



TECHNOLOGY AND PROSECUTION: THE EVOLVING COURTROOM



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March 2024

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ACKNOWLEDGMENTS

This report was written by Senior Attorney Antonia Merzon and Executive Director Kristine Hamann, both of Prosecutors' Center for Excellence. We received many suggestions and comments from prosecutors nationally and we are particularly grateful for the the insights and assistance provided by Miami-Dade Chief Assistant State Attorney Stephen Talpins (Florida), Henrico County Commonwealth Attorney Shannon Taylor (Virginia), and Platte County Prosecuting Attorney Eric Zahnd (Missouri), as well as Senior Attorney Advisor John Wilkinson, Attorney Advisor Jonathan Kurland and Attorney Advisor Patti Powers, all from AEquitas. Georgetown University Law School student Brittany Appleby-Rumon provided superb assistance with editing and research.

We also thank Fredric Lederer from the Center for Legal & Court Technology at William & Mary Law School in Williamsburg, Virginia for his advice and excellent work in this area.

This project was supported in part by the Innovative Prosecution Solutions Grant No. 2017-YX-BX-K002 awarded by the Bureau of Justice Assistance. The Bureau of Justice Assistance is a component of the Department of Justice's Office of Justice Programs, which also includes the Bureau of Justice Statistics, the National Institute of Justice, the Office of Juvenile Justice and Delinquency Prevention, the Office for Victims of Crime, and the SMART Office. Points of view or opinions in this document are those of the authors and do not necessarily represent the official position or policies of the U.S. Department of Justice.

TECHNOLOGY AND PROSECUTION: The Evolving Courtroom

INTRODUCTION

Advancements in technology are continually creating new options for prosecutors. The Covid-19 pandemic accelerated this process, forcing the rapid adoption of technical solutions for managing social distancing requirements. Prosecutors now face an array of tech-driven opportunities with the potential to transform many aspects of their job. The question is whether and how to take advantage of them. New technology can offer great improvements, such as speed, efficiency, and financial savings. But it also can raise concerns about security, integrity, and legal compliance, as well as the financial costs of equipment and training.

New forms of courtroom technology have been emerging and expanding for years. With the advent of digital hardware and software in the 1980s and 90s, courtrooms, like everywhere else, began to utilize a variety of tools to improve the effectiveness of their work. Everything from case management to assistive technology for people with disabilities has been revolutionized in this process. Court systems with high caseloads have often been the first to incorporate these innovations. The spread of Covid-19, however, propelled new technology into courthouses everywhere. As one study put it, the pandemic created a “unique opportunity to leverage creative thinking, seize on an emergency-created receptivity to change and adopt technology to create long-term and much-needed improvements.”¹

This evolution in technology has prompted changes to a courtroom’s very infrastructure. Hardware and cabling are needed to provide reliable internet access. Computers, sound systems, display monitors, cameras, and other devices must be positioned and installed. Courtrooms must be configured to handle this technology so that judges, clerks, counsel, parties, witnesses, jurors, and the public can make full use of these amenities.² Numerous court systems have installed this type of

¹ Conference of Chief Justices & Conference of State Court Administrators, *Guiding Principles for Post-Pandemic Court Technology*, National Center for State Courts (July 16, 2020), <https://www.srln.org/system/files/attachments/Guiding%20Principles%20for%20Post%20Pandemic%20Court%20Technology%20%28CCJ%3ACOSCA%202020%29.pdf> (last visited 6/14/2021).

² Lederer, Fredric I., *The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic* (2021), Faculty Publications (2022), <https://scholarship.law.wm.edu/facpubs/2022>.

infrastructure and are already employing a variety of technological adaptations. Many others are considering technology updates.

In this paper, we will discuss several forms of evolving courtroom technology, including remote appearances and advances in visual display, artificial intelligence, data analytics, and recorded and automated transcription. The benefits of each, as well as issues to resolve, are discussed. These technologies will greatly affect the litigation of criminal cases and directly impact prosecutors' work in the years to come.

REMOTE APPEARANCES

Over the course of several decades, evolving videoconferencing technology has enabled people in different places to meet and interact over the internet. Software applications such as Zoom, Teams, and Webex now provide virtual meeting spaces where multiple participants can see and speak to one another. While this technology has existed for years, the pandemic prompted its widespread adoption for both personal and professional use.

In the courtroom context, videoconferencing technology allows court proceedings to occur without all parties having to physically appear in the courtroom. Instead, the judge and other participants can convene virtually from separate locations. This capability allowed courts to continue to function when pandemic-induced social distancing measures limited human contact.

Equipment and Connectivity

Courts cannot assume that all parties to criminal proceedings have the necessary technical resources to take advantage of videoconference appearances. When determining whether to use a videoconferenced proceeding, courts must confirm that all participants have access to the following:

Internet connectivity. Videoconferencing software relies on the internet to connect people in disparate places to a virtual meeting room. As a result, every participant appearing remotely in a court proceeding must have access to reliable internet service with the speed and bandwidth to support real-time, two-way video communication.³

³ Videoconferencing companies provide specifications for the level of internet speed and bandwidth needed to properly use their services. For example, Zoom's suggested requirements can be found here: https://support.zoom.com/hc/en/article?id=zm_kb&sysparm_article=KB0060748.

Computing devices. Videoconferencing services are software applications. To use these applications, all participants must have access to a device that is capable of running the software – such as a computer, laptop, tablet, or smartphone.

Technical support. Conducting a remote appearance requires technical support. Courts must be able to adequately set up, initiate, and operate a proceeding, as well as assist participants with technical problems that might arise. Ideally, technologists within the court staff or from third-party vendors can perform this role. In some court systems, judges or court staff may be tasked with technical support.⁴

Security and Public Access

Remote court appearances are conducted online, and therefore require cybersecurity measures. Early in the pandemic, videoconferencing systems, such as Zoom, experienced security breaches that allowed unauthorized individuals to access and interrupt private meetings.⁵ While many problems have been addressed, any use of videoconferencing for court proceedings must be secure from intrusion, data theft, malware infection, or any other form of cyberattack. Not only might this activity directly harm the participants, but interference could also force the court to delay the proceeding.⁶ Proper cybersecurity mitigates these risks.

Security measures for remote appearances are complicated by the need for public access to the courtroom, both physical and virtual. By law, most physical courtrooms are open to the public so that anyone can observe the administration of justice. Remote proceedings must follow the same standards for public access. This requirement can be met in several ways, including by livestreaming court proceedings or by making audiovisual recordings of court proceedings that can be posted online for public viewing.⁷

During the pandemic, courts developed effective approaches to meet security and public access needs that continue to be used today. Many courts have turned to

⁴ See, Lederer, Fredric I., *The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic* (2021), Faculty Publications (2022), <https://scholarship.law.wm.edu/facpubs/2022>.

⁵ See Perrett, Connor, *A federal court hearing in Georgia was Zoom-bombed with photos of the 9/11 attacks, ISIS, and porn*, Business Insider (Sept. 15, 2020), <https://www.insider.com/federal-hearing-zoom-bombed-photos-of-911-2020-9> (During an ongoing virtual hearing in a Georgia federal court, a third-party shared his screen with all 100 participants, displaying the swastika and sexual images).

⁶ See, Lederer, Fredric I., *The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic* (2021), Faculty Publications (2022), <https://scholarship.law.wm.edu/facpubs/2022>.

⁷ In Colorado, remote public access to court proceedings is now required under a 2023 state law: https://leg.colorado.gov/sites/default/files/2023a_1182_signed.pdf. In other states, such as Maryland, remote public access has been established as a court rule:

<https://www.mdcourts.gov/sites/default/files/import/eservices/pdf/remotehearingsguidelines.pdf>.

videoconferencing formats with encrypted channels and a range of security features.⁸ Members of the public can log in through the videoconferencing software to view proceedings in real time, but cannot participate in them (similar to a physical courtroom). Other courts have established YouTube Channels to allow for public proceedings.

In sensitive cases, such as those involving sex abuse, domestic violence, or gangs, courts sometimes restrict public access.⁹ In a physical courtroom, this process is as simple as preventing members of the public from entering. For remote proceedings, courts may disable live online public access, or allow public viewing only in supervised physical spaces. These spaces can be monitored by court personnel to prevent illegal recordings that might later be used to target, humiliate, or harm witnesses.

Remote Models

Two general models are being used for remote court proceedings – fully virtual and hybrid models. In a *fully virtual court proceeding*, no one is present in a physical courtroom. Instead, the judge, court staff, counsel, defendant, and all other participants appear remotely from their individual locations. In a *hybrid court proceeding*, the judge and court staff are in the physical courtroom, while one or more of the other participants appears using videoconferencing. In many places, state law and local court rules were modified during the pandemic to allow for both types of remote proceeding.¹⁰

Remote proceedings in criminal prosecutions must protect the due process and other constitutional and statutory rights of the defendant. In other words, a remote proceeding must fulfill the equivalent constitutional standards as an in-person proceeding. All parties must be able to “fully participate in the virtual hearing so as to

⁸ See, e.g. Security guidelines from Webex and Microsoft Teams: <https://www.webex.com/security.html> and <https://docs.microsoft.com/en-us/microsoftteams/teams-security-guide>. Products such as these use encrypted channels for videoconferencing and allow offices to maintain conferencing settings that comply with national and regional security regulations.

⁹ The right to a public trial is established in the United States Constitution’s Sixth Amendment. The U.S. Supreme Court has held that public access may be restricted when a court determines there is an overriding interest to do so, there are no reasonable alternatives, the closure is no broader than necessary, and the court makes findings to support the closure. Waller v. Georgia, 467 U.S. 39 (1984).

¹⁰ See, Deisy Hernandez, Chief Assistant, Office of the State Attorney Miami-Dade County, Florida, *Considerations for Remote Proceedings*, Prosecutors’ Center for Excellence Pop-Up on Lessons Learned from the Pandemic (June 21, 2021), <https://pceinc.org/pce-videos-pop-up-on-lessons-learned-from-the-pandemic/>. (In Miami-Dade, Florida, before the pandemic began, statutes limited use of remote proceedings to a defendant’s appearance at their bond hearing. The Florida Supreme Court had to promulgate rules to electronically sign indictments and informations and virtually swear-in witnesses); (In New York, most remote proceedings were permissible only under executive order signed during the onset of the pandemic - break-out group, notes on file with PCE).

present relevant evidence, adequately challenge adverse evidence, fully observe proceedings, make appropriate argument, and communicate effectively.”¹¹

Some court systems have used remote models for routine criminal litigation matters since before the pandemic, using methods that meet these due process standards. For example, in many jurisdictions, an incarcerated defendant’s first appearance has long been a hybrid proceeding. The judge and court staff are in the physical courtroom, while the defendant remains at the jail. Depending on the system, the prosecutor and defense attorney may be at the jail or in the courtroom. During this hybrid appearance, the judge arraigns the defendant on criminal charges, decides whether to set bail, hears arguments on other relevant issues, and sets the schedule for the case.

Proceedings Not Involving the Introduction of Evidence

The constraints of the pandemic revealed that additional phases of a criminal prosecution can be readily handled remotely.¹² Proceedings that do not involve the introduction of physical evidence or the presentation of witness testimony are easily transferable to remote models. These steps are procedural in nature and require only the judge, prosecutor, defendant, and defense counsel to appear. As discussed below, proceedings using evidence require additional due process and other constitutional considerations.

Matters that can be attended remotely with little to no risk of eroding due process include:

- Search warrant and similar applications
- Arraignment after initial charging
- Arraignment after probable cause finding
- Continuances
- Motion practice
- Non-evidentiary hearings
- Non-evidentiary competency matters
- Discovery conferences
- Pre-trial conferences

¹¹ Lederer, Fredric I. and Center for Legal & Court Technology, *Analysis of Administrative Agency Adjudicatory Hearing Use of Remote Appearances and Virtual Hearings* (2021), p. 13, Faculty Publications (2022), <https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=3081&context=facpubs>.

¹² Lederer, Fredric I. and Center for Legal & Court Technology, *Analysis of Administrative Agency Adjudicatory Hearing Use of Remote Appearances and Virtual Hearings* (2021), Faculty Publications, (2022), <https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=3081&context=facpubs>, (Reporting the results of a study of twelve federal agencies that successfully adopted remote adjudicatory hearing procedures during the pandemic).

- Plea conferences¹³
- Pleas
- Sentencing
- Progress reports about treatment, diversion and other plea/sentence conditions
- Appeals

Proceedings Involving the Introduction of Evidence

Other proceedings in a criminal prosecution involve the introduction of physical items and witness testimony. Both forms of evidence raise legal and practical issues when considering how to handle such proceedings remotely. Proceedings where evidence is introduced include:

- Grand Jury presentations
- Preliminary/probable cause hearings
- Suppression hearings for various forms of evidence
- Competency hearings
- Other evidentiary hearings
- Bench/non-jury trials
- Jury trials

Physical Evidence

For physical evidence, such as tangible objects and documents, a remote proceeding must enable the introducing witness to establish the item's evidentiary foundation – such as its authenticity and chain of custody. The defendant and defense counsel also must be able to examine the item for the purposes of challenging its admission into evidence (or the prosecutor for defense exhibits).

There are several potential scenarios when physical evidence is introduced. If counsel is physically present with the introducing witness and exhibit, then the process would function in the same manner as during a traditional, in-person proceeding. If counsel is not present with the introducing witness and exhibit, then additional steps may be necessary to ensure all rights of the defendant are preserved. For example, the court can give counsel and the defendant the opportunity to examine physical exhibits prior

¹³ In some jurisdictions this practice may be constrained by statutory requirements and has met with some resistance from defense counsel. Remote plea conferences may be more suitable for pleas involving probationary terms.

to the remote proceedings.¹⁴ See section below on Visual Evidence for discussion about technology used to display evidence.

Witness Testimony

For testimonial evidence, a remote proceeding must allow witnesses to provide sworn testimony on both direct and cross-examination, and to answer any questions from the judge or jury. Remote proceedings also must protect defendants' Sixth Amendment right to confront the witnesses against them, and their due process rights to a fair trial. In other words, a remote proceeding should function in a manner equivalent to in-person testimony. For example, the videoconferencing technology used by the court and witness should allow all parties to fully see and hear the witness, so that they can evaluate both the witnesses' words and demeanor.

Courts will have to carefully consider whether a videoconference adequately preserves these rights.¹⁵ Procedural rules may be necessary to ensure that remote witness appearances are equivalent to in-person testimony. Examples of such rules include:

- Methods for verifying the identity of the witness
- Processes for administering the oath
- Camera angles that provide a clear view of the remote witness¹⁶
- Camera angles that reveal if anyone is present with the remote witness
- Prohibitions against the presence of prejudicial objects or backgrounds¹⁷
- Prohibitions against items that might influence witness testimony (e.g. cellphones, computers, notes, documents)

¹⁴ Nicholas M. Pace, Bethany Saunders-Medina, Jamie Morikawa, Sanjana Manjeshwar, & Anne Bloom, *COVID-19 and the Courts, Lessons from the Pandemic*, RAND Institute for Civil Justice & University of California Berkeley's Civil Justice Research Initiative (2021), https://www.rand.org/pubs/conf_proceedings/CFA1299-1.html (With remote trials lawyers may encounter "difficulties sharing documents and evidence" and "interruptions such as 'Zoom-bombing' and slow Wi-Fi connections").

¹⁵ See, Lederer, Fredric I., *The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic* (2021), Faculty Publications (2022), <https://scholarship.law.wm.edu/facpubs/2022>; Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge's Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022), <https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>

¹⁶ United States Courts, *As Pandemic Lingers, Courts Lean into Virtual Technology* (Feb. 18, 2021), [https://www.uscourts.gov/news/2021/02/18/pandemic-lingers-courts-lean-virtual-technology#:~:text=As%20the%20coronavirus%20\(COVID%2D19,do%20not%20require%20a%20jury](https://www.uscourts.gov/news/2021/02/18/pandemic-lingers-courts-lean-virtual-technology#:~:text=As%20the%20coronavirus%20(COVID%2D19,do%20not%20require%20a%20jury), (U.S. District Court Judge, Mary S. Scriven, found that with remote hearings she could "se[e] the full faces of witnesses on a screen 18 inches away, instead of viewing them at an angle in the witness box, provid[ing] a better view")

¹⁷ United States Courts, *As Pandemic Lingers, Courts Lean into Virtual Technology* (Feb. 18, 2021), <https://www.uscourts.gov/news/2021/02/18/pandemic-lingers-courts-lean-virtual-technology> (During a virtual child custody dispute, "[t]he father who was making his custody claim was sitting with a well-positioned photograph of him and his daughter on the desk." The presiding judge remarked, "that would not have happened in the courtroom" and added "witnesses need to be encouraged to appear as if they were on the witness stand and not think of it as an opportunity to color the proceeding.").

- Guidance for how to “arrive” and “leave” the virtual witness stand
- Acceptable locations for remote testimony (e.g. no bedrooms or public spaces)
- Dress codes (e.g. no pajamas, nudity)

There may be additional considerations for witnesses testifying virtually from outside of the state where the court has jurisdiction. For example, some states may require such witnesses to be sworn by an official within the state where the witness is located.¹⁸ Defense counsel may choose to waive this requirement. Also, before taking testimony from an out-of-state witness, courts should determine if their state would have jurisdiction to prosecute for perjury should the witness provide false testimony under oath.¹⁹

Holographic Testimony

New technology may improve the presentation of physical and witness evidence in hybrid proceedings. Advancements in holographic communication are making it possible for remote witnesses to testify through a three-dimensional video display. The witness appears as a hologram in the courtroom, on or near the witness stand. This more-lifelike presentation of the witness may offer defendants the ability to cross-examine as if the witness were appearing in-person. Moreover, holographic witnesses can hold and display exhibits three-dimensionally, allowing the court and jury to see them in a manner closer to their true form.²⁰

Jurors

Grand Juries and jury trials are evidentiary proceedings that require the selection of jurors. Remote jury selection is possible through either a fully virtual or hybrid process. If fully virtual, potential jurors are interviewed from their homes or workplaces by a judge and counsel who are operating from their own separate locations. In a hybrid process, judge and counsel are typically in the courtroom, while potential jurors are interviewed from remote locations.

Under either of these remote selection models, the court would use a videoconferencing platform to assemble a remote jury pool. The videoconference

¹⁸ See, e.g., *Virtual Bench Trial: Protocols and Procedures*, New York State Unified Court System (2021), <https://www.nycourts.gov/whatsnew/pdf/VirtualBenchTrial-Protocols-2112021.pdf>.

¹⁹ See, e.g., *Perjury and Jurisdiction When Testimony Was Delivered Via Two-Way Technology*, AEquitas (2020), <https://innovativeprosecutionsolutions.org/wp-content/uploads/2020/09/Perjury-Via-Closed-Circuit-TV-1.pdf>, which discusses the issue of out-of-state virtual perjury in the context of Michigan law.

²⁰ Horne, Chris, *Testimony by hologram, instant voice-to-text trial records: Artificial intelligence reshaping the legal system*, 6/12/2023 (updated 10/16/2023), <https://www.wavy.com/news/local-news/williamsburg/testimony-by-hologram-instant-voice-to-text-trial-records-artificial-intelligence-reshaping-the-legal-system/> (discussing the hologram technology developed by Proto, a Los Angeles company).

would have to be configured such that the judge and attorneys could speak both to the entire pool and to jurors individually.

At the conclusion of a Grand Jury presentation or trial, the virtual jury would have to deliberate. Since jury deliberations are secret, the jurors would convene in a discrete videoconference meeting space. For example, a separate “breakout room” could be created in the Grand Jury or trial videoconference that only the jurors and a bailiff could access. The jurors and bailiff would be sworn to the same secrecy rules required when administering an in-person jury.²¹

Other hybrid approaches are available for jury selection and service. One option is to conduct jury selection remotely, but have the selected jurors serve in-person at the courthouse.²² Another option is to have jury selection and service conducted entirely in-person in a courtroom, while counsel and/or witnesses participated remotely. In these scenarios, jury selection and deliberation would simply follow normal in-person procedures.

Defense Agreements and Waivers

When using remote proceedings in a criminal case, prosecutors and courts should strongly consider obtaining agreements from defendants that waive any claims of constitutional, statutory, or other legal violations. Criminal justice procedures were created and refined based on in-person proceedings. Remote appearances in a criminal prosecution, even when conducted conscientiously and fairly, may inherently differ from longstanding in-person practices that adequately protect a defendant’s legal rights. Agreements and waivers may be especially important with use of a virtual jury. A remote jury deliberating from twelve different locations is quite different than twelve individuals together in one room.²³

²¹ See Judge Herbert B. Dixon, Jr., *Pandemic Potpourri: The Legal Profession’s Rediscovery of Teleconferencing*, American Bar Association (Nov. 16, 2020), https://www.americanbar.org/groups/judicial/publications/judges_journal/2020/fall/pandemic-potpourri-legal-professions-rediscovery-teleconferencing/ (In Collin County, Texas, juries were selected and deliberated via separate virtual breakout rooms).

²² See United States Courts, *As Pandemic Lingers, Courts Lean into Virtual Technology* (Feb. 18, 2021), <https://www.uscourts.gov/news/2021/02/18/pandemic-lingers-courts-lean-virtual-technology> (In the District of Connecticut, jury members in one civil case were selected virtually from home but then came to court for an in-person trial).

²³ Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge’s Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022), <https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>.

When to Use Remote Proceedings

As remote court proceedings become more common, many courts are deciding when to use remote proceedings and what model to choose. There are many potential benefits and questions to resolve. Indeed, the National Center for State Courts recently launched an initiative to test technology and best practices options for hybrid hearings.²⁴

Because the legal and practical factors to consider are especially important in criminal cases, prosecutor offices should be aware of these issues and participate in the decisions being made in their court systems.

Benefits of Remote Appearances

- **Courtroom efficiencies.** Remote proceedings can save time and reduce scheduling difficulties in the courtroom. For example, when incarcerated defendants appear from jail, court staff do not have to expend time and effort transporting and securing the defendant. Cases involving multiple defendants and counsel can be scheduled more easily if parties are allowed to appear remotely. Remote appearances for out-of-jurisdiction witnesses reduce scheduling concerns, especially when cases inevitably require date changes.
- **Cost savings.** Reducing the in-court caseload can translate to a reduced cost burden throughout the justice system. Prisoner transport, court staff operations, prosecutor and defense counsel staffing – all of these in-person time and money costs could be significantly reduced using hybrid or fully virtual proceedings.
- **Prosecutor staffing.** Remote appearances may be preferable for prosecutor offices with staffing issues, since the time saved by appearing from the office can allow a prosecutor to have more time at their desks to work on other matters. Remote options also may benefit prosecutor offices with wide geographical jurisdictions that require staffing courtrooms in distant locations.²⁵
- **Improved appearance rates for defendants.** Some un-jailed defendants do not appear in court because doing so would require long-distance travel, losing time

²⁴ *Hybrid Hearings Improvement Initiative (HHII) to offer insights, support to nearly 100 courts*, NAT'L CTR. FOR STATE COURTS (March 29, 2023), <https://www.ncsc.org/newsroom/at-the-center/2023/hybrid-hearings-improvement-initiative-to-offer-insights.-support-to-nearly-100-courts#:~:text=The%20initiative%2C%20a%20pilot%20project,both%20the%20courts%20and%20public.>

²⁵ See, Deisy Hernandez, Chief Assistant, Office of the State Attorney Miami-Dade County, Florida, *Considerations for Remote Proceedings*, Prosecutors' Center for Excellence Pop-Up on Lessons Learned from the Pandemic (June 21, 2021), <https://pccinc.org/pce-videos-pop-up-on-lessons-learned-from-the-pandemic/> (In Miami-Dade, Florida, remote proceedings are a necessity because of the lack of courthouse parking to accommodate a population of six million and no less than 15,000 cases pending at any time in the State Attorney's office).

from work, or child care arrangements. Remote options can improve appearance rates for such defendants.

- **Reduced time and travel for witnesses.** Remote testimony is particularly helpful for witnesses who might otherwise have to travel long distances to testify in court, witnesses who simply lay the technical foundation for the introduction of evidence, and professional witnesses who have limited time available (such as doctors and expert witnesses). Remote options also can provide an efficient method for routine police appearances, allowing officers to testify and then return to duty more quickly.
- **Protecting victims of domestic violence and sex crimes.** With permission from the court, remote appearances can benefit victims or witnesses of violence who are afraid to confront a defendant in court or are concerned about contact with an out-of-custody defendant in the courthouse.
- **Foreign-language interpretation.** Remote interpreters can save courts time and money. Instead of each court having to locate interpreters for an array of foreign languages (or using a telephonic translation service), court systems (and prosecutor offices) can share interpreters who provide translation through videoconferencing. While the witness testifies in-person or remotely, the remote interpreter can listen and provide simultaneous translation to the court.
- **Recording and transcription.** Most videoconferencing platforms provide free audiovisual recording, as well as transcription of the communications made during a session. The recordings could be used by human reporters or automated transcript services to create the official record. In addition, the platform’s “unofficial” transcript is available immediately, and can be a useful tool for the court and attorneys who normally must wait for official transcripts from human reporters.

Issues to Resolve

- **Passing new statutes, local rules, and procedures authorizing remote proceedings.** During the pandemic, states and court systems created laws and rules authorizing the use of remote proceedings. Since some of these authorizations were made on an emergency basis, continued approval of remote methods may be unclear. In addition, some laws and rules may be outdated, requiring amendments to include videoconferencing and other technology innovations.²⁶
- **Cost of technology, technical support, and training.** Funding is necessary for the equipment and internet access required for virtual conferencing. Depending

²⁶ Lederer, Fredric I., *The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic* (2021), Faculty Publications (2022), <https://scholarship.law.wm.edu/facpubs/2022>.

on the size of the court system, equipping every courtroom with the technology to conduct hybrid remote proceedings could be costly. Courts also will need internal or third-party technical support to ensure smooth operation of remote proceedings, as well as training for judges and court staff on how to use videoconferencing software and hardware in compliance with relevant court rules and state laws. All of these requirements represent potentially sizable costs.

- **Access to necessary technology and technical support.** Remote options for court proceedings require all participants to have sufficient internet and device access. Some parties may not own computers or smartphones, while others may have inadequate internet service. Indeed, many rural regions of the country do not yet have the physical infrastructure to provide the level of internet service required for videoconferencing.²⁷ In a criminal case, courts must ensure that unequal technology access to a remote proceeding does not result in a due process violation.²⁸ And even for parties with the necessary technology, courts and prosecutors may have to provide technical support to troubleshoot remote proceedings.
- **Remote access for those with disabilities.** Remote options also must be available to judges, court staff, defendants, attorneys, witnesses, and jurors with disabilities. Assistive technology is another area of rapid technological development and already offers potential solutions, such as screen readers and remote sign-language interpreters.²⁹
- **Standardizing remote options.** If courts adopt remote appearances as a routine practice, policies should be standardized about when and how they will be employed to ensure equal access and uniformity. One policy to consider is whether the use of remote proceedings should be subject to veto by any party.
- **Private communication within a remote proceeding.** Defense attorneys speaking with clients, sidebars between attorneys and judges, and conferrals between a judge and clerk are examples of common private discussions in an in-

²⁷ In rural areas, fast internet speed and cell service coverage may be limited or non-existent, making virtual meetings impossible. Even if a witness has access to the technology, they may lack the necessary expertise to use it to participate effectively, especially when giving testimony. See, The Priority Criminal Justice Needs Initiative, *Promising Practices from Victim Services Providers' COVID-19 Response, Protecting Victims and Those Who Serve Them*, RAND Corp. (2021), https://www.rand.org/pubs/research_briefs/RBA108-5.html; see also, Conference of Chief Justices & Conference of State Court Administrators, *Guiding Principles for Post-Pandemic Court Technology*, National Center for State Courts (July 16, 2020), <https://www.srln.org/system/files/attachments/Guiding%20Principles%20for%20Post%20Pandemic%20Court%20Technology%20%28CCJ%3ACOSCA%202020%29.pdf> (To reduce barriers to access “ensure...online services are mobile responsive [and] compatible with the most used browsers.” To “bridge the digital divide” consider “allow[ing] participation via telephone or court or community-based kiosks”).

²⁸ Lederer, Fredric I., *The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic* (2021), Faculty Publications (2022), <https://scholarship.law.wm.edu/facpubs/2022>.

²⁹ Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge's Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022), <https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>.

person courtroom. Videoconferencing systems used for remote proceedings must provide analogous options for private communication, such as breakout rooms within the virtual meeting space. Courts will have to decide how to implement these private virtual spaces within a proceeding.

- **Credibility determinations.** When testimony is provided remotely, judges and juries must be able to adequately evaluate the demeanor and truthfulness of the witness. This potential fact-finding issue, and its impact on due process, is one of the concerns frequently expressed about remote proceedings. Recent studies, however, have determined that videoconferencing does not affect judges' ability to assess a witness' demeanor.³⁰ The widespread use of videoconferencing also suggests that the average person is comfortable interacting with and assessing others through this medium.
- **Confrontation Clause.** As mentioned earlier, the Sixth Amendment gives defendants the right to confront the witnesses against them. Courts and prosecutors must ensure that a remote proceeding fully affords this right to a defendant. Courts also may require defendants to state their agreement to a remote appearance in writing, with specific provisions acknowledging that any Sixth Amendment rights are being met.
- **Developing valid agreements and waivers for remote proceedings.** There are many good reasons for a defendant to choose a remote proceeding. But because remote proceedings have some inherent differences from the in-person courtroom (especially when witness testimony and jurors are involved), courts and prosecutors should consider developing agreements and/or waivers to avoid future litigation about the proceeding's fulfillment of constitutional or statutory rights.
- **Improper influences on witnesses.** When witnesses testify remotely, there is a risk that people or materials out of view of the camera may improperly influence their testimony. For example, taking the remote testimony of a domestic violence victim from a home shared with an abuser may increase this risk, as well as encourage recantation or future violence. One solution is to ask the witness to testify from a nearby courthouse or prosecutor office where a court officer or other neutral monitor could be present. Courthouses could create rooms for this purpose with two cameras, one showing the witness and the second showing the entire room. Another solution is to have a neutral monitor approved by the court

³⁰ Lederer, Fredric I. and Center for Legal & Court Technology, *Analysis of Administrative Agency Adjudicatory Hearing Use of Remote Appearances and Virtual Hearings* (2021), Faculty Publications (2022), <https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=3081&context=facpubs>; United States Courts, *As Pandemic Lingers, Courts Lean into Virtual Technology*, Feb. 18, 2021, <https://www.uscourts.gov/news/2021/02/18/pandemic-lingers-courts-lean-virtual-technology> (U.S. District Court Judge, Mary S. Scriven, found that with remote hearings she could “se[e] the full faces of witnesses on a screen 18 inches away, instead of viewing them at an angle in the witness box, provid[ing] a better view”).

dispatched to the witness' location while the witness testifies (taking into account any safety concerns for the monitor or witness).

- **Impact on victims and witnesses.** Remote proceedings offer a different experience from traditional courtrooms for victims and witnesses seeking justice. For some, it may be a benefit to testify away from the courtroom. Others may feel their testimony is not being treated with appropriate attention or importance.³¹ Evaluating the impact on victims and witnesses is a significant factor when considering remote options.
- **Public access – what not to display.** While the public may be entitled to view a remote proceeding, some parts of the process may be inappropriate for public display. One important decision is whether to allow streaming access to jury selection, a process that requires jurors to divulge personal information. Relatedly, courts must decide whether the jury should be visible online during a trial. Courts and attorneys also must take steps to ensure that privileged or sensitive information (such as documents containing personal identifiers) are not inadvertently displayed.
- **Absence of formality.** One of the primary differences between in-person and remote proceedings is a perceived absence of formality. Customs such as rising for the judge and sitting in a formal courtroom with flags and seals are not the same via videoconferencing, and may undercut the importance of truthful testimony. Courts and prosecutors can consider measures to create a formal remote atmosphere, such as the use of courtroom backdrops, dress code requirements, and methods to acknowledge the entry of a judge or jury to the virtual proceeding.

VISUAL DISPLAY

Many courtrooms are now equipped with technology that allows the visual display of case information. Judges and counsel can use computers, screens, and monitors to show items such as physical objects, documents, photos, videos, and presentation slides to the court, witnesses, jury, and the public.³²

³¹ See, The Priority Criminal Justice Needs Initiative, *Promising Practices from Victim Services Providers' COVID-19 Response, Protecting Victims and Those Who Serve Them*, RAND Corp. (2021), https://www.rand.org/pubs/research_briefs/RBA108-5.html (Victim advocates raise concerns that virtual court processes are not as impactful for victims as in-person hearings).

³² See, Lederer, Fredric I., *The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic* (2021), Faculty Publications (2022), <https://scholarship.law.wm.edu/facpubs/2022>; Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge's Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022), <https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>.

Benefits of Visual Display

Use of visual display technology has many benefits for prosecutors in the courtroom, including:

- **Time savings.** Displaying numerous pieces of evidence visually is less cumbersome and time-consuming than manually locating and presenting each individual item to the court, opposing counsel, the witness, and the jury. Prosecutors can organize the exhibit display before a proceeding so that the court presentation is quick and straightforward.
- **Presentation software.** Visual display systems allow prosecutors to easily use presentation software (such as PowerPoint, Google Slides, Trial Director, or Canva) to support arguments made during opening and closing statements.
- **Jury instructions.** Judges can use visual displays to more effectively present and explain instructions and other information to the jury.
- **Public access.** Visual information displayed on screens or monitors is more visible to members of the public, including those watching proceedings via online streaming services.

Issues to Resolve

While use of courtroom visual display technology has become widespread, prosecutors should be aware of several potential concerns.³³ In a courtroom with new technology, it is important for a prosecutor to conduct a test run prior to the trial of how exhibits will be introduced, used by the witnesses, and preserved. Some issues may require intervention or instruction by the judge to ensure fair and appropriate use of display systems.

- **Logistics of witnesses using the evidence.** Display technology on a fixed screen can make it difficult for a witness or litigant to describe or point to an aspect of the exhibit. Attorneys should consider methods that would assist the witness in this process, such as physical or electronic pointers, and ensure that the record reflects these interactions with the display.
- **Preservation.** Creating a full record of a court proceeding may require preservation of any visual display used in the courtroom, as well as anything drawn on an exhibit during testimony. Prior to trial, courts, prosecutors, and defense

³³ Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge's Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022), <https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>.

counsel must consider how best to ensure that copies of this information are maintained in a manner that can be viewed again by trial and appellate courts.

- **Prejudicial information displayed to witnesses or jury.** Visual display can be abused if attorneys insert improper or prejudicial information when presenting exhibits or slides to witnesses or the jury. Prosecutors should ask to view the defense’s visual exhibits and slides before they are displayed whenever possible.
- **Cherry-picking evidence.** When displaying documents and other exhibits to witnesses or the jury, counsel may enlarge or make “call-outs” of certain details.³⁴ This practice can prejudicially highlight helpful evidence, while obscuring the full content of the exhibit. Solutions to this issue include viewing exhibits in advance, preparing complete versions of exhibits to counter prejudicial defense displays, and planning objections to prejudicial material as needed.

ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS

“Artificial intelligence” (or “AI”) refers to computer systems that perform functions normally conducted using human intelligence, such as decision-making, recognition tasks, or language translation. Courts around the country have been using AI for several years, particularly in generating risk assessment scores for judges making pre-trial release and sentencing decisions.³⁵ New AI applications in development – such as AI used to generate motions, review video and documentary evidence, and conduct legal research – may also become widespread.³⁶ Indeed, China has purportedly created an “AI prosecutor” that can review case facts and identify the correct criminal charges to file.³⁷

Data analytics is the process of gathering and scrutinizing large sets of data to draw conclusions about past events and make predictions about future ones. AI is increasingly used to perform this type of analysis. Data analytics is already integrated

³⁴ Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge’s Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022),

<https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>.

³⁵ Taylor, Alexandra “Mac”, *AI Prediction Tools Claim to Alleviate an Overcrowded American Justice System...But Should They Be Used?*, Stanford Politics (Sept. 13, 2020), <https://stanfordpolitics.org/2020/09/13/ai-prediction-tools-claim-to-alleviate-an-overcrowded-american-justice-system-but-should-they-be-used/>; Dixon Jr., Herbert B., *Artificial Intelligence: Benefits and Unknown Risks*, The Judge’s Journal, American Bar Association (Jan. 15, 2021), https://www.americanbar.org/groups/judicial/publications/judges_journal/2021/winter/artificial-intelligence-benefits-and-unknown-risks/.

³⁶ Curry, Rachel, *AI is making its way into the courtroom and legal process*, CNBC (Nov. 1, 2023), <https://www.cnbc.com/2023/11/01/ai-is-making-its-way-into-the-courtroom-and-legal-process.html#:~:text=AI%20is%20playing%20a%20role,still%20review%20AI%27s%20legal%20work>.

³⁷ Chen, Stephen, *Chinese Scientists Develop AI ‘prosecutor’ that can press its own charges*, South China Morning Post (Dec. 26, 2021), <https://www.scmp.com/news/china/science/article/3160997/chinese-scientists-develop-ai-prosecutor-can-press-its-own>.

into some of the risk assessment and recidivism prediction programs in use within the criminal justice system, and likely will expand further into the realm of criminal litigation. For example, data analytics could be used to research and evaluate potential jurors, predict the decisions of judges, and make determinations about plea offers versus the likelihood of conviction if a case goes to trial.

Benefits of AI and Data Analytics

While AI and data analytics are not yet integrated throughout the criminal justice process, benefits of this developing technology include:

- **Speed.** AI and analytics have the potential to streamline labor-intensive processes, such as video/document review and legal research. Fast and detailed analysis also improve the presentation of evidence and research to the court.
- **Reduced bias.** Using computer-driven AI and predictive analysis may reduce the level of human bias in important prosecutorial decisions, such as charging and plea bargaining. A computer theoretically provides a neutral analysis of comprehensive data, rather than a human judgement of limited information. See also, discussion point below regarding concerns about increased bias.
- **Persuading the court.** The addition of “neutral” tools, such as AI and data analytics, in bail, charging, plea offer, and sentencing decisions may be a persuasive factor to the courts. An ostensibly impartial perspective may convince courts that the prosecution’s arguments for a particular position are valid. See also, discussion point below regarding concerns about bias within these tools.
- **Better outcomes.** AI and analytics could help prosecutors pick better jurors and predict judicial decisions. Tools capable of these improvements would have to provide this analysis without violating privacy laws, constitutional protections, and court rules. If such technology becomes available, it may help prosecutors achieve better outcomes as their cases proceed through the court process.

Issues to Resolve

The use of AI and data analytics raise several issues that could restrict their implementation both in courtrooms and as prosecution tools:

- **Increased bias.** Numerous studies have revealed that AI-driven recommendations and decisions can reflect any inherent biases within the data sets they rely upon.³⁸ At this time, there is a notable risk of amplified racial, gender,

³⁸ Callahan, Molly, *Algorithms Were Supposed to Reduce Bias in Criminal Justice – Do They?*, The Brink, Boston University (Feb. 23, 2023), <https://www.bu.edu/articles/2023/do-algorithms-reduce-bias-in-criminal-justice/>; Barabas, Chelsea, *Beyond*

and other biases in AI-dependent systems because of historical prejudices reflected in the data being used for predictive analysis.

- **Privacy issues.** The performance of AI and data analytics improves with the more data it has available to process. Predictive analysis about the likely decisions of judges, attorneys, and potential jurors may seek to pull in data that implicates privacy expectations and legal protections. Courts and prosecutors evaluating predictive analytics must scrutinize whether new systems are avoiding this pitfall.
- **Reliability.** Currently, AI interpretation of data (and follow-on analytics) is not always reliable. If court systems and prosecutors consider using AI-driven tools, they must do extensive testing to ensure that outcomes are accurate and trustworthy.
- **Credibility determinations.** One of the primary functions of a judge and jury is to assess the credibility of witness testimony and other forms of evidence. Some countries, like China, are increasingly using AI to make courtroom decisions about evidence. In the United States, opting for AI-driven decisions about matters such as relevance and truthfulness would mean replacing complex human judgments with those of a machine. This use of AI would raise concerns about due process and other constitutional protections for defendants.

RECORDED AND AUTOMATED TRANSCRIPTION

Traditionally, human court reporters have chronicled the events and transcribed the testimony occurring within a courtroom to create the record of a proceeding. This process allows the judge or the parties to review prior testimony or argument. It also produces the official record for purposes of appeal.

Technology offers options for generating the court record beyond the services of human reporters.

Audiovisual recording of the entire courtroom proceeding enables a human court reporter to create the full transcript at a later time. While audio recording might be sufficient for this purpose, video recording permits the reporter to see the events as they unfolded, providing more context for interrupted speech, sidebars, and other common courtroom interactions. As discussed further below, audiovisual recordings of remote proceedings can also serve as the basis of a fully transcribed court record.

Bias: Re-Imagining the Terms of "Ethical AI" in Criminal Law, 2 Geo. J. L. Mod. Critical Race Persp. 2 (2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3377921.

Automated transcription systems use artificial intelligence to transcribe speech to text and are becoming available for the courtroom. For example, FTR RealTime is a service that transcribes court proceedings using microphones keyed to each speaker. The captured voices are fed through the microphones into an AI-based software application that transcribes what is said and attributes statements to the correct participant.³⁹ These systems may best be used in combination with a simultaneous audiovisual recording, which gives courts the means to verify the transcript should questions arise.

Benefits of Automated and Audiovisual Court Records

Recording and automated transcription technology offer courts and prosecutors several practical benefits, including:

- **One-time cost.** Courts that purchase an audiovisual and/or automated transcription system pay the one-time cost of acquiring the necessary equipment and software. Once in place, an automated system can transcribe any number of proceedings. Courts usually pay human reporters for their services on a yearly or daily basis, meaning ongoing costs over time that may go up if reporter salaries or courtroom demand increases. Some prosecutors face the same cost comparison when paying for transcription services at Grand Jury proceedings. Prosecutors and courts interested in automated transcription services should also explore potential continuing costs, such as annual licensing fees or charges for updates.
- **Solution when no human reporter is available.** Many court systems and prosecutor offices are experiencing a shortage of human court reporters. Audiovisual recording and automated transcription systems are viable alternatives when no reporter is available. Recording allows human reporters to transcribe the proceedings at a later date. Automated systems can create the transcription without a human reporter.
- **Same-day transcripts.** Automated systems can immediately produce a transcript of court proceedings, giving the judge and parties access the same day. Human court reporters typically require several days or weeks to produce a transcript, and may charge significantly more for faster service.
- **Preservation of the entire record.** Audiovisual recording of courtroom proceedings can preserve aspects of the record beyond the transcript. Items or information displayed visually will also be captured, along with the demeanor and actions of any participants. When coupled with transcription services – either

³⁹ Horne, Chris, *Testimony by hologram, instant voice-to-text trial records: Artificial intelligence reshaping the legal system* (6/12/2023, updated 10/16/2023), <https://www.wavy.com/news/local-news/williamsburg/testimony-by-hologram-instant-voice-to-text-trial-records-artificial-intelligence-reshaping-the-legal-system/>.

human or automated – an audiovisual recording arguably provides the most complete court record.⁴⁰ State law and court rules may not yet contemplate an audiovisual record; however, the nature of the “record” is likely to change as the presentation of information and evidence evolves.

Issues to Resolve

While efficient, non-human court reporter services also raise important concerns, including:

- **Replacement of human reporters.** Automated transcription systems and audiovisual recording have the potential to replace human court reporters, who often have years of experience working with the court system. On the other hand, human reporters will always have certain advantages, including the ability to seek immediate clarification of inaudible speech. The role of human court reporters also may change over time. If more courts turn to automated reporting, human reporters may evolve into court technologists who maintain, operate, and verify these systems.⁴¹
- **Accuracy.** Automated and audiovisual systems must be highly accurate and comprehensive to replace humans in creating the official record. Systems must demonstrate that they can capture speech correctly and differentiate between speakers, especially when multiple people speak at once. Some automated systems are reaching 92-95% accuracy, surpassing the accuracy of human reporters.⁴² All systems will require accuracy testing before they can be used for court proceedings.
- **Data storage and cost.** Audiovisual recordings and automated transcriptions of proceedings require secure digital storage. As has been seen with body camera recordings, storing large amounts of data in a secure environment can be costly. Moreover, these digital records must be readily accessible for use by parties and on

⁴⁰ See, Lederer, Fredric I., *The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic* (2021), Faculty Publications, (2022), <https://scholarship.law.wm.edu/facpubs/2022>; Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge's Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022), <https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>.

⁴¹ Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge's Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022), <https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>.

⁴² Lederer, Fredric I. and Center for Legal & Court Technology, *Courtroom Technology from the Judge's Perspective – a 2022-23 Update*, Court Review Vol. 59 (2022), <https://nationalcenterforstatecourts.app.box.com/v/AmJudgesCourtReviewArchive/file/1393276794332>; Horne, Chris, *Testimony by hologram, instant voice-to-text trial records: Artificial intelligence reshaping the legal system*, 6/12/2023 (updated 10/16/2023), <https://www.wavy.com/news/local-news/williamsburg/testimony-by-hologram-instant-voice-to-text-trial-records-artificial-intelligence-reshaping-the-legal-system/> (Discussing the automated transcript technology developed by For The Record, a Denver company).

appeal. Third-party storage services may be a solution; however, use of these services also raises cost, custody, and security questions.

CONCLUSION

Advances in technology are quickly changing the longstanding practices of traditional courtrooms. The work of a prosecutor is centered around the court, and as new options evolve, prosecutors may find efficient and inexpensive ways to handle their workload. Prosecutors also will have to weigh these opportunities against the legal and ethical duties of criminal litigation, as well as the practical considerations about the quality and reliability of any emerging technology. This paper has presented information about developments currently at the forefront of the evolving courtroom. But in today's tech environment, new ideas are constantly coming into view, and prosecutors must be prepared to weigh the costs, benefits, and unknowns.