District Court, Larimer County, State of Colorado 201 LaPorte Avenue, Suite 100 Fort Collins, CO 80521-2761 (970) 494-3500	DATE FILED: September 20, 2022 4:52 PM CASE NUMBER: 2022CR196
PEOPLE OF THE STATE OF COLORADO v. CHRISTOPHER RUSSELL JONES, **Defendant.**	▲ COURT USE ONLY ▲ Case No.: 2022CR196 Courtroom: 3B

ORDER GRANTING MOTION TO EXCLUDE HISTORICAL CELL SITE LOCATION INFORMATION BASED ON TRAX SOFTWARE

Defendant moves to exclude under Colo. R. Evid. 702 evidence of historical cellular, data-based analysis based on the use of Trax software on the ground that it's unreliable. (While initially the motion was broader and covered other topics, Jones narrowed the scope of the motion as set forth in the preceding sentence.) The People oppose the motion and disclosed several expert witnesses who will testify at trial. Among them is an expert who plans to discuss Jones's location based on Trax.

On August 26, 2022, the Court held a *Shreck* hearing and took the matter under advisement. For the reasons set forth below, the motion is granted, and the People won't be allowed to offer any testimony about Jones's location that stems from Trax.

I. INTRODUCTION.

The Court makes the following findings of fact by a preponderance of the evidence. In this action, the People charged Jones with three counts: (1) stalking in violation of Colo. Rev. Stat. § 18-3-602(1)(c),(5); (2) violation of a protection order, Colo. Rev. Stat. § 18-6-803.5(1)(a); and (3)

violation of bail bond conditions, Colo. Rev. Stat. § 18-8-212(1). Jones has pleaded not guilty, and a five-day jury trial, which is consolidated with another case, is set to begin on September 27, 2022.

All three counts stem from Jones allegedly driving by the apartment of his former fiancée—S.V.—in violation of the protection order (specifically, he can't be within fifty yards of S.V. or her apartment). According to S.V. and her son, they saw a red Dodge Ram, which they suspected might belong to Jones, driving through their apartment complex on two occasions. The investigating officer, Benjamin Himes, reviewed security-video footage for the second day in which S.V. supposedly saw Jones, and he noted a red truck driving through the complex. But the truck wasn't a Dodge—it was a Toyota. Further, the Toyota had a camper in the back, and S.V. conceded that Jones's truck doesn't have a camper.

Himes later obtained a search warrant for Jones's cellphone and got call-detail records ("CDRs") spanning a range of time from his cellphone towers in the area. Law enforcement then analyzed the data using software called Trax, which purports to map Jones's cellphone location. Jones lives in Cheyenne, Wyoming, and works in Johnstown, Colorado. His work takes him through I-25 since he drives a truck. The results from Trax created an "estimate" for the location of Jones's cell phone that placed him near S.V.'s apartment nearly every day between December 30, 2021, and January 11, 2022.

In his motion challenging Trax's reliability, Jones objects on multiple grounds. But in essence, he contends that Trax is junk science and, thus, unreliable under Rule 702. Initially, Jones' motion was quite broad, and purported to challenge the use of cell-site location information about his phone. But at the hearing, he conceded that such information has been widely accepted as reliable. As the U.S. Supreme Court has noted, typical cell-site location information works as follows:

> Cell phones continuously scan their environment looking for the best signal, which generally comes from the closest cell site. Most modern devices, such as

> smartphones, tap into the wireless network several times a minute whenever their signal is on, even if the owner is not using one of the phone's features. Each time the phone connects to a cell site, it generates a time-stamped record known as cell-site location information (CSLI). The precision of this information depends on the size of the geographic area covered by the cell site. The greater the concentration of cell sites, the smaller the coverage area. As data usage from cell phones has increased, wireless carriers have installed more cell sites to handle the traffic. That has led to increasingly compact coverage areas, especially in urban areas.

Carpenter v. United States, 138 S. Ct. 2206, 2211–12 (2018).

So, Jones instead narrowed his attack on Trax, which is markedly different. Unlike typical cell-site location information, Trax takes CDRs—essentially, cellphone records—from providers and uses the data to craft maps of a cellphone's location. To develop the maps, Trax reviews its cell-tower database of 50 million antennas and uses that data to create an estimated handoff range: the area where Trax thinks the cellphone is handed off to another cell site. In other words, if the data leaves Trax's mapping area, Trax assumes the phone's moved on to another site.

To determine if its handoff range is accurate, Trax looks at the specific cell site antenna and plots a sixty-degree cone around it. Within the cone, Trax looks at the three cell sites that are closest to the source tower, takes the average distance between them, and multiplies that figure by 0.97. Trax's architect—Sy Ray—described his method as a trial-and-error process in which Trax employees (or others acting on its behalf) go on the ground, pick ten different antennas with different shapes, and attempt to break down the differences between them.

Ray said that looking at the density of coverage gave him most accurate results. According to him, the mathematical principles upon which he relied are "very simple": "we look at tower density, which is determined by cell sites that are within the proximity of the azimuth of the target cell site, we look at the averages how far away those cell sites are, which impacts that density, and then we cross reference with our results from the drive tests, which is that 0.97 factor."

When asked how Ray came up with the 0.97 figure, he said it was a "data-driven" figure based upon his company's three million drive tests. "How can we represent what we're seeing in our

data across 50 million cell sites?" is how Ray put it. And the 0.97 figure, which he claimed is a constant, is what gives him the "best result." Ray admitted that if he used a different figure—0.95 or 0.96, for example—the shape of the coverage area becomes "too small."

Similarly, if he takes the average distance of antennas and multiplies it by 0.98, he finds that it doesn't conform to his drive-test data that's connecting outside the estimate area. He claimed that the 0.97 "constant" is the most accurate number to replicate the data his company has gathered from the drive tests.

Ray also admitted, however, that the 0.97 figure isn't based on any radiofrequency principles. He didn't consult with any radio frequency engineers to derive the formula. And he claimed that a radiofrequency principle he relied upon to support algorithm was the "line of sight" or "free space" principle. Though he claimed that it's a well-known principle and referred the Court to a publication on his company's website, the Court was unable to locate the publication.

While Ray stands by his formula, it hasn't gained traction in the scientific community. The methodology and algorithm aren't published or subject to peer review, and they've been routinely labeled as junk science by the relevant scientific community. (Ray revealed the formula during his testimony, but that's not publishing or subjecting the formula to scientific scrutiny; it's the opposite, because it has the effect of sandbagging anyone who wishes to challenge it.)

To illustrate the blowback from the scientific community, one article describes Trax's mapping as a "profoundly flawed practice." *See* Vladan M. Jovanovic & Brian T. Cummings, *Analysis of Mobile Phone Geolocation Methods Used in US Courts*, 10 Inst. Elec. & Elecs. Eng'rs Access 28037, 28051 (2022).[1] The article also noted that "no [radiofrequency] books, journal papers, or patents could be found that have ever used such a shape to represent sector coverage, isolated or in the best

[1] The Court finds that Jovanovic's article was published in a peer-reviewed publication in accordance with academic standards.

server scenario. Furthermore, not even in the crudest approximations do any [radiofrequency tools, processes, or any of the mapping applications used by [radiofrequency] engineers in their everyday work for network operators take such an approach." *Id.* at 28044.

Another article highlighted the shortcomings in CDRs: explaining that they "are merely records used by cellphone companies 'for the purpose of financial transactions such as generating bills to the subscriber and . . . settling accounts with other carriers.'" Victoria Saxe, *Junk Evidence: A Call to Scrutinize Historical Cell Site Location Evidence*, 19 U.N.H. L. Rev. 133, 142 (2020). The author further elaborated that CDRs "contain limited information," don't have "documented error rates or validation methodologies," and it's "unclear how accurate the actual location information in these records is." *Id.*

Yet another dealt a broad blow, noting that "[a]nalyzing cell tower connections is the least accurate . . . method[] of locating a cell phone, yet this method is consistently used to convict and imprison criminal defendants." Thomas J. Kirkham, Comment, *Rejecting Historical Cell Site Location Information as Unreliable Under Daubert and Rule 702*, 50 U. Tol. L. Rev. 361 (2019). And as the Court discusses below, *see supra* Section III.B.4, these critiques are few of many. Without doubt, the scientific community has rejected Trax's methods. *Accord* Jovanovic& Cummings, *Geolocation Methods*, *supra*, at 28037.

Despite overwhelming criticism from the scientific community, Trax has gained traction with law enforcement. In fact, Trax is used primarily by law enforcement in criminal cases. Law enforcement appears to be the principal (if not the sole) consumer of the product. So, it appears that police are relying on location data that provides a "gross overestimate" of a phone's location, Jovanovic & Cummings, *Geolocation Method*, *supra*, at 28041, and has been deemed "'the least accurate method of tracking a cell phone,' to hypothesize a defendant's location when the alleged crime occurred[,]" Saxe, *Junk Evidence*, *supra*, at 137.

With that in mind, the Court held a *Shreck* hearing to learn more. There, the People called Michael Fegely: a former police officer who now works for ZetX. But he has no scientific background and couldn't testify about Trax's ranging formula or algorithm. The hearing, thus, was continued so that the People could summon the right witness.

Ray was that witness. He is ZetX's founder. He has an associate's degree but no bachelor's degree or any other academic credential. He's not a professional engineer or a radio frequency engineer. At the hearing, Ray claimed, however, that he was an engineer (in his words, he's "more of an engineer than an engineer"). Despite his lack of qualifications, he estimated that Trax is 94–96 percent accurate. He reached that figure by conducting drive tests in which ZetX employees drive around the coverage area and eyeball Trax's maps for accuracy. He also created a formula—the algorithm—upon which Trax relies to give its estimates.

As for Jones, he also called two witnesses: Mark Pfoff and Vladan Jovanovic. Pfoff works in computer forensics and has a bachelor's degree in computer science. Pfoff said that Trax isn't reliable and used GPS records[2] to show that when Jones was supposedly at S.V.'s apartment, he was actually driving on an interstate.

Jovanovic is geolocation and systems-engineering consultant. He has a doctorate in electrical engineering and has published roughly thirty papers that discuss cell-site location systems, including one that exhaustively questions Trax's reliability. *See* Jovanovic & Cummings, *Geolocation Methods*, *supra*, at 28037. He testified that Trax isn't reliable because its radius is four times larger than the average radius and overestimates its range three times more than the average range. According to Jovanovic, Trax essentially draws a circle around a fifty-mile radius, and if the target location falls within that radius, Trax deems its algorithm accurate.

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[2] GPS is often seen as the most accurate cell-location method. Victoria Saxe, *Junk Evidence: A Call to Scrutinize Historical Cell Site Location Evidence*, 19 U.N.H. L. Rev. 133, 137 (2020); Clifford S. Fishman & Anne T. McKenna, *Wiretapping & Eavesdropping: Surveillance in the Internet Age* § 29:35 (3d ed. 2007).

In short, Jones argues that Trax is unreliable, so all evidence related to it should be inadmissible. The People, meanwhile, insist that Trax passes Rule 702 muster and should be admissible. The Court agrees with Jones and finds that the People failed to meet its burden of admissibility.

II. APPLICABLE LEGAL STANDARDS.

Colorado Rule of Evidence 702 governs the admissibility of scientific or other expert testimony: "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise." Colo. R. Evid. 702. "The purpose of a [Rule] 702 inquiry is to determine whether the proffered scientific evidence is reliable and relevant, and for the trial court—acting as a gatekeeper—to prevent the admission of 'junk science.'" *Estate of Ford v. Eicher*, 220 P.3d 939, 942 (Colo. App. 2008) (quoting *Elsayed Mukhtar v. Cal. State Univ.*, 299 F.3d 1053, 1063 (9th Cir. 2002)), *aff'd* 250 P.3d 262 (Colo. 2011).

A *Shreck* hearing occurs under the parameters of Rule 104 because it deals with preliminary questions of witness qualifications and admissibility of evidence: "Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court. In making its determination it is not bound by the rules of evidence except those with respect to privileges." Colo. R. Evid. 104(a) (cleaned up).

To perform its gatekeeper function, the "court determines whether the testimony is reliable and relevant by considering whether: (1) the scientific principles underlying the testimony are reasonably reliable; (2) the expert is qualified to opine on such matters; (3) the expert testimony will be helpful to the jury; and (4) the evidence satisfies CRE 403." *Eicher*, 250 P.3d at 266 (citing *People v. Shreck*, 22 P.3d 68 (Colo. 2001)).

In *Shreck*, the supreme court—adopting the factors from *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 593–94 (1993)—articulated four non-exclusive factors that a district court may consider to determine if the proposed scientific, technical, or other specialized knowledge is reliable:

(1) whether the technique can and has been tested;

(2) whether the theory or technique has been subjected to peer review and publication;

(3) the scientific technique's known or potential rate of error, and the existence and maintenance of standards controlling the technique's operation; and

(4) whether the technique has been generally accepted.

Shreck, 22 P.3d at 77 (citing *Daubert*, 509 U.S. at 593–94).

Because those four factors aren't exhaustive, the court emphasized that district courts should consider the totality of the circumstances and the case as a whole. And when doing so, the court offered another five factors that may be useful:

(1) the relationship of the proffered technique to more established modes of scientific analysis;

(2) the existence of specialized literature dealing with the technique;

(3) the non-judicial uses to which the technique are put;

(4) the frequency and type of error generated by the technique; and

(5) whether such evidence has been offered in previous cases to support or dispute the merits of a particular scientific procedure.

Id. at 77–78.

Simply put, district courts are encouraged to tailor the factors to the specific circumstances of the case. The supreme court gave that flexibility because, like the U.S. Supreme Court, it recognized that the "factors identified in *Daubert* may or may not be pertinent in assessing reliability,

depending on the nature of the issue, the expert's particular expertise, and the subject of his testimony." *Id.* at 78 (quoting *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 50 (1999)).

Applying the above standards here, the Court concludes that while the proposed expert testimony about using Trax to pinpoint Jones's location is relevant, Trax isn't reliable. Thus, its probative value is substantially outweighed by the danger of unfair prejudice or of misleading the jury, which means it won't be useful to the jury. Accordingly, Jones's objection is sustained. The Trax evidence isn't admissible, and the People's experts won't be allowed to testify about the Trax-related contents of their reports.

III. DISCUSSION.

To explain why Trax isn't reliable, the Court first discusses its relevance and then examines multiple factors listed in *Shreck*: (1) testability and non-judicial uses, (2) peer review, (3) error rate, and (4) acceptance.

A. Relevance.

Relevant evidence "means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence." Colo. R. Evid. 401. As the Advisory Committee Note to the identical federal rule notes, "[t]he standard of probability under the rule is 'more probable than it would be without the evidence.' Any more stringent requirement is unworkable and unrealistic." Fed. R. Evid. 401, Advisory Comm. Notes (1972).

Admittedly, the Trax evidence is relevant to the charges because it makes it more probable that Jones was near S.V.'s apartment in violation of the protection order. The evidence is also marginally relevant to the stalking charge: it tends to show that Jones repeatedly may have driven by S.V.'s apartment to stalk her. But the key here is to determine whether the Trax evidence is reliable.

B. Reliable.

To determine whether Trax is reliable, the Court considers a wide range of factors, including "(1) whether the technique can and has been tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the scientific technique's known or potential rate of error, and the existence and maintenance of standards controlling the technique's operation; and (4) whether the technique has been generally accepted." *Shreck*, 22 P.3d at 77 (citing *Daubert*). The Court discusses each in turn and also reviews how other courts have decided the issue.

1. Testing and non-judicial uses.

The first factor of a scientific technique's reliability is whether the technique has been and is capable of being tested. *Shreck*, 22 P.3d at 77. Trax is capable of being tested. Ray explained that Trax's mapping may be tested through drive-bys and radio propagation. And while Jones argues that Trax hasn't been tested, that's inaccurate. After all, if it couldn't be tested, then Jones's own expert wouldn't be able to use GPS technology to show that Jones was on the highway, not near S.V.'s apartment.

And as discussed below, *see infra* Subsection III.B.4, the ability to test Trax and similar methods have resulted in substantial literature from the scientific and legal community. The bottom line is that Trax attempts to provide location data, and it's possible to test whether that data's accurate.

Even so, there are few, if any, non-judicial uses for Trax. Indeed, Ray, a former law enforcement officer, created the software, which is primarily used by law enforcement in criminal cases against defendants.

2. Peer Review.

This factor favors Jones. There is no record evidence that Trax has been subjected to peer review. If anything, because ZetX has not published Trax's algorithm and methodology, it's shielded

itself from review. True, Ray provided the algorithm in his testimony, but that's not the same as welcoming the peer review or scrutiny of the scientific community. To date, no scientific, peer-reviewed study has analyzed whether the algorithm, or formula, upon which Trax relies has any scientific basis or is grounded upon principles of mathematics, statistics, or radiofrequency.

Even so, the People argue that Trax has "gone through the peer review of courtroom testimony." That argument is frivolous. Judges (and lawyers) aren't generally scientists, and their job doesn't entail checking the math of the experts who testify. Besides, in-court testimony is a far cry from subjecting Trax to the scientific method, which is "[a] very significant *Daubert* factor." *United States v. Evans*, 892 F. Supp. 2d 949, 956 (N.D. Ill. 2012) (quoting *Chapman v. Maytag Corp.,* 297 F.3d 682, 688 (7th Cir. 2002)).

Exposing the formula to the scientific method is key because "the scrutiny of the scientific community . . . increases the likelihood that the substantive flaws in methodology will be detected." *Id.* (quoting *Daubert,* 509 U.S. at 593). In other words, "[w]hile scientific evidence can usually be double-checked by other scientists for error or contributing factors, there is generally no such double-check for nonscientific testimony." David L. Faigman & Edward J. Imwinkelried, *Evidence Code Section 802: The Neglected Key to Rationalizing the California Law of Expert Testimony*, 42 Loy. L.A. L. Rev. 427, 446 (2009).

So, without scientific peer review, there's "an even greater threat of [the jury receiving] inaccurate information . . . because the very nature of scientific evidence helps to assure a likelihood of accuracy." *Id.* And given that risk, it's well within the Court's discretion to insulate the jury from hearing those inaccuracies. *See People v. Cooper*, 496 P.3d 430, 446 (Colo. 2021) (excluding expert testimony when it's based on "something that . . . science has neither studied nor approved . . . [because] it ultimately would have required [the expert] to share [information] with the jury [that's] incomplete . . . inaccurate and misleading").

In sum, because Trax isn't subject to peer review (and has actively avoided it), this factor cuts against its reliability.

3. Error Rate.

Another factor that the Court should consider is whether Trax has a known or potential rate of error and whether standards exist to control Trax's operation. *See Shreck*, 22 P.3d at 77. This factor also heavily favors Jones.

The People assert that Trax's error rate is between 4–6 percent (or 94–96 percent accurate). But rather than support that assertion with data and peer-reviewed studies, they base it solely on testimony from Ray: who said that he calculated the error rate based on drive-test results. But there are several problems here.

For one, the Court doesn't find Ray credible. He inflated his credentials, inaccurately claiming to be an engineer—he's "more of an engineer than an engineer"—despite having no qualifications, licenses, or credentials to support that label. As noted, his sole academic degree is an associate's, and there's no evidence that it's related to engineering. Nor is there evidence that Ray's taken any engineering classes. To be sure, he's created a booming business and has successfully pitched Trax to several law-enforcement agencies. But a sound business model doesn't equal an accurate error rate.

In essence, the People ask the Court to conflate Ray's marketing skills with science and credit his self-serving error rate. The Court declines that invitation and is "not obligated to admit testimony just because it is given by an expert." *Evans*, 892 F. Supp. 2d at 956 (quoting *United States v. Mamah*, 332 F.3d 475, 478 (7th Cir. 2003)). Instead, "[i]t is critical under Rule 702 that there be a link between the facts or data the expert has worked with and the conclusion the expert's testimony is intended to support." *Id.* (quoting *Mamah*, 332 F.3d at 478. And here, that link doesn't exist.

That relates to the Court's second point: Trax's error rate is supported by nothing more than confirmation-bias research. It's completely unscientific. In going about his method, Ray assumed that the null hypothesis is true and set out to "prove" it. He assumes that the "constant" for his drive tests, 0.97, is accurate based upon his drive tests, and uses it to confirm a coverage area for the cells cite in question.

That's backwards: in scientific studies, it's necessary to assume that the null hypothesis is *false* and get evidence that the null hypothesis is, in fact, true. Put differently, the null hypothesis[3] "is a type of statistical hypothesis that proposes that no statistical significance exists in a set of given observations." Null Hypothesis, https://www.investopedia.com/terms/n/null_hypothesis.asp (visited Sept. 20, 2022). That's nothing like Trax's drive tests, which aren't scientific, but "biased confirmation exercises. . . Drive tests could never be a reliable testing method because it is impossible to mimic the network conditions on the date in question." *See* Kirkham, *Rejecting Historical Cell Site Location Information*, *supra*, at 377.

Ray's testimony bears out the confirmation bias that's permeates Trax: he admitted that 0.97 gives the "best result," which is nothing more than an attempt to make the data fit a hypothesis—to confirm it, by assuming, ex ante, that a statistical significance exists in Trax's drive test measurements. Figures like 0.96 or 0.95 create cognitive dissonance for Ray because the coverage area becomes "too small." In other words, if the data he receives doesn't fit the theory, he changes

[3] The null hypothesis may be expressed in other terms, too. It's also "a maintained assumption about the object of statistical study that will be dropped only if the statistical evidence is sufficiently inconsistent with the assumption." Jill E. Fisch, et al. *The Logic and Limits of Event Studies in Securities Fraud Litigation*, 96 Tex. L. Rev. 553, 573 (2018). For example, when analyzing exam pass rates between students across the entire population, a null hypothesis would be "[t]he assertion that the pass rates in the population are the same. Thus, assuming the null hypothesis is true would mean that there's no difference between students "in the whole population—differences in the sample are due to the luck of the draw." Michael J. Saks, et al., *Annotated Reference Manual on Scientific Evidence* § 4.B.1 (2d. ed 2006).

the "constant" to make the theory fit. That's the epitome of an unscientific approach, which renders any information from Trax unreliable.

What's more, a drive test on a date after the alleged incident occurred won't likely show the same coverage results as it would've on that date:

> It is critical to understand that drive testing . . . after an incident is not going to show exactly the same results as a drive test that would have occurred on the date and time of the incident. There are multiple issues with using drive testing as evidence . . . . In fact, since radio waves are not static and do not propagate exactly the same way over time, the cell tower and sector a cell phone may 'see' or prefer can change even within a few minutes.

Larry Daniel, *Cell Phone Location Evidence for Legal Professionals* 77 (2017).

Despite those concerns, the People failed to address them. Instead of supporting Trax's purported error rate with evidence, they simply urge the Court to believe Ray's testimony, no questions asked. But without record evidence to support a scientifically based error rate, the Court is under no obligation to blindly accept Ray's testimony as credible, and it declines to do so.

In a last-ditch effort, the People imply that the Court must accept both Ray's estimate and Trax's drive testing because Jones's expert, Jovanovic, didn't offer a competing error rate. Once again, that argument is frivolous. Regardless of whether Jovanovic identified an error rate, it's incumbent on the People—as the proponent of the evidence—to establish its admissibility, not on *defendant* to prove that Trax is unreliable. The bottom line is that Ray isn't credible, Trax's drive testing doesn't produce an accurate error rate, and Jovanovic's inability to pinpoint the error rate doesn't cure those flaws. As a result, this factor favors Jones.

4. Acceptance.

An important factor in a *Shreck* analysis is whether the technique at issue has been generally accepted by the scientific community. 22 P.3d at 77. The People insist that Trax has been accepted and offer two arguments to show why. Both are unavailing.

First, the People contend that Trax is accepted because LexisNexis acquired Trax's parent company, ZetX. That's a remarkable line of argument, which, again, is devoid of merit. Acquiring a company has no bearing on whether the scientific community has accepted a particular practice. To give an analogy: when Philip Morris acquired Nicocig (an e-cigarette company), did that mean the scientific community had accepted vaping as a healthy habit? Of course not. The same is true here. Acquisition doesn't equal acceptance.

The People's second argument is also unpersuasive. According to them, because courts have accepted some cell-location evidence, Trax has been accepted too. But that blurs the point. Just because *some* types of cell-location evidence have been accepted, it doesn't follow that *all* cell-location evidence gets the green light. The Court must review the case as a whole and the specific evidence at issue. *See Shreck*, 22 P.3d at 77. And here, Trax's methods simply haven't been accepted as reliable.

Indeed, there are a litany of articles rebuking Trax and its underlying methods. Some have called Trax's mapping as "a profoundly flawed practice" that has "no basis in the science of . . . any engineering practices." Jovanovic & Cummings, *Geolocation Methods*, *supra*, at 28051. Others have taken aim at cell-site analysis more broadly, finding its accuracy "highly variable and remarkably unvalidated." Saxe, *Junk Evidence*, *supra*, at 145.

As noted above, *see supra* Subsection III.B.3, Trax's drive testing has taken heavy criticism. But Trax's use of CDRs has also come under fire: CDRs "can't tell you where within that coverage area the caller was; in some areas, the caller could have been anywhere within a 420-square-mile vicinity of a particular tower." Mark Hansen, *Prosecutors' Use of Mobile Phone Tracking Is 'Junk Science,' Critics Say*, ABA J. (June 1, 2013, 8:50 AM).

As one author explained, "[a]lthough several specialty software tools purport to produce accurate analysis results, including mapping generated from CDR/CSLI evidence, none of the

software tools currently perform the discovered evidence validation and analysis error mitigation methodology." John B. Minor, *Forensic Cell Site Analysis: A Validation & Error Mitigation Methodology*, 12:2 J. Digit. Forensics, Sec. & L. 33, 47 (2017).

The lack of validation and error mitigation are especially problematic because

> CDRs do not provide cell phone locations, but they do provide data detailing which cell tower connected the phone to the cellular network. Because no location is stated on CDRs, an expert witness must hypothesize the location of an individual's phone by comparing the historical cell twoer connection data with locations of cell towers in the area. The witness must then offer an *opinion* as to where the phone was located at the time of the call based on the location ofe the cell tower that connected a phone call. This entire method is based on the false assumption that cell phones always connect to the closest cell tower.

Kirkham, *Rejecting Historical Cell Site Location Information*, *supra*, at 362.

As a result, "[g]eolocation estimates based on CDRs that only have information about the sector that carried the call . . . are inherently unreliable." Jovanovic & Cummings, *Geolocation Methods*, *supra*, at 28050. In short, identifying cell location based on CDRs is "vastly different" from cellphone forensics and has "glaring deficiencies," particularly the absence of "peer review or error rates." Andrew McQuilkin, *Sleeping Gate-Keepers: Challenging the Admissibility of Cell-Phone Forensic Evidence Under Daubert*, 11 J. High Tech. L. 365, 399–402 (2011) (citing Tyler Moore, *The Economics of Digital Forensics* 2, 3 (2006)).

That's just the tip of the iceberg. The community has widely concluded that Trax's methods "cannot reliably place a suspect near a crime scene." Michael Cherry, et al., *Cell Tower Junk Science*, 95 Judicature 151, 152 (2012). The literature explains that "[u]nlike real-time cell phone tracking, the reliability of which is not questioned . . . the methodology employed in historical cell site analysis should be properly scrutinized." Aaron Blank, *The Limitations and Admissibility of Using Historical Cellular Site Data to Track the Location of a Cellular Phone*, 18 Rich. J.L. & Tech. 3, 32 (2011). That methodology is especially unreliable when it's based "solely upon an unsubstantiated belief in their scientific reliability." *Id.*

In sum, Trax and its methods have been routinely (and sharply), admonished by the scientific and legal community, and the People haven't directed the Court to any evidence showing otherwise. Consequently, this factor favors Jones.

5. Trax in Other Courts.

To determine whether Trax is reliable, the Court also looks to whether other jurisdictions have found it reliable. *People v. Tunis*, 318 P.3d 524, 529 (Colo. App. 2003); *see also Shreck*, 22 P.3d at 77 (asking if the evidence been offered in other cases). This factor is split as courts have both accepted and rejected Trax-related evidence or the methods behind it. Even so, the Court adds its voice to the courts that have rejected it.

On the one hand, the Court is aware of three decisions that have found Trax or similar evidence to be reliable (or have upheld such decisions):

1. *United States v. Reynolds*, No. 1:20-cr-24, 2021 WL 3750156 (W.D. Mich. Aug. 25, 2021).
2. *Trevino v. State*, No. 05-19-00295-CR, 2020 WL 2537246, *7–8 (Tex. Ct. App. May 19, 2020) (finding—without analyzing or explaining—that all cell-site location evidence is the same).
3. *State v. Ramirez*, 425 P.3d 534, 544 (Wash. Ct. App. 2018) (same); *but see State v. Villanueva*, No. 36694-4-III, 2020 WL 7396544, at *13–14 (Wash. Ct. App. Dec. 17, 2020) (unpublished) (admitting only for demonstrative purposes).

On the other hand, three decisions have rejected or been skeptical of the evidence:

1. *United States v. Evans*, 892 F. Supp. 2d 949, 956–57 (N.D. Ill. 2012) (excluding cell-site location evidence (mapping) after finding it unreliable).

2. *People v. Valdez*, C087046, 2022 WL 556833, at *19 & n.24 (Cal. Ct. App. Feb. 24, 2022) (unpublished) (highlighting Trax's shortcomings but affirming because defense counsel failed to object).

3. *United States v. Hill*, 818 F. 3d 289, 297 (7th Cir. 2016) ("No federal court of appeals has yet said authoritatively that historical cellsite analysis is admissible to prove location of a cell phone user."); *id.* at 299 ("The admission of historical cell-site evidence that overpromises on the technique's precision—or fails to account adequately for its potential flaws—may well be an abuse of discretion.")

To begin with, the Court notes that the courts that have found Trax and similar evidence reliable have done so without questioning or analyzing its methods. For instance, in *Ramirez*, the Washington court of appeals found that the evidence was reliable *because of* drive tests. 425 P.3d at 544. But the court never explained *why* those tests are reliable or based on reliable principles. *See id.*

The same is true for the Texas court of appeals in *Trevino* and the Western District of Michigan in *Reynolds*. In *Trevino*, the court found that all cell-site location information was identical without explaining that conclusion. *See* 2020 WL 2537246, *7–8. And in *Reynolds*, the court acknowledged that Trax hadn't been peer reviewed, but found that the error rate and general acceptance favored reliability "[b]ased on how knowledgeable and compelling Ray was as a witness." 2021 WL 3750156, at *5.

The Court finds those decisions unpersuasive and won't follow them. In the Court's view, those decisions "either ignored or disregarded . . . error rates and peer review." McQuilkin, *Sleeping Gate-Keepers*, 11 J. High Tech. L. at 401. Indeed, as Judge Paul W. Grimm of the District of Maryland has aptly noted, "[j]udges should be cautious about admitting this evidence in the face of an evidentiary challenge just because so many courts in the past have done so, often without any real consideration of whether it meets the requirements of Rule 702." Hon. Paul W. Grimm, *Admissibility*

of Historical Cell Phone Location Evidence, 44 No. 4 Litig. 53 (Summer 2018). The Court shares Judge Grimm's concerns here because the decisions that found Trax to be reliable focused almost exclusively on testing, and for Trax specifically, credited Ray's testimony wholesale, without probing his methods. *See Reynolds*, 2021 WL 3750156, at *2–5.

The Court, however, can't adopt Ray's assertions based solely on his *ipse dixit*. *General Electric Co. v. Joiner*, 522 U.S. 136, 146 (1997) ("Nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert."). Most compelling are the complete absence of data to support Trax's purported error rate and the scientific community's wholesale rejection of Trax's methods. As the court in *Evans* put it, Trax's "chosen methodology has received no scrutiny outside the law enforcement community." 892 F.Supp.2d at 957. Thus, the Court joins the ranks of *Evans* and finds that the People have failed to demonstrate that Trax is reliable.

C. The evidence will be useful to the jury and its probative value substantially outweighs the danger of any unfair prejudice.

The last two analytical steps in a Rule 702 challenge require the Court to determine if expert testimony on Trax will help the jury and if it satisfies Rule 403. *Shreck*, 22 P.3d at 77. Once again, again, the People can't satisfy either requirement.

First, testimony about Jones's location—based on Trax—won't be useful to the jury. As explained above, Trax isn't reliable. So, any testimony about it doesn't make it more likely that Jones was at S.V.'s apartment complex.

Second, Trax-related testimony fails under Rule 403. Under that rule, even relevant "evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence." Colo. R. Evid. 403.

Here, the danger of misleading the jury or unfairly prejudicing Jones far outweighs the probative value of the Trax evidence. As noted, "the very nature of scientific evidence helps to assure a likelihood of accuracy." Faigman & Imwinkelried, *Evidence Code Section 802*, *supra*, at 446. Thus, the risk that Trax evidence would mislead a jury or cause them to unfairly prejudice Jones is great. It's very likely that a jury would be misled by Trax's flashy maps and seeming accurate results. But underneath those surface displays lies a sea of unreliability that the jury won't see. In sum, because Trax-related evidence won't be useful to the jury and would unfairly prejudice Jones, it isn't admissible.

IV. CONCLUSION.

For the reasons stated above, Jones's objection is sustained. The People are prohibited from introducing testimony or evidence of Jones's location that's based on Trax.

SO ORDERED on September 20, 2022.

BY THE COURT

JUAN G. VILLASEÑOR
District Court Judge