

**New York City Council
Committee on Technology**

**Oversight - Follow up on Local Law 49 of 2018 in Relation to
Automated Decision Systems Used by Agencies.
January 22, 2020**

*Written testimony of
Marc Canellas*

Vice-Chair, IEEE-USA Artificial Intelligence and Autonomous Systems Policy Committee

Good morning Chairman Holden and members of the Committee on Technology,

My name is Marc Canellas, and I serve as the Vice-Chair of the IEEE-USA’s Artificial Intelligence and Autonomous Systems Policy Committee (referred to as the “AI Policy” Committee).¹ Our AI Policy Committee is responsible for advocating on behalf of the public policy interests of U.S. IEEE members on any topic related to artificial intelligence and autonomous systems, including the Automated Decision Systems (ADS) of interest today. We are a volunteer committee of the Institute of Electrical and Electronics Engineers, Inc. (IEEE, pronounced “Eye-triple-E”), the largest association of technical professionals in the world with over 422,000 members in over 160 countries.² I am grateful for the work done by my friends and colleagues at the IEEE considering how best to harness the promise and avoid the pitfalls of AI systems, but the specific conclusions in this testimony are my own.

I hold a Ph.D. in Aerospace Engineering from the Georgia Institute of Technology. I am currently a second-year law student at New York University’s School of Law. I have previously served as an IEEE-USA Science and Technology Fellow in the United States House of Representatives. My research, funded by the Department of Defense and National Science Foundation, focused on how to design and deploy ADS in complex, safety-critical environments in the aerospace and defense domains. As a law student, I have interned with the Neighborhood Defender Service of Harlem’s Family Defense Unit and the Federal Defenders of New York and seen the most punishing aspects of ADS being inflicted on New Yorkers.

The Task Force Had the Opportunity to Lead

The past two years have been a watershed moment for the governance of Artificial Intelligence (AI) and ADS. Government commissions and agencies in the United States and around the world have established procedures, processes, principles and recommendations for meaningful and ethical governance of AI. As officials acting for the benefit of their community, they recognize that they are trusted with the lives and livelihoods of their citizens. They recognize that they have an obligation to answer questions about the role

¹ The Artificial Intelligence and Autonomous Systems Policy Committee brings together IEEE members with experience and expertise in the various disciplines used in scientific field of artificial intelligence (AI) to address the public policy needs of the S&T community working with this important emerging technology. The committee meets as needed to address current events and the emerging questions related to AI and publishes position statements that reflect a consensus viewpoint of IEEE’s U.S. membership, and which IEEE-USA staff will use to guide advocacy efforts within the United States. Specific uses include, but are not limited to, legislative advocacy, rule-making notice-and-comment letters, and advocacy efforts with the US Administration and federal agency officials.

² <https://ieeeyusa.org/volunteers/committees/aiaspc/>
<https://www.ieee.org/about/today/at-a-glance.html>

of technology in modern life. They recognize they are responsible for publicly addressing the risks to fundamental rights and freedoms.

Just a few weeks ago, the White House released the first-of-its-kind AI principles for executive agency regulators: public trust, public participation, scientific integrity and information quality, risk assessment and management, benefits and costs, flexibility, fairness and non-discrimination, disclosure and transparency, safety and security, and interagency coordination.³ In 2019, the Department of Defense's (DOD) Defense Innovation Board adopted a set of principles stating that the ethical development and application of AI is responsible, equitable, traceable, reliable, and governable.⁴ Also in 2019, the National Institute of Standards and Technology (NIST) established a plan for developing technical standards related to AI.⁵

Europe is making progress, too. In late 2018, the Council of Europe, the international organization devoted to upholding human rights, democracy, and the rule of law in Europe, adopted five principles for the use of AI: respect for fundamental rights, non-discrimination, quality and security, transparency, and user-control.⁶ This past October, Germany released a set of ethical guidelines for protecting “the individual, preserving social cohesion, and safeguarding and promoting prosperity in the information age”: human dignity, self-determination, privacy, security, democracy, justice and solidarity, and sustainability.⁷

It is against this backdrop that the New York City ADS Task Force Report is particularly disappointing. Within two years, each of these national and international commissions and agencies have been able to begin, establish and successfully complete their guiding principles and recommendations, while the ADS Task Force conclusion was that there “aren’t easy answers to these questions.”⁸

Good Governance Requires Good Design

No “easy answers.”

That was the conclusion of the Chairs of the Automated Decision Systems Task Force. As a subject-matter expert in ADS, I must respectfully disagree. There are easy answers. Answers that other government bodies have embedded in their principles and recommendations. Answers that entire technical disciplines have been developing for decades to help build safe and effective automated systems that are relied upon each day. The “easy” answer is to require good design – to require that the ADS works.

³ <https://www.whitehouse.gov/wp-content/uploads/2020/01/Draft-OMB-Memo-on-Regulation-of-AI-1-7-19.pdf>

⁴ https://media.defense.gov/2019/Oct/31/2002204458/-1/-1/0/DIB_AI_PRINCIPLES_PRIMARY_DOCUMENT.PDF

⁵ <https://www.nist.gov/document/report-plan-federal-engagement-developing-technical-standards-and-related-tools>

⁶ <https://rm.coe.int/ethical-charter-en-for-publication-4-december-2018/16808f699c>

⁷ “The [German] Data Ethics Commission holds the view that regulation is necessary, and cannot be replaced by ethical principles... This is particularly true for issues with heightened implications for fundamental rights that require the central decisions to be made by the democratically elected legislator.”

https://www.bmjv.de/SharedDocs/Downloads/DE/Themen/Fokusthemen/Gutachten_DEK_EN.pdf?__blob=publicationFile&v=1

⁸ The NYC Automated Decision Systems Task Force Report’s opening letter from the Chairs highlight two questions at the center of their report: First, “[w]hat do the values of equity, transparency, and accountability that are already embedded in our work mean in [the] context [of Automated Decision Systems]?” Second, “[h]ow do we make sure that the technologies that can help improve the lives of those who rely on local government services are being used in an ethical manner and do not have unintended consequences that are unfair or harmful?” The Chairs conclude that “there aren’t easy answers to these questions.” <https://www.documentcloud.org/documents/6561086-ADS-Report-11192019-1.html>

There are many charges fairly levied against ADS: from embedding bias and discrimination, eviscerating privacy, or undermining fairness and due process of law. Unfortunately, lawmakers interpret this language as requiring them to develop entirely new and novel principles for designing AI and related technologies that are divorced from anything we've seen before. That is simply not true.

Framing any governance as new and novel is too often used to justify long deliberation processes, undue delay, and complete inaction, or to justify baseless claims that governments are demanding too much from technologists – supposedly impeding innovation and entrepreneurship.

Principles of civil liberties and civil rights are critical to comprehensive governance of ADS. But we cannot use those necessary discussions as a justification to force New Yorkers who are losing their jobs, losing their children, and losing their freedom to wait for basic protections that are already long past due.

Defining Good Design: Does It Work?

Does it work? Those are the three words that every ADS designer and regulator ought to answer before any ADS is deployed. Although questions of bias, transparency, and accountability must be discussed, a functional design is a necessary foundation to ensure a minimum standard of safety and efficacy.

- What are the ADS' capabilities and its limitations?
- What is the ADS' effect on the people who will use it, the organizations where it will be used, and the people upon whom it will be used?
- Has the ADS been independently verified and validated?

These principles of good design are so embedded in our daily lives that we take them for granted. When your doctor prescribes medicine for you or your children, you inevitably ask, "Does it work?" You ask about what the medicine can and cannot do (capabilities and limitations), whether it will work for your circumstances or have relevant side-effects (effects), and how it has been tested (independent verification and validation). Because the Federal Drug Administration requires good design to achieve basic safety and efficacy,⁹ and requires that the medicine actually works, you can make informed decisions about your health and trust your doctor's prescription.

Good design is so embedded in our lives, it is assumed in many of these discussions about bias, transparency, and accountability when it should not be. Without knowing the ADS' capabilities and limitations, intended effects, or whether it has been verified and validated, how can anyone begin to determine bias, transparency, or accountability in a meaningful way?

Imagine a facial-recognition system that is twice as accurate in identifying Caucasian faces compared to faces of people of color.¹⁰ This is clearly a biased system that needs investigation. But then it is revealed that the system is only 10% accurate overall. With that information, it does not matter that the system is biased. Minor modifications to the ADS will not improve it. It fundamentally does not work and should not be deployed.

⁹ <https://www.fda.gov/drugs/drug-information-consumers/fdas-drug-review-process-ensuring-drugs-are-safe-and-effective>

¹⁰ "Twice as accurate" is used as a hypothetical example of a facial-recognition system that may be able to be modified into some sort of compliance. However, the reality for facial-recognition system accuracy is much worse. The National Institute of Standards and Technology tested 189 facial-recognition algorithms from 99 developers, representing the majority of commercial developers. They found that the facial-recognition systems "falsely identified African-American and Asian faces 10 to 100 times more than Caucasian faces."
<https://www.nytimes.com/2019/12/19/technology/facial-recognition-bias.html>

The power of “Does it work” is that it is a factual question. It is not normative or aspirational. Designers can comprehensively disclose the ADS’ capabilities and limitations, how the ADS will affect organizations and people, and the results of independent verification and validation. That is demanded in the aviation and defense industry. That is demanded of our medicine. It ought to be demanded of ADS here in New York City.

Many of the ADS that undermine the rights and privileges of New Yorkers are flawed at their core because they simply do not work. Enforcing the minimum standard of good design is a path towards meaningful governance and regulation of ADS that can start today. It is found in each of the principles already adopted by the White House (scientific integrity and information quality, and safety and security¹¹), the DOD Defense Innovation Board (reliability and traceability¹²), the Council of Europe (quality and security¹³), and the German Data Ethics Commission (security¹⁴).

Requiring good design will not stop all the inequitable, opaque, and unaccountable ADS, but it will begin to stop much of the tragic experimentation of pseudo-scientific, techno-solutionist automated decision systems on New Yorkers who need protection the most.

Where technologists may claim ignorance of the principles of due process, privacy, civil rights, and biases, they cannot ignore the principles of good design – they are the established foundations of engineering design and computer science.

IEEE: An American and World Leader in ADS Governance

Just like the FDA looks to biochemists and medical doctors for guidance, or the FAA looks to aerospace engineers and human factors engineers, this Council ought to look to engineers and technologists specialize in human-centered ADS design – especially those at the IEEE.

¹¹ Scientific Integrity and Information Quality: “The government’s regulatory and non-regulatory approaches to AI applications should leverage scientific and technical information and processes. ...Best practices include transparently articulating the strengths, weaknesses, intended optimizations or outcomes, bias mitigation, and appropriate uses of the AI application’s results. Agencies should also be mindful that, for AI applications to produce predictable, reliable, and optimized outcomes, data used to train the AI system must be of sufficient quality for the intended use.” Safety and Security: “Agencies should promote the development of AI systems that are safe, secure, and operate as intended, and encourage the consideration of safety and security issues throughout the AI design, development, deployment, and operation process.” <https://www.whitehouse.gov/wp-content/uploads/2020/01/Draft-OMB-Memo-on-Regulation-of-AI-1-7-19.pdf>

¹² Traceable: “AI engineering discipline should be sufficiently advanced such that technical experts possess an appropriate understanding of the technology, development processes, and operational methods of its AI systems, including transparent and auditable methodologies, data sources, and design procedure and documentation.” Reliable: “AI systems should have an explicit, well-defined domain of use, and the safety, security, and robustness of such systems should be tested and assured across their entire life cycle within that domain of use.” https://media.defense.gov/2019/Oct/31/2002204458/-1/1/0/DIB_AI_PRINCIPLES_PRIMARY_DOCUMENT.PDF

¹³ Quality and Security: “Data based on judicial decisions that is entered into a software which implements a machine learning algorithm should come from certified sources and should not be modified until they have actually been used by the learning mechanism. The whole process must therefore be traceable to ensure that no modification has occurred to alter the content or meaning of the decision being processed. The models and algorithms created must also be able to be stored and executed in secure environments, so as to ensure system integrity and intangibility.” <https://rm.coe.int/ethical-charter-en-for-publication-4-december-2018/16808f699c>

¹⁴ Security: “Guaranteeing security entails compliance with stringent requirements, e. g. in relation to human/machine interaction or system resilience to attacks and misuse.” https://www.bmjv.de/SharedDocs/Downloads/DE/Themen/Fokusthemen/Gutachten_DEK_EN.pdf?__blob=publicationFile&v=1

IEEE has made its history in leveraging the technical expertise of its 420,000 engineers around the world. We advocate for public policy which adheres to the principles of good design, and to standardize these principles of good design in various industries.

ADS-related advocacy in the United States is led by the AI Policy Committee,¹⁵ of which I am the Vice-Chair. Our efforts at the federal level notably include organizing the bipartisan and bicameral Congressional AI Caucuses which includes 27 Representatives (23 Democrats, 4 Republicans)¹⁶ and 6 Senators (3 Democrats, 3 Republicans).¹⁷ In just this past year, our AI Policy Committee commented on the development of the federal privacy framework by the National Institute of Standards and Technology,¹⁸ endorsed Congressional legislation calling for the ethical development of artificial intelligence,¹⁹ sent a letter to the U.S. House and Senate leadership urging passage of legislation recognizing every American's digital privacy rights,²⁰ and endorsed NYU's proposal to establish the New York City's Center for Responsible AI.²¹ We also produced a report monitoring developments of AI around the world,²² discussed automation and labor at the Texas AFL-CIO Constitutional Convention,²³ and our members were recognized for their contributions to the DOD's Defense Innovation Board's newly adopted set of principles to guide ethical development and application of AI.²⁴

IEEE's Standards Association (SA) uses the same expertise in AI and ADS to establish formal standards for their design. IEEE SA plays a critical role in modern life. For example, the only way your phone or computer knows how to "talk" to the WiFi is because of the IEEE 802.11 Wireless Network Standards that define the "language" of WiFi.²⁵ In other words, if you want to connect to WiFi, the IEEE 802.11 standard is the only way to do it.

IEEE SA is now applying the same process to ADS-related technologies: if you want to design and deploy ADS, this is how you ought do it. IEEE has established the Global Initiative on Ethics of Autonomous and Intelligent Systems,²⁶ bringing together engineers, philosophers, social scientists, and lawyers from around the globe to leverage principles of good design into 14 standards addressing specific issues including: ethics

¹⁵ Position Statement: Artificial Intelligence Research, Development and Regulation (February 2017)

<https://ieeusa.org/wp-content/uploads/2017/10/AI0217.pdf>

¹⁶ <https://artificialintelligencecaucus-olson.house.gov/>

¹⁷ <https://www.heinrich.senate.gov/press-releases/heinrich-portman-launch-bipartisan-artificial-intelligence-caucus>

¹⁸ IEEE-USA and IEEE-SA Comments to NIST on Draft NIST Privacy Framework: A Tool for Improving Privacy Through Enterprise Risk Management. <https://ieeusa.org/wp-content/uploads/2019/10/102119.pdf>

¹⁹ Letter to Rep. Lawrence (Michigan) endorsing H. Res. 153, calling for the development of guidelines for ethical development of artificial intelligence. <https://ieeusa.org/wp-content/uploads/2019/04/032919.pdf>

²⁰ Letter to House and Senate leadership urging passage of legislation recognizing every American's digital privacy rights. <https://ieeusa.org/wp-content/uploads/2019/01/010719.pdf>

²¹ IEEE-USA Letter endorsing New York University's (NYU) Proposal to Establish the New York City Center for Responsible AI. <https://ieeusa.org/wp-content/uploads/2019/07/073019.pdf>

²² <https://ieeusa.org/volunteers/committees/aiaspc/ai-global-survey/>

²³ <https://www.txworkersunite.com/>

²⁴ AI&ASPC Chair Mina Hanna, AI&ASPC member Dr. Lydia Kostopoulos, and IEEE Executive Director Steve Welby were all recognized for their contributions to the U.S. Department of Defense's Defense Innovation Board's (DIB) newly adopted set of principles to guide ethical development and application of AI in DoD.

<https://innovation.defense.gov/ai/>

²⁵ *IEEE 802.11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*. (2016 revision). IEEE-SA. 14 December 2016. doi:10.1109/IEEESTD.2016.7786995.

<https://ieeexplore.ieee.org/servlet/opac?punumber=7786993>

²⁶ <https://ethicsinaction.ieee.org/#read>

in system design,²⁷ transparency of autonomous systems,²⁸ data privacy,²⁹ algorithmic bias,³⁰ child and student data governance,³¹ employer data governance,³² and children’s online rights.³³ There is a recent proposed project to develop a standard on organizational governance of AI.³⁴

There is so much wisdom within IEEE and the engineering community about what constitutes good design. Good design – that if demanded today – would limit and constrain many biased, discriminatory systems and applications before they are deployed, and before citizens are left to protect themselves from experimentation.

Forensic Science Tool: The Standard-bearer for Bad Design and Bad Governance

For far too long unsafe and ineffective ADS have deployed on New Yorkers. If those responsible for them had just asked, “Does it work?” so much heartbreak could have been avoided.

The one most disturbing to me is the Forensic Science Tool, known as ‘FST’. FST was an ADS developed in 2011 by the New York City’s Office of Chief Medical Examiner (OCME) to help their forensic scientists make identifications from DNA samples that were too tiny or contained a mix of more than one person’s genetic material.³⁵ FST emerged as a pioneering tool, beyond the standard FBI DNA practice and other public labs.³⁶ But while DNA evidence has been considered the gold standard of forensic evidence in criminal court, FST has been revealed as a standard-bearer of bad design.

There were fundamental and obvious flaws in FST. For example, the algorithm did not consider that different people in a mixture could be family and, therefore, share DNA. Even Dr. Bruce Budowle, an architect of the F.B.I.’s national DNA database, testified that the FST’s statistical methods were “not

²⁷ Model Process for Addressing Ethical Concerns During System Design: defining a process model by which engineers and technologists can address ethical consideration throughout the various stages of system initiation, analysis and design. (IEEE P7000™) https://standards.ieee.org/news/2016/ieee_p7000.html

²⁸ Transparency of Autonomous Systems: Describing measurable, testable levels of transparency, so that autonomous systems can be objectively assessed and levels of compliance determined. (IEEE P7001™) <https://standards.ieee.org/project/7001.html>

²⁹ Data Privacy Process: Defining requirements for a systems/software engineering process for privacy oriented considerations regarding products, services, and systems utilizing employee, customer or other external user’s personal data. (IEEE P7002™) <https://standards.ieee.org/project/7002.html>

³⁰ Algorithmic Bias Considerations: Describing specific methodologies to help users certify how they worked to address and eliminate issues of negative bias in the creation of their algorithms. (IEEE P7003™) <https://standards.ieee.org/project/7003.html>

³¹ Standard for Child and Student Data Governance: defines specific methodologies to help users certify how they approach accessing, collecting, storing, utilizing, sharing, and destroying child and student data. (IEEE P7004™) <https://site.ieee.org/sagroups-7004/>

³² Standard for Transparent Employer Data Governance: Defining specific methodologies to help employers to certify how they approach accessing, collecting, storing, utilizing, sharing, and destroying employee data. (IEEE P7005™) <https://standards.ieee.org/project/7005.html>

³³ Standard for Age Appropriate Digital Services Framework—Based on the 5 Rights Principles for Children: Establishing a framework for developing age appropriate digital services for situations where users are children. (IEEE P2089™) <https://standards.ieee.org/project/2089.html>

³⁴ Recommended Practice for Organizational Governance of Artificial Intelligence: specifying substantive governance criteria such as safety, transparency, accountability, responsibility and minimizing bias, and process steps for effective implementation, performance auditing, training and compliance in the development or use of artificial intelligence within organizations. (IEEE P2863)

³⁵ <https://www.nytimes.com/2017/09/04/nyregion/dna-analysis-evidence-new-york-disputed-techniques.html>

³⁶ <https://www.propublica.org/article/thousands-of-criminal-cases-in-new-york-relied-on-disputed-dna-testing-techniques>

defensible.”³⁷ However, few, if any, at OCME or New York State’s DNA Subcommittee had the expertise to double check it.³⁸ After years of defendants attempting to access the underlying FST code, a federal judge in 2016 finally made it available to defense experts for review. The expert witness concluded that FST’s accuracy “should be seriously questioned.”³⁹ Within three months,⁴⁰ OCME announced it would abandon FST in favor of a more commonly-used DNA ADS, known as STRMix.⁴¹

In October 2019, just three months ago, a New York State Supreme Court called for all cases using FST to be reviewed because there was “no scientific consensus in favor” of FST as a legitimate tool.⁴² But this is little consolation to the over 1300 defendants who had their liberties and freedoms, threatened or taken away because of FST evidence. For six years, evidence was used from an ADS that is now considered indefensible and lacking legitimacy. For six years, evidence was used from an ADS that has been officially and voluntarily abandoned.

Hearing this, how was FST anything but a failed pseudo-scientific technological experiment on the population of New York City? People’s lives, liberties, and freedoms were threatened by a scientifically and statistically illegitimate ADS. And who is evaluating whether STRMix, the OCME’s new DNA ADS, is safe and effective? If previous performance is any indicator of future expectation, and it is, why should any New Yorker trust it?

Looking more broadly at the FST catastrophe, it’s important to understand that FST failed before ever getting to the questions of bias, transparency, or accountability. FST was not good design. FST simply did not work. FST’s true capabilities and limits were not disclosed. FST’s designers did not account for the capabilities of those using it or anticipate and appreciate the effects it would have.

These issues with FST only came to light because of public defenders and investigative reporters seeking the truth. For six years, in over 1300 cases, OCME did not disclose FST’s indefensible methods when New Yorker’s liberties and freedoms were at stake. This begs the question: Where was the leadership of New York?⁴³ Judges did not need a theory of bias, accountability, or transparency to determine that FST was not fit for the courtroom, so what was the leadership of New York waiting for?

For all the discussion of transparency, equity, and accountability in discussions of ADS, the truth is that I am testifying about human decisions, not algorithmic ones. I have served in government myself. I have also seen the pain wrought by FST and other ADS. When I reflect on the ADS Task Force’s procedures and

³⁷ <https://www.nytimes.com/2017/09/04/nyregion/dna-analysis-evidence-new-york-disputed-techniques.html>

³⁸ <https://www.nytimes.com/2017/09/04/nyregion/dna-analysis-evidence-new-york-disputed-techniques.html>

³⁹ <https://www.propublica.org/article/thousands-of-criminal-cases-in-new-york-relied-on-disputed-dna-testing-techniques>

⁴⁰ <https://www.propublica.org/article/thousands-of-criminal-cases-in-new-york-relied-on-disputed-dna-testing-techniques>

⁴¹ <https://www.nytimes.com/2017/09/04/nyregion/dna-analysis-evidence-new-york-disputed-techniques.html>

⁴² *People v. Thompson*, N.Y. Slip Op. 51521(U) (Sup. Ct. 2019);

<https://gothamist.com/news/judge-attacks-controversial-dna-software-s-still-used-send-people-prison>

⁴³ It is not clear that this will be addressed given that the Mayor’s Executive Order No. 50 establishing the Algorithms Management and Policy Officer exempted any information that would “interfere with a law enforcement investigation or other investigative activity by an agency or would compromise public safety.”

<https://www1.nyc.gov/assets/home/downloads/pdf/executive-orders/2019/eo-50.pdf> This exception is commonly critiqued as the “NYPD exception.” But it can be critiqued through the lens of good design. As exemplified by FST, not disclosing information about these law-enforcement-related ADS will only compromise the public’s right to know whether the ADS works at all.

final report, I can only hope that you realize that when New Yorkers are demanding transparency, equity, and accountability, they don't only mean for ADS, they mean for you, too.

Tombstone Design: The Need for Good Governance Before the Harm Occurs

I cannot overly emphasize enough that where there are threats of serious or irreversible damage, even the lack of “easy” answers cannot be used as a reason for abdicating governance until after the harm has occurred. While abdicating responsibility to prevent foreseeable and preventable harm may be acceptable to some, it is absolutely unacceptable to those in the aerospace and defense industry where I was trained, and unacceptable to those I work with in the IEEE – and it ought to be unacceptable to a City Council responsible for the health and wellbeing of such a great city.

We call it “tombstone design.” That is the aviation industry’s term for this type of abdication of responsibility. We have this haunting term because our ADS are responsible for the safety of millions of passengers, pilots, and warfighters – because when our systems fail, people die.

Aviation has historically been plagued by designers ignoring defects until they have caused fatal accidents. We have been forced to acknowledge tragedies, and the need to understand and remedy their causes. Today aviation is an incredibly safe mode of transportation because of these acknowledgements, but we are constantly reminded of why we must respect the demands of good design.

Look no further than the recent tragic example of the Boeing 737 MAX 8. The MAX 8 incorporated the Maneuvering Characteristics Augmentation System (MCAS) automation, an ADS meant to help keep the aircraft pointed in the right direction. The MCAS ultimately contributed to two accidents and the deaths of 346 people before its tragically bad design was acknowledged, and the aircraft were grounded. The MCAS’ flawed design pushed the nose of the aircraft down and, despite the pilots desperately trying to pull the nose up, they couldn’t overcome the MCAS’ death grip. Ethiopian Airlines Flight 302 impacted the ground at nearly 700 mph, creating a crater 90 feet wide and 120 feet long with wreckage driven into the soil up to 30 feet deep.⁴⁴

The first tragedy is that Boeing’s engineers and leadership knew that the MCAS automation was flawed from the beginning.⁴⁵ At the time of development, Boeing employees were describing the aircraft as a “joke,”⁴⁶ that there was no way they would put their families on those aircraft.⁴⁷ They knew they had designed a unstable aircraft and then tried to use an algorithm as a band-aid. As a result, the pilots – the humans which the Federal Aviation Regulations unequivocally state are directly and ultimately responsible for the safe operation of the aircraft⁴⁸ – had no idea how to regain control from the MCAS as it sped out of control into the ground.

⁴⁴ <http://nymag.com/intelligencer/2019/04/what-passengers-experienced-on-the-ethiopian-airlines-flight.html>

⁴⁵ <https://www.seattletimes.com/business/boeing-aerospace/failed-certification-faa-missed-safety-issues-in-the-737-max-system-implicated-in-the-lion-air-crash/>; <https://www.aviationtoday.com/2019/11/02/boeing-ceo-outlines-mcas-updates-congressional-hearings/>

⁴⁶ Boeing employees described the aircraft as a “joke” and “ridiculous.” <https://www.nytimes.com/2020/01/10/business/boeing-737-employees-messages.html>

⁴⁷ <https://www.cnn.com/2020/01/09/business/boeing-documents/index.html> One employee wrote, “Honesty is the only way in this job — integrity when lives are on the line on the aircraft and training programs shouldn’t be taken with a pinch of salt... Would you put your family on a MAX simulator trained aircraft? I wouldn’t.” “No,” the other worker responded

⁴⁸ 14 C.F.R. §91.3 (2020) “Responsibility and authority of the pilot in command. (a) The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.”

The second tragedy is that the Federal Aviation Administration (FAA) had abdicated its responsibility to oversee and certify the safety of these aircraft dependent on highly-complex ADS. “[C]iting lack of funding and resources, [the FAA] had delegated increasing authority to Boeing to take on more of the work of certifying the safety of its own airplanes.”⁴⁹ Ultimately, the certification of this ADS was completely delegated to Boeing.⁵⁰ Again, the Boeing employees knew the FAA was abdicating their role, describing regulators as “dogs watching TV” because “[t]here is no confidence that the F.A.A. is understanding what they are accepting (or rejecting).”⁵¹

The tombstone design perpetrated by designers at Boeing and allowed by regulators at the FAA, not only killed 346 people but eroded global trust in the aviation industry. CEO’s of airlines around the world and the international aviation regulators are openly concerned about the long-term effects of draining public confidence.⁵² Where an FAA certification of an aircraft was once respected around the world, the MAX 8 has now caused international aviation safety regulators to question their mutual recognition and reciprocity.⁵³

Aware of the issue of public trust, Congress required testimony from the now-former Boeing CEO, Mr. Dennis Muilenburg. “If back then we knew everything that we know now, we would’ve made a different decision.”⁵⁴ In other words, it took two accidents and the deaths of 346 people for them to realize that the flawed MCAS never should have been deployed in the first place. That is tombstone design.

Seeing the People at the Tip of the Spear

For all the tragedy that Boeing and the FAA have caused with their tombstone design, broader society demanded that they face their mistakes. With a year, the MAX 8 has been completely grounded, Boeing’s CEO was fired, and Congress demanded testimony from designers and regulators.

What is truly unthinkable is that they would do nothing in the wake of tragedy.

But that is exactly what has happened in New York as an army of ADS spread across the city. FST illegitimately threatened the liberties and freedom of over 1300 New Yorkers without any oversight. OCME then adopted STRMix, a private version of FST, to replace it. The Administration for Child Services is developing new predictive analytics for investigating claims of abuse and neglect.⁵⁵ The New York City Housing Authority is beginning to use third-party data broker ADS systems to manage voucher programs, tenant screening, property management, and maintenance requests.⁵⁶ The New York Police Department has long implemented so-called “gang” databases⁵⁷ and technology persistently monitoring New York City for

⁴⁹ <https://www.seattletimes.com/business/boeing-aerospace/failed-certification-faa-missed-safety-issues-in-the-737-max-system-implicated-in-the-lion-air-crash/>

⁵⁰ <https://www.seattletimes.com/business/boeing-aerospace/failed-certification-faa-missed-safety-issues-in-the-737-max-system-implicated-in-the-lion-air-crash/>

⁵¹ <https://www.nytimes.com/2020/01/10/business/boeing-737-employees-messages.html>

⁵² <https://www.businesstravelnews.com/Transportation/Air/Airline-CEOs-Worry-of-Eroding-Public-Trust-as-Boeing-Max-Return-Drag-On>

⁵³ <https://www.businesstravelnews.com/Transportation/Air/Airline-CEOs-Worry-of-Eroding-Public-Trust-as-Boeing-Max-Return-Drag-On>

⁵⁴ <https://www.aviationtoday.com/2019/11/02/boeing-ceo-outlines-mcas-updates-congressional-hearings/>

⁵⁵ <https://chronicleofsocialchange.org/child-welfare-2/new-york-predictive-analytics-debate-child-welfare/31732>

⁵⁶ <https://ainowinstitute.org/ads-shadowreport-2019.pdf>

⁵⁷ <https://theintercept.com/2018/06/11/new-york-gang-database-expanded-by-70-percent-under-mayor-bill-de-blasio/>

gunfire.⁵⁸ The Department of Corrections and Board of Corrections are using ADS to determine who has access to care (e.g., nursery programs for new mothers) and programming (e.g., literacy classes).⁵⁹

When will true oversight begin? Is anyone sure that any of these ADS actually work?

I worry that the difference between what happened with the Boeing MAX 8 and what is happening in New York City, is that when those in power see the Boeing MAX 8 accidents, they can see themselves at the tip of the spear. They can imagine themselves on those aircraft. They immediately worry about their and their family's safety. Their self-interest demands action.

But too many people in this city, when they hear about FST, do not empathize. They don't see those 1300 New Yorkers. They cannot imagine being affected by STRMix, child services, the housing authority, the police, or corrections. They just don't see the people, the families, and the communities at the tip of the spear. They don't see the people who have lost loved ones, children, homes, jobs, livelihoods, and dignity because of these agencies and their ADS. But those people are real. Their suffering is real. Their fear is real. Every bit as real as the tragedies caused by the MAX 8. And not reacting to the tombstone design occurring in this city is just as unthinkable.

Do Not Allow ADS Without Requiring That They Work

So, I implore you today, do not allow ADS to be implemented in New York without requiring that the ADS works. It is the foundation of ethical AI principles across the United States and around the world, and across the safety-critical domains that our lives depend upon each day from aviation and defense to medicine.

First, find and stop the badly designed ADS. Stop New York's own history of tombstone design. See the people at the tip of the spear. Don't allow unsafe and ineffective ADS like the Forensic Science Tool to run amok throughout the city, wreaking havoc for years without oversight.

Second, enforce the principles of good design. Demand that those designing and implementing the ADS disclose the ADS' capabilities and limitations, how the ADS will affect real people and organizations, and the independent verification and validation.

Of course, there are deeper issues of bias, accountability, and transparency that must be included in any meaningful governance. But, today, New York City can demand good design. Today, New York City can decide to end its own history of tombstone design.

New Yorkers are demanding transparency, equity, and accountability, and they don't only mean for ADS alone, they mean for you, too. The right first step is to assure them that ADS are safe and effective. It's not only what good design requires, but what good governance demands.

⁵⁸ <https://www.nytimes.com/2015/03/17/nyregion/shotspotter-detection-system-pinpoints-gunshot-locations-and-sends-data-to-the-police.html>

⁵⁹ <https://ainowinstitute.org/ads-shadowreport-2019.pdf>