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Desmarais, Charles, "Trevor Paglen sees Artistry in 'Machine Vision,'" *The San Francisco Chronicle*, January 7, 2017

"Imagine a war of autonomous machines." Four key words, freighted on their own, fearsome in combination: Imagine. War. Autonomous. Machines. The sentence is quoted from a documentary film by the late Harun Farocki. It is the obsessive central topic of a tribute by Trevor Paglen, published last year. It is, Paglen writes, one of "two critical warnings about a future that has already come to pass … an observation about the relationship between seeing and contemporary warfare."
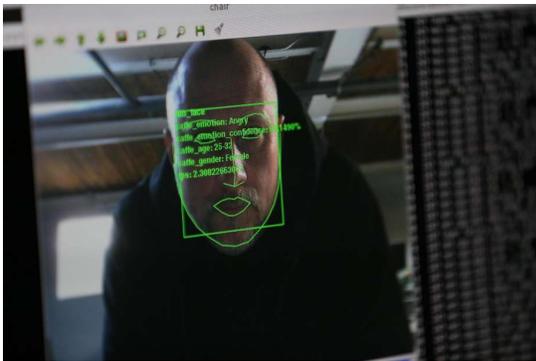
Trevor Paglen demonstrates a facial recognition algorithm that he has used in performance.

Paglen has made a career of art about what he calls the "unseeable and undocumentable." His work points obliquely to what can't be observed straight on. That often includes potent but highly secret weapons of surveillance and battle — photographs of barely discernible military satellites and drones, lost in a vast sky; images of closely guarded installations, recorded through high-power telescopes; endlessly scrolling lists of operation code names.

His latest project moves from his Berlin studio back to the Bay Area, where he got his start after earning a doctorate in geography from UC Berkeley. From now through May, Paglen will be artist in residence at Stanford University's Cantor Arts Center.

Trevor Paglen at Pier 70, site of his performance.

The residency begins with a performance designed by the artist in collaboration with the musicians of the Grammy Award-winning Kronos Quartet and Obscura Digital, a company known for high-tech visual productions and projections. "Sight Machine," as the work is called, is his first foray into live presentation.

The new work deals with what he refers to as "machine vision" — the seemingly boundless arena of image making and processing upon which more and more of our society relies. Machine vision is essential today to commerce, manufacturing, security, communications,

entertainment, medicine — even to a newly invented ritual of "friendship." It guides driverless cars on our highways and unmanned missiles to their targets.

Trevor Paglen, "Cloud, Scale Invariant Feature Transform (SIFT)" (2016).

The product of machine vision is, mostly, invisible images. "We are increasingly living in a world," he told me a few weeks ago, "where probably most of the images in the world are made for machines — by machines for other machines, and humans aren't in the loop." Paglen's current project is an attempt to understand this new vision and to give it form that we can see. Working with a team of five to seven assistants, he is interpreting, for humans, image analysis algorithms originally designed only to sort the 1s and 0s used by computers. For the Kronos Quartet staging, some of those algorithms will be applied to video images of the live performers, then projected in the industrial space where audience and musicians sit.

"For me, this art project is just starting to try to learn how to see this emerging photographic landscape — this machine vision landscape which is not readily visible to our eyes. Because it normally just happens inside a black box somewhere."

Paglen's residency at Stanford was initiated in conversation with Alison Gass, chief curator and associate director at the Cantor. It is, Gass says, "a pilot for what we hope will be a regular program." The artist plans to be on campus "a week or so every month," and will deliver the annual Wilsey Distinguished Lecture on Feb. 8.

Trevor Paglen, "National Security Agency Surveillance Base, Bude, Cornwall, UK" (2014).

The project will culminate in a major exhibition Gass plans for late 2018 — a show she thinks of as "The History of the 20th Century through the Eyes of Trevor Paglen," she says, though Paglen prefers to call it a history of machine vision, beginning with the famous animal motion studies conducted at Stanford by Eadweard Muybridge in the late 1800s. Both agree that she would select an exhibition of Paglen's work, while he would curate a historical section or companion.

Paglen comes to Stanford with the goal of working with faculty, researchers and students not only in the fine arts, but in disciplines not so closely associated with the Cantor Center. The work of two scholars, in particular, attracted him. Jennifer Granick is a lawyer and the director of civil liberties for the Center for Internet and Society at Stanford Law School; Fei-Fei Li is director of the Stanford Artificial Intelligence Lab and the Stanford Vision Lab.

The conflicts and challenges of work in the area of artificial intelligence and machine vision are highlighted by comments that seem offhand at first. One is from a recent article by Paglen, who asks, "Can humans learn how to see like the seeing machines that are becoming ever more ubiquitous?" The answer to the question could determine the degree of control human beings will exercise over the machines they have created.

Trevor Paglen, "Japan-US Cable System, NSA/GCHQ - Tapped Undersea Cable, Pacific Ocean" (2016).

Li, on the other hand, is seeking to teach machines to make sense of the images they capture. In an entertaining TED talk [available online,](#) she articulates a distinction between vision, which is a neutral process based on physical characteristics, and seeing, which requires interpretation.

"By 'seeing,'" she says, "we really mean 'understanding.'" The ethical conundrums of thinking machines may be the stuff of science fiction, but they are no less serious for their popular depiction.

"Facebook's facial recognition algorithm, called 'Deep Face' — it's more accurate than humans," Paglen tells me. "It's better at identifying a face than any human person is. It can look at a picture of you as a baby, that it's

never been trained on, and recognize that it's you — with high accuracy.
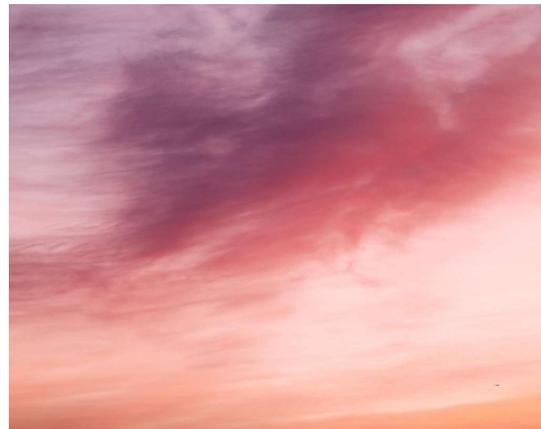
A photograph by Trevor Paglen from a series of images of drones.

"That's just one domain. If we're talking about self-driving cars, if we're talking about industrial processes and manufacturing — if you're doing quality assurance — you want to do that with machine vision.

"Code Names of the Surveillance State" (2014): video by Trevor Paglen.

"In general, those are the things that are driving the emerging world of machine vision. Those equations of optimization and labor. This has, I think, dramatic implications for the way that the world is going to look — in terms

of, what does labor look like? What does policing look like? What do municipal services look like? What does credit or insurance look like?

Trevor Paglen: "The NGA is responsible for collecting, analyzing and distributing intelligence derived from maps and imagery. According to documents provided by Edward Snowden, the NGA's budget request was $4.9 billion last year, more than double its funding a decade ago. It is headquartered in Springfield, Virginia." "And when you start doing that, now you're living in a world in which rights and freedoms are being allocated by metadata signatures."

Trevor Paglen: "The National Reconnaissance Office is in charge of developing, deploying and operating secret reconnaissance satellites. With a budget request of $10.3 billion, it is the third-largest U.S. intelligence agency. It is headquartered in Chantilly, Virginia."

Trevor Paglen, "With a budget request of $10.8 billion, the National Security Agency (NSA) is the second-largest agency in the U.S. intelligence community. It is headquartered in Fort Meade, Maryland."

Trevor Paglen demonstrates one of the many facial recognition algorithms used in his performance.

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Trevor Paglen checks out the warehouse before his performance at Pier 70.