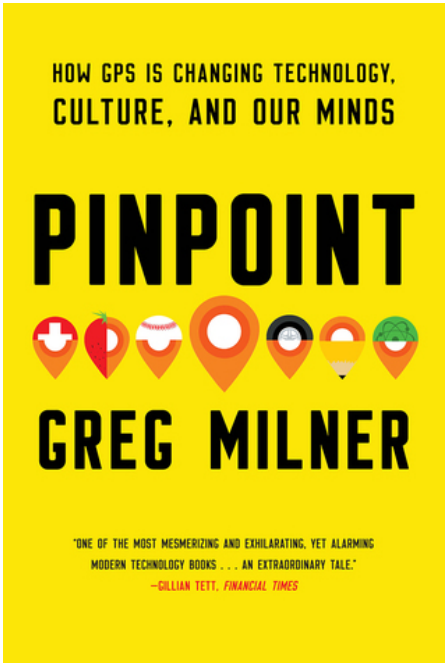

Pinpoint: How GPS is Changing Technology, Culture, and Our Minds

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Over the last fifty years, humanity has developed an extraordinary shared utility: the Global Positioning System. Even as it guides us across town, GPS helps land planes, route mobile calls, anticipate earthquakes, predict weather, locate oil deposits, measure neutrinos, grow our food, and regulate global finance. It is as ubiquitous and essential as another Cold War technology, the Internet. In *Pinpoint*, Greg Milner takes us on a fascinating tour of a hidden system that touches almost every aspect of our modern life.

While GPS has brought us breathtakingly accurate information about our planetary environment and physical space, it has also created new forms of human behavior. We have let it saturate the world's systems so completely and so quickly that we are just beginning to confront the possible consequences. A single GPS timing flaw, whether accidental or malicious, could bring down the electrical grid, hijack drones, or halt the world financial system. The use, and potential misuse, of GPS data by government and corporations raise disturbing questions about ethics and privacy. GPS may be altering the nature of human cognition—possibly even rearranging the gray matter in our heads.

Pinpoint tells the sweeping story of GPS from its conceptual origins as a bomb guidance system to its presence in almost everything we do. Milner examines the different ways humans have understood physical space, delves into the neuroscience of cognitive maps, and questions GPS's double-edged effect on our culture. A fascinating and original story of the scientific urge toward precision, *Pinpoint* offers startling insight into how humans understand their place in the world.

Pinpoint: How GPS is Changing Technology, Culture, and Our Minds Details

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From Reader Review Pinpoint: How GPS is Changing Technology, Culture, and Our Minds for online ebook

Nooilforpacifists says

This is not the history of the GPS project--or at least, not much. Instead, it is a punch-drunk weave of examples attempting to convince that the existence of GPS has, or "may be altering the nature of human cognition--possibly even rearranging the gray matter in our head." My first thought: is Mr Milner the last believer in Jean-Baptiste Lamarck?

The beginning recounts the now familiar story of Polynesian Eastern migration via a system that those used to Cartesian space --Captain Cook among them -- found almost impossible to grasp. Polynesians didn't move from island to island, but charted turn points by checking the stars *as if seen at those islands*. This was at odds with European views of the Pacific Ocean as a place to get *through* to arrive at their destination. Such navigation skills died long before GPS. This would be one of many quasi-pointless digressions in the book.

The actress Hedy Lamarr gets her due, as the inventor of "spread spectrum" technology in the early 1940s--no patents, of course. I've looked for a book on Lamar-to-GPS-to-Qualcomm, but this isn't it, and was filler here.

The best part of the book is the middle third, telling the history of the fits, starts, and plausible alternatives to GPS. Appalled by the Viet Nam-era waste of munitions, the failure of interdiction, not to mention civilian casualties, an Air Force Colonel/Professor named Parkinson dreamed of a delivery system so accurate it could drop five bombs accurately: four bombs into the same crater made by the first. The design came together in 1973, but funding a 24 (now 31) satellite constellation still seemed difficult.

Until Spring 1999, when President Clinton ordered accurate strikes on Belgrade in response to Serbian aggression in Kosovo. GPS-targeted munitions worked brilliantly. "But there is a corollary to being able to drop five bombs in the same hole: what if you have the wrong hole?" The CIA used an outdated map, and walloped the Chinese Embassy. With great precision. So sorry. Funding GPS thereafter was not a problem.

The other genuinely interesting issue -- one in which I was involved personally -- was civilian access to GPS. The US military argued it made no sense to create a system that could send a missile into the fifth floor, fourth window from the left in the Kremlin, only to allow anyone to use the same technology--possibly against America. But then KAL007 strayed over Soviet airspace, and was rewarded with two missiles up the kazoo, killing nearly 300. President Reagan announced a compromise where the military got a more precise signal (better than 10 m accuracy) than offered to civilians (~100 m accuracy). Civilian GPS also won't work above a certain altitude or faster than a certain speed (I'm not telling).

Almost immediately, the early GPS entrepreneurs, such as Trimble, realized they didn't need to know how to decode the military channel; merely discovering its existence allowed building cheap receivers that could compare the phase shift of the unreadable military channel with the civilian transmission, improving the precision of the consumer product to near equal the military. Plus ground-based transmitters radiate the same GPS signal -- called differential GPS -- allowing, for example, civil aircraft to land via GPS when runways otherwise would be blanketed by fog. The military did that years before; now, the technology exists to allow an autopilot on a Part 121 passenger airline to land at about half the airports in Europe and North America. (Except were the pilot Egyptian or the plane Malaysian…)

GPS is free; paid for by US tax dollars, given to the world. It spawned a multi-billion dollar, global consumer product market. Ford just announced it will build driverless cars, GPS enabled, of course. Such

consumer-driven pressure means President Reagan's decision to open GPS to civilians never could be reversed. Yet Russia, Europe and China all have, or are building, their own satellite navigation systems to "compete" with free GPS. Why? One wonders why the EU, in particular, throws € billions at "Galileo", rather than building a better fence around Romania, Bulgaria and Greece.

Anyway, that's the good stuff. The rest of the book is nonsensical, if harmless, speculation, about our ability to navigate devolving to smartphones, with some interesting tidbits about how GPS assists in earthquake measurements and (following all those failed missions to Mars) helped make the Mars Curiosity Lander mission a success--navigating "away from earth by using GPS in the rearview mirror."

The book's psychological padding is both too speculative and too off-course. Two books would be better: a technical history of GPS (for the layman); and a "What If?" that could be filed between Thor Heyerdahl and L. Ron Hubbard.

Emily says

Enjoyable & accessible science writing! This book filled in plenty of gaps in my knowledge that I didn't know were there. My personal interest in any given chapter's subject matter was hit or miss; I would have loved to read more about the cultural changes resulting from so many individuals carrying GPS-enabled devices around. We learn quite a bit about the ethics and legality of law enforcement using GPS to track individuals, but that chapter just touches on the same technology used by employers on their workers and advertisers on customers (and nothing about individuals following each other around!). Same with the anecdotes and interviews - some were fascinating tidbits and others felt unnecessary, but a different reader might have felt the opposite.

The primary focus is on the history of navigational science and how it's being deployed now despite our limited ability to deal with its risks and flaws. Which really drives home how new this is - I'm guessing most readers grew up and learned to drive firmly in the paper map or maybe the early Mapquest era, and find it hard to wrap our heads around how GPS-dependent seemingly unrelated infrastructure is. I can only imagine how an equivalent book published ten years from now will read...

Peter Tillman says

Good start but stalled. Try again??

Or not. I read some of the critical reviews, here and at Amazon, and I think I'll call it good. The author is no expert, and made some dumb mistakes and silly/nonsensical extrapolations. Or so others think. "Life is Short. Books are Many."

Nick says

This is a fascinating look at how GPS has come to be such a vital part of our modern world, and I definitely learned a lot about the technology and those that predated it.

Charlene says

Pretty interesting. I really enjoyed the history of the Polynesian explorers, the focus on tectonic plates, and the discussions of earthquakes and tsunamis best. Milner also does a good job of explaining GPS tech. I thought I would be interested in that since I learned about in geology class (because of it's relation to measuring earthquakes, but I was not as interested in that as I thought I might be. Though, I can see other people liking a lot more than I did.

One of the best aspects of this book is Milner's constant focus on how innovation and new tech come about. The military always gets their hands on research and tries to destroy the enemy with it. If it can kill enemies, then it has a good chance of getting funded. If it is unlikely to kill the enemy, the funding is less certain. One of my old neuroscience professors tried to drill that into our heads. She said no matter what, even if the studies are funded by non military sources, the military always gains access to whatever they want. Milner really echoed those sentiments.

Sarah says

I can't really give an unbiased review of this one. GPS is my industry, so I thought the topic was incredibly interesting--I honestly don't know whether someone not in my field would like it or not. The history he goes through is so new that some of it has happened even since I've been working in the field, so I remember it. I found myself not so much reading the book as studying it, marking up almost every page with highlighter of things I want to remember. Mr. Milner is coming to speak at a conference we are hosting in the summer, and I really look forward to meeting him.

Steve says

I really liked this book. GPS is way more than the blue dot on your phone app. Milner takes the reader on a vast journey from the etak navigation methods of the Polynesian sailors to the guidance systems on the Mars lander. What started out simply as an Air Force bomber guidance project has become an indispensable backbone of modern civilization. Milner introduces the reader to vast variety of non-military technologies that rely on GPS including air traffic control, sugar beet farming, plate tectonics research, earthquake prediction, modern financial systems, weather forecasting, precision time keeping, global warming research and of course mapping and geodesy to name a few. There is also a chapter on whether as a culture we are losing our spatial awareness and what does this mean for our society. Good read if your interested in how the world works.

Daniel says

A surprisingly good book that I picked on a whim. It delves into an amazing array of subjects such as: Geology, Geodesy, Meteorology, Air traffic control, Cartography, Weapons guidance, psychology, orbital mechanics, trigonometry, agriculture just to give a few . All from a small weak signal that the US government thought was going to be useless and the Air Force actively tried to kill on numerous occasions. It shows how private enterprise took a tool the government thought at first was of niche importance to a tool that is central to our way of life.

This book is worth the read and if you are a native of my adopted state of Colorado you will learn how important your state is to world events in a way I'm sure most of us never thought of.

Sara says

GPS is woven into the society of modern life to an astounding degree—much more than I realized. It doesn't just keep track of location, it also regulates time. The importance of GPS is definitely on par with the internet. Many have suggested that the way we interact with the internet may be changing our brains—and the same may be true for GPS.

Greg Milner's book provides a fascinating history of the development of the GPS technology. Apparently the Air Force couldn't imagine a good use for it, which is just mind-blowing. (Reason? "We already have a navigation system.") It also points out the rather alarming insecurities in the system.

There is so much more in this book than what I've outlined above. It's a fascinating read, and I'd honestly recommend it to anyone who uses GPS. Which is pretty much everybody, at this point. I never realized how ubiquitous the technology is, and how we're using even when we think we're not.

I received an ARC of this book through a Goodreads giveaway.

Tara Brabazon says

This is a fascinating book that explores how GPS creates cognitive transformation. Milner probes how GPS is impacting on our culture. The section on "Death by GPS" is powerful. It is well written, as we expect of Milner. But I would have preferred greater attention to literacy and theories of geosociality. It is difficult to 'prove' how GPS change our 'brains.' It is more instructive to probe how GPS changes how we think about bodies, space and movement. That is a different book. But this one offers a strong entree into the GPS.

Jessi says

As someone always concerned about privacy while at the same time wanting to utilize the latest in technology, I found this book to be a fascinating and enlightening read. The ethics of GPS as regards privacy and Fourth Amendment rights had been something that had long been bothering me, and I was happy that Milner covered the topic in this book.

The author takes readers on a journey through the beginning of how humans navigated and saw the world into how the use of GPS began with mainly military intentions. Something that we take for granted today was something that many in the Air Force and other scientific fields had to fight for in the arena of funding and at conception level.

The reason I was most interested to read this book and was not disappointed, was the coverage of how GPS is changing the way we think. My best friend lives 50 minutes away from me, and I would not be able to get to her house despite going there many times because I rely solely on my phone to get me there. I have mental maps of other places I frequent in the DFW metroplex area, but I am sure, like the test subject mentioned in several research cases, I could have a vaster and further reaching conception of the area if I didn't use GPS to

get me to certain places at certain times.

My husband and I always joke about the incident in the office where Michael literally drives his car into a lake because the GPS told him to do it, but surprisingly incidents like this have happened, some with deadly results.

This book is definitely worth reading for those who are concerned about privacy, like the history of technology, or simply would like to know more about how the brain processes information. I liked that Milner, though his subject is heavily scientific, kept things mostly on an accessible level for all.

Source: I received a copy of this title from the publisher in exchange for a fair review.

P D says

3.5 stars

The effective thesis of this book is that GPS is really, really important. It's not as silly or overaggrandized as it sounds—and which is proved by all the detail in here—but the problem is, there's nothing sexy about GPS. So a topic that is, yes, essential to the modern world, and any risk to which should keep us awake at night (especially thanks to lax security), just ends up feeling stretched out, because there isn't that much to say.

The lack of technical minutiae is a boon to the reader who doesn't care about that sort of stuff, but I would have preferred more details there (especially as I am still not clear on how the different wavelength of the signal from the satellite vs on the ground was useful to generate even more detail), and less time spent on the mini-biographies at the beginning.

You will learn a lot from reading this, but at the same time it's hard not to feel that the topic would be as effectively covered—albeit with fewer anecdotes—in, say, one The Guardian's long reads.

Nicole says

Mostly a waste of time. The beginning on Polynesian navigation was fascinating, as was the description toward the end of uses for earth sciences (plate tectonics, earthquakes, volcanoes) and space. But everything in the middle is pretty boring.

Douglas Lord says

Quick—guess how many GPS satellites there are up there in space? 100? 200? My wife just guessed 4,000. Well, the answer is 24. All owned and operated by the U.S. military’s 50th Space Wing 2nd Space Operations Squadron. Sixteen monitoring stations keep that shit together day in and day out at 20,000 kilometers up in space. GPS runs more stuff than you know—more than just driving to the Gap over in Willowdale. It does military security, measures the tectonic plates, and plays a huge role in air traffic control safety. It even has some sort of role in how we calculate time. This title provides readers with a primer on the history of navigation and what led to GPS, just enough about the implications of privacy and GPS, and only a little bit on the subtitular “how it is changing…our minds.” Military stuff is paramount and gets a lot of

ink, but the appeal is really the clarity with which Milner explains all the science-y stuff that’s related to GPS, like plate tectonics, precision agriculture that uses the technology to boost crop yields, and LORAN, the WWII radio-based navigation system. Milner points out that the signals are “so dependable, so ordered and clean, that GPS has become our heartbeat. If it failed tomorrow, our society would experience enormous disruptions and scientific setbacks.” And it is a fascinating, vital topic: GPS “signals are traveling at the speed of light. A timing error of just a millionth of a second will translate into a distance error of 200 miles.” VERDICT The book gathers just about everything you’d want to know about GPS into one readable, organized place (a place quite unlike my daughter’s bedroom) with clear, logical, explicative writing.

Find reviews of books for men at Books for Dudes, Books for Dudes, the online reader's advisory column for men from Library Journal. Copyright Library Journal.

Nabila says

I found this book at a bazaar. I had never heard of it before, but I bought it anyway. As someone who's working with GPS, I thought the book might be interesting. I've read a lot of articles about how GPS is bad (which frankly infuriates me), and I thought this book would be more or less the same. Especially after reading the blurb about how GPS might be altering our brains (but what technology isn't?). I expected some GPS bashing and shaming.

I was pleasantly surprised to find how accurate the book is. Granted, there are some minor inaccuracies that don't sit well with me (e.g., I wouldn't call an ellipsoid as irregular--geoid definitely is though. And don't get me started on map projections). But overall, the book is a great introduction to the world of GPS. However, I wish there were more explanations about the other global navigation satellite systems, like GLONASS. Most receivers (including your smartphones) can receive signals from both GPS and GLONASS (and even signals from other systems), so I don't see why the book exclusively talks about GPS.

I think Mr. Milner did an excellent job of explaining the many interesting applications of GPS. GPS is more than just the blue dot that tells you where you are and where to find the nearest bookstore (and insisting that you should turn right, even though right is a river). There are so many uses of it that most people are not aware of, such as helping beet farmers, studying earthquakes, monitoring volcanoes, or climate studies. I highly recommend this book to anyone who wants to know more about GPS.
