automated helicopter taxis might induce and with what implications. I asked this question following a presentation by a representative of Zephyr Airworks at a conference in mid-2019 (Kominik, 2019). Ms Kominik’s response humorously noted that she did not envisage Jetsons-style aerial congestion within her lifetime. Her response also appeared to abdicate responsibility for wider future implications by commenting that future generations would have the opportunity to make decisions about the type and extent of future transport systems.

A less offhand, and more intergenerationally just, response to the demand inducing potential of helicopter taxis might note the, albeit perhaps temporally distant, possibility of aerial congestion. If we expand current vehicle travel possibilities to include cheap and quick aerial taxis, we may shift trips from existing modes and increasingly include trips that we do not currently make. Trips to a better (more distant) mall, beach, dentist, workplace, or restaurant might all become more feasible, resulting in additional travel and increasing numbers of aerial vehicles.

Airspace

With air taxis, conflicts for air space may intensify. Air taxis may compete for space with unoccupied drones, traditional air traffic, and landowners who do not wish to be under flight paths (for a contemporary example of such conflict see *Hunt, 2019*). Airspace is not infinite, is usually governed by use regulations *(Civil Aviation Authority of New Zealand, 2019a, 2019b)*, and could become congested if vehicles like Cora succeed in the "mission of bringing everyday flight to everyone" *(Cora, 2019)*. Downs (1962) noted that:

…only a road or system of roads wide enough to carry every commuter simultaneously at optimal speed would be sufficient to eliminate all peak-hour congestion. It is obvious that no such roads are practical unless we convert our metropolitan areas into giant cement slabs.

It is relevant to consider how much of our urban airspace we would be willing to devote to aerial transport, how much aerial congestion we would be willing to tolerate in the skies above us, and how this may influence the safety and comfort of those on the ground. Electric aerial vehicles may be quiet and clean (compared to combustion driven vehicles) but the implications of things like aerial collisions, changed urban wind environments *(Crew, 2017)*, visual pollution, and implications for urban bird populations are worthy of forethought.

On the ground

It is well accepted that the way we travel influences the shape and size of urban areas. Increased travel speeds have a history of contributing to the development of urban sprawl *(Bruegmann, 2005; Newman & Kenworthy, 1996)*. If air taxis facilitated everyday aeromobility, we may see the further development of urban sprawl with all of its usual associated impacts for the environment, for equity, accessibility, and social networks, and for active travel and population health. The high energy requirements of take-off mean that aerial vehicles are more efficient over longer, rather than shorter trips *(Kasliwal et al., 2019)*. This may help to encourage people to make longer journeys resulting in the redistribution of populations and amenities. One technology developer proudly envisions a future in which people will have "the freedom to live in the country, while still being able to work in the city" (Opener, 2019); the developer does not highlight the potentially broad implications of such social change.

We may see reductions in land used for ground transport (such as roads and parking facilities) *(Kasliwal et al., 2019)*, but we might also need greater devotion of land to the generation of sufficient electricity to power electric aerial vehicles. The ground-based implications of air taxis are not as straightforward as the simple elimination of congestion.

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Conclusions

A Jetsons-style era of everyday aeromobility may not be imminent, but efforts are underway to develop vehicles capable of delivering such a future. We know from historical precedent that changes in transport technology can have profound impacts on how our society works *(Wells, 1932)*. We also know that once we have embarked on widespread adoption of a particular form of mobility it can be difficult to change direction *(Imran & Pearce, 2015)*. Consequently, before we accept that air taxis are "the logical next step in the evolution of transportation" and we can "say goodbye to traffic" *(Cora, 2018)* we should consider, and take responsibility for, the full range of impacts that might be associated with such a transition. Herein lies a challenge for social impact assessment.

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