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Fredric I. Lederer

William & Mary Law School, filede@wm.edu

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The Evolving Technology-Augmented Courtroom Before, During, and After the Pandemic

*Fredric I. Lederer**

ABSTRACT

Even before the COVID-19 Pandemic, technology was changing the nature of America's courtrooms. Access to case management and e-filing data and documents coupled with electronic display of information and evidence at trial, remote appearances, electronic court records, and assistive technology for those with disabilities defined the technology-augmented trial courtroom. With the advent of the Pandemic and the need for social distancing, numerous courts moved to remote appearances, virtual hearings, and even virtual trials. This Article reviews the nature of technology-augmented courtrooms and discusses virtual hearings and trials at length, reviewing legality, technology, human factors, and public acceptance, and concludes that virtual hearings will continue after the Pandemic.

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* Fredric I. Lederer, Chancellor Professor of Law and Director, Center for Legal & Court Technology, William & Mary Law School. © 2020 by Fredric I. Lederer. Founded in 1993 as the Courtroom 21 Project, the Courtroom of the 21st Century Today, the Center for Legal & Court Technology (CLCT), www.legaltechcenter.net, is a joint initiative of William & Mary Law School, the nation's oldest law school, and the National Center for State Courts. CLCT's mission is to improve the administration of justice through appropriate technology. Some years after it began operations, CLCT created the Court Affiliates so that CLCT could more directly assist the courts. The Court Affiliates are public service networks of state, federal, and Canadian courts, adjudicatory agencies, and court- and agency-centric individuals with a common mission: the employment of useful, efficient, and economical legal technology to enhance the administration of justice. This Author is the founder of CLCT and has been its director since its founding. In that capacity, he has helped design technology-augmented courtrooms, provided advice to many courts on that subject, and assisted the Court Affiliates since their founding. Accordingly, the content of this Article is informed by his experience and knowledge.

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I. INTRODUCTION

In the United States, legal proceedings in courtrooms provide final resolution for disputes. The trial courtroom is the home and the stage for the adversarial justice system in which one or more parties must convince a fact-finder, judge or jury, of the merits of their case to prevail under applicable law. Until fairly recently, a discussion of trial practice necessarily would have been largely courtroom-centric and, indeed, architecturally focused. After all, the courtroom is the forum for opening statements, witness examination, evidence introduction, closing arguments, and jury selection, instructions, and verdict, matters which have been essentially unchanged since the founding of the nation. Even before the advent of the COVID-19 Pandemic, technology provided trial participants with new ways of accomplishing

traditional tasks.¹ The Pandemic, however, made the use of some forms of technology, especially remote appearances, critical if the courts were to continue resolving disputes. Indeed, the Pandemic has called into question the necessity for physical courtrooms as hearings and even trials move to virtual space.²

As for the beginnings of courtroom technology:

It is possible, however, that the first real “high-technology courtroom” was that of U.S. District Judge Carl Rubin who presided in the 1980s over a complex tort trial in which counsel installed computers in the courtroom and then left them in place. The “godfather” of the high-technology courtroom is almost certainly the Honorable Roger Strand, now a senior U.S. district judge, whose Phoenix courtroom and whose own famous pioneering efforts played a major role in popularizing courtroom technology and its effective use.³

Today, in the age of the internet, technology-augmented courtrooms are commonplace, as are adjudicatory agency hearing rooms.⁴ Unfortunately, there is no accepted definition for a technology-augmented courtroom and no central registry for them, so their total number is unknown.⁵ In light of this Author’s experience consulting on the design of many technology-augmented courtrooms, this Article primarily characterizes such courtrooms as having:

- (1) Bench access to electronic data, whether for case management, legal research, or other purposes;

1. See Elizabeth C. Wiggins, *What We Know and What We Need to Know About the Effects of Courtroom Technology*, 12 WM. & MARY BILL RTS. J. 731, 731–32 (2004).

2. See generally *infra* Section II.D, for a discussion of remote appearances, including virtual hearings and trials.

3. Fredric I. Lederer, *Introduction: What Have We Wrought*, 12 WM. & MARY BILL RTS. J. 637, 638 (2004) (footnotes omitted).

4. See Fredric I. Lederer, *The Road to the Virtual Courtroom? A Consideration of Today’s – and Tomorrow’s – High Technology Courtrooms?*, 50 S.C. L. REV. 799, 801–02 (1999). Examples of these include the rooms used for Social Security disability hearings and immigration court proceedings. See Christina Goldbaum, *Videoconferencing in Immigration Court: High-Tech Solution or Rights Violation?*, N.Y. TIMES (Feb. 12, 2019), <https://www.nytimes.com/2019/02/12/nyregion/immigration-court-video-teleconferencing.html> [<https://perma.cc/CB6L-F454>]; *How Does a Video Disability Hearing Work?*, DISABILITY BENEFITS HELP, <https://www.disability-benefits-help.org/faq/video-disability-hearing> [<https://perma.cc/QLS6-XFTH>] (last visited Dec. 1, 2020). For purposes of this Article, “courtroom” includes adjudicatory agency hearing rooms unless explicitly or implicitly noted to the contrary. Any references to juries, of course, refer only to courtrooms.

5. *But see* Wiggins, *supra* note 1, at 731, 732–33 (stating that a 2002 survey, with ninety of ninety-four federal districts reporting, indicated that 85 percent had access to videoconferencing equipment with 12 percent having equipment installed in a courtroom). Incomplete data for some state courts can be found at *State Court Organization*, NAT’L CTR. FOR STATE CTS., <http://data.ncsc.org/QvAJAXZfc/opendoc.htm?document=Public%20App/SCO.qvw&host=QVS@qlikviewisa&anonymous=true> [<https://perma.cc/C69N-ENAM>] (last visited Dec. 1, 2020) (including courts that have acknowledged use of digital recording and digital evidence, among other technology).

- (2) Visual display of information, primarily by counsel, whether as evidence or during openings and closings;
- (3) Technology-augmented or technology-created court record;
- (4) Remote appearances, whether by witness, interpreter, court reporter, counsel, judge, or juror, or by any combination of participants, including entirely online hearings and trials;
- (5) Assistive technology.⁶

These characteristics provide the framework for analyzing technology-augmented courtrooms, as well as a number of key issues, such as the potential future use of remote appearances and virtual hearings.

Trial courtrooms and hearing rooms are not the only centers for dispute resolution, of course. Arbitration and other forms of alternative dispute resolution are also often technology-augmented and may use the same technology as trial fora.⁷ Appellate courtrooms can also be augmented by technology, if only to provide the public with remote access to their hearings.⁸ Some appellate courts have long used remote telephone⁹ or video arguments.¹⁰ During the Pandemic, a



United States v. Virac, 2010 CLCT Laboratory Trial (simulated case) with the Honorable Barbara Rothstein, US district court judge and then-Director of the Federal Judicial Center, presiding

6. See Lederer, *supra* note 3, at 637, 645–46 (meaning technology for those with disabilities).

7. For example, JAMS has a website dedicated to the resolution of disputes via video, web, or audio conference, JAMS, <https://www.jamsadr.com/online> [<https://perma.cc/F4JP-DVS8>] (last visited Dec. 1, 2020), and article 19.2 of the 2014 LCIA Arbitration Rules states that hearings may “take place by video or telephone conference or in person (or a combination of all three),” London Ct. of Int’l Arb., *LCIA Arbitration Rules*, art. 19, ¶ 2 (Oct. 1, 2014), https://www.lcia.org/Dispute_Resolution_Services/lcia-arbitration-rules-2014.aspx#Article%2019 [<https://perma.cc/7CSG-787S>]. Note that as ADR ordinarily is private, technology-augmented ADR proceedings will have an enhanced need for cybersecurity to prevent outside knowledge of the proceedings. See Lederer, *supra* note 4, at 839.

8. See Lederer, *supra* note 4, at 802, 844; Wiggins, *supra* note 1, at 732–34. In 1999, this Author reported that the US Courts of Appeals for the Second, Tenth, and DC Circuits used videoconferencing for arguments. Lederer, *supra* note 4, at 802.

9. See David R. Cleveland & Steven Wisotsky, *The Decline of Oral Argument in the Federal Courts of Appeals: A Modest Proposal for Reform*, 13 J. APP. PRAC. & PROCESS 119, 135–36 (2012); 6TH CIR. R. 34(g)(3). The Sixth Circuit has entertained telephone arguments for many years. 6TH CIR. R. 34(g)(3) (“The court may conduct oral argument by teleconference.”).

10. See, e.g., OFF. OF THE CLERK, U.S. CT. OF APPEALS FOR THE TENTH CIR., PRACTITIONER’S GUIDE TO THE UNITED STATES COURT OF APPEALS FOR THE TENTH CIRCUIT 57 (10th ed. 2020), <https://www.ca10.uscourts.gov/sites/default/files/clerk/2020PracGuideUpdate-10thEdition.pdf> [<https://perma.cc/7WRH-5DQP>] (“The court has experimented with and may

number of appellate courts, including the US Supreme Court,¹¹ have held remote appellate arguments by phone or video. Years ago, William & Mary Law School's Center for Legal & Court Technology (CLCT), then the Courtroom 21 Project, proved that appellate counsel could argue an appeal virtually, as at trial, displaying visual images of the record below, including exhibits and key provisions of legal authorities.¹² The Court of Appeals for the Armed Forces twice sat at William & Mary Law School's McGlothlin Courtroom, with some of the judges appearing remotely and student amicus counsel arguing in this fashion.¹³ Generally speaking, appellate courts have not taken that route yet.

Before proceeding to an analysis of technology-augmented courtrooms, it should be noted that such courtrooms are dependent upon their electronic infrastructure, which is a substantial part of the cost of such a courtroom. That infrastructure typically includes internet access,¹⁴ cabling,¹⁵ a quality sound system,¹⁶ and the hardware and software necessary for audio, video, and data control, switching, and

continue to use video technology to hear oral arguments.”); MARCIA M. WALDRON, U.S. CT. OF APPEALS FOR THE THIRD CIR., NOTICE: AVAILABILITY OF VIDEO-ARGUMENT (2013), <https://www.ca3.uscourts.gov/sites/ca3/files/videonot.pdf> [<https://perma.cc/R56H-XGCV>] (“The United States Court of Appeals for the Third Circuit permits oral argument by videoconference to our primary location in Philadelphia from our locations in Newark, NJ and Pittsburgh, PA as well as district courts that have compatible videoconferencing equipment.”). Australia’s High Court has used videoconferencing for counsel arguments requesting that the Court hear their appeals. See Michael Kirby, *The Future of Appellate Advocacy*, 27 AUSTRALIAN BAR REV. 141, 147 (2006) (“One example of an innovation that has had a direct impact on oral advocacy is the introduction of video-link technology in the courts. . . . This technology is now frequently employed by the High Court for the hearing of special leave applications”).

11. See, e.g., Fred Barbash, *Oyez. Oy Vey. Was That a Toilet Flush in the Middle of a Supreme Court Live-Streamed Hearing?*, WASH. POST (May 7, 2020, 7:24 AM), <https://www.washingtonpost.com/nation/2020/05/07/toilet-flush-supreme-court> [<https://perma.cc/HZE4-2SHW>].

12. See Lederer, *supra* note 4, at 802–03. This Author supervised these experiments. See *id.* Note that hypertext-linked appellate briefs go back to at least 1997. See Yukio, Ltd. v. Watanabe, 111 F.3d 883, 884–85 (Fed. Cir. 1997). Such a brief is very easy to use visually as a presentation tool during argument.

13. See, e.g., Lederer, *supra* note 4, at 802.

14. See *id.* at 802, 806, 811.

15. See Lederer, *supra* note 4, at 928 n.149. Today, fiber-optic cable is often used given its large data capacity. See Ed Miskovic, *Fiberoptics in the Justice System*, MERIDIAN TECHS., <https://www.meridian-tech.com/downloads/articles/Fiberoptics%20in%20the%20Justice%20System.pdf> [<https://perma.cc/QDJ2-2862>] (last visited Dec. 1, 2020) (noting that the cables today are often fiber optic).

16. See, e.g., *Justice Audio Visual Technology*, CONF. TECHS., INC., <https://www.conferencetech.com/portfolio/justice/> [<https://perma.cc/5LUR-RTS5>] (last visited Dec. 1, 2020). Audio quality is often a substantial problem in courtrooms and sometimes very difficult to do well. See *Court Room Acoustics*, COURTHOUSE: A GUIDE TO PLAN. & DESIGN, <https://www.ncsc.org/courthouseplanning/space-planning-standards/courtroom-acoustics> [<https://perma.cc/8T45-NLJQ>] (last visited Dec. 1, 2020).

manipulation.¹⁷ As Martin Gruen, CLCT's former deputy director, emphasizes, what was previously considered "audio/video" is no longer just digital but part of modern computer networking,¹⁸ greatly increasing the complexity of a courtroom's infrastructure. This Article does not discuss infrastructure any further, except to note that carefully implemented WiFi permits the inexpensive creation of useful but constrained technology-augmented courtrooms. Because the equipment necessary for such a courtroom can be portable and can easily be shipped to a courtroom, hearing room, or one-time temporary location, William & Mary's CLCT, which is experimenting with the concept, often refers to this as a "courtroom in a box."¹⁹

In light of the Pandemic, it may be useful to distinguish a technology-augmented courtroom or hearing room from a "virtual" hearing or trial. Traditionally, trial or administrative adjudication hearings have taken place physically in courtrooms and hearing rooms. Some participants may be remote, but the given procedure usually takes place at least to some extent in a physical space. Virtual hearings, on the other hand, occur in cyberspace. Although a streaming image could be displayed in a courtroom or courthouse, a true virtual hearing occurs outside a courtroom or courthouse and is defined by the implementing technology. This Article addresses virtual hearings later against the backdrop of a more traditional technology-augmented courtroom.

II. COURTROOM TECHNOLOGY

A technology-augmented courtroom is ordinarily characterized by access to electronic case data, visually presented evidence and other material, a technology-related court record, the ability to host remote

17. Herbert B. Dixon, Jr., *The Basics of a Technology-Enhanced Courtroom*, AM. BAR ASS'N (Nov. 1, 2017), https://www.americanbar.org/groups/judicial/publications/judges_journal/2017/fall/basics-technologyenhanced-courtroom/ [<https://perma.cc/Z268-TZNS>].

18. Martin Gruen, *How Will Networked Audio/Video Change Our Courtrooms and Beyond?* at 2020 Court Affiliates Virtual Conference, <https://courtaffiliates.org/events/> [<https://perma.cc/3MVB-QQJ6>] (June 2, 2020).

19. See FREDRIC LEDERER, MARTIN GRUEN & DAVID TAIT, *TECHNOLOGY ENHANCED COURTROOMS: A PRIMER, UPDATE, AND THOUGHTS ON THE FUTURE* 11, 29 (2019), <https://s3.amazonaws.com/dntstatic/80535b87-5fec-4b6f-76a0-3108ebde04ec> [<https://perma.cc/W9KS-JFFS>]. The key to such a courtroom is the creation of a small, controlled local WiFi network in the courtroom, which is made possible by equipment from vendors such as Extron and WolfVision, both CLCT Participating Companies. Active participants use personal devices to send data, images, audio, and video content through the local network to wirelessly connected tablets and other display devices. See, e.g., Gruen, *supra* note 18; *Court & Legal*, WOLFFVISION, <https://www.wolfvision.com/vsolution/index.php/us/solutions/court-legal> [<https://perma.cc/CYW9-ZTTE>] (last visited Dec. 1, 2020).

appearances, and assistive technology to help those with disabilities participate fully during the trial or hearing.²⁰

A. Courtroom Access to Case Management and Other “Data”

Modern court management is based on electronic case data.²¹ Attorney submissions are electronically filed or “e-filed,” and court administrators and judges manage and monitor their cases via elaborate and sophisticated case management systems, sometimes augmented by electronic docketing systems.²² The judge on the bench often has access to this data from a bench computer, tablet, or personal phone, along with instant access to legal research databases, and other network and internet resources.²³ At least in CLCT’s McGlothlin Courtroom, the judge can display any of this data to counsel, who can then respond with their own electronic data. However important the ability to use and access this data may be, the “killer application” in a technology-augmented courtroom is the ability to display information visually.

B. Visual “Information” Display

From a lawyer or judge’s perspective, the defining element of a technology-augmented courtroom is the ability of counsel to visually display images to witnesses, judges, opposing counsel, jurors, and

20. THE AM. INST. OF ARCHITECTS, AV/IT INFRASTRUCTURE GUIDELINES FOR COURTS 1 (2013), <https://network.aia.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=fc4af29f-89f3-431e-b535-ef34c34bad2c> [<https://perma.cc/S8M2-RYVW>].

21. Ramón A. Abadin, *Liberty and Justice for All? Equal Access Requires a Court Technology Upgrade*, 90 FLA. BAR J. 4, 4 (2016).

22. See Gordon King, *State Courts Continue Move Toward Electronic Filing, Docketing*, REPS. COMM., <https://www.rcfp.org/journals/state-courts-continue-move/> [<https://perma.cc/3F3P-U8J8>] (last visited Dec. 1, 2020); W. Kelly Stewart & Jeffrey L. Mills, *New Risks Every Litigator Should Know*, JONES DAY: FOR THE DEFENSE (June 2011), <https://www.jonesday.com/files/Publication/efd9d946-2272-4493-9bb6-312e53bb8419/Presentation/PublicationAttachment/9398f37a-c4a0-4338-8a4e-35cdf2d69900/FTD-1106-StewartMills.pdf> [<https://perma.cc/S98R-UH6T>]. When linked with other systems with compatible data formats, case management permits online payment of traffic fines and could permit sending court appearance reminders to trial participants as well as registering their physical arrival in the courthouse and courtroom. *E.g.*, *Court Solutions*, ATI CONNECT, <https://ati-cti.com/courtsolutions/> [<https://perma.cc/ZB27-HVFA>] (last visited Dec. 1, 2020).

23. See *United States v. Bari*, 599 F.3d 176, 181 (2nd Cir. 2010); Eric P. Robinson, *Using the Internet During Trial: What About Judges?*, DIGIT. MEDIA L. PROJECT (Mar. 29, 2010, 5:36 PM), <http://www.dmlp.org/blog/2010/using-internet-during-trial-what-about-judges> [<https://perma.cc/3T7J-888E>].

members of the public in the courtroom.²⁴ The images can be of evidentiary exhibits, both documentary and real, and visual content prepared by counsel as part of motion practice, opening statements, and closing arguments.²⁵

The assumption is that the fact-finder understands, remembers, and is persuaded by visual information more effectively than oral information. This may well be correct, but there is little direct scientific support for this assumption from the courtroom arena itself.²⁶ Overzealous counsels' use of aggressive PowerPoint slides and other visual material has been held to be overly prejudicial,²⁷ so there is a "dark side" to visual presentation.²⁸ What seems certain is that case presentation with visual information display is much faster



United States v. Jones, 2019 CLCT Laboratory Trial (simulated case) showing smartphone evidence

24. THE AM. INST. OF ARCHITECTS, *supra* note 20, at 8. Streaming to the general public via the internet is easily possible but was not ordinarily done until some courts during the Pandemic used streaming to satisfy the "public trial" requirement for court hearings. *See, e.g., Hearing Livestreams*, SUPERIOR CT. OF CAL. CNTY. OF SACRAMENTO, <https://www.saccourt.ca.gov/criminal/hearing-livestreams.aspx> [<https://perma.cc/KSR5-LN4Y>] (last visited Dec. 1, 2020) ("Due to the COVID-19 pandemic and the need to enforce social distancing, the court is now live-streaming criminal hearings."); *Texas Court Live Streams*, TEX. JUD. BRANCH, <http://streams.txcourts.gov/> [<https://perma.cc/YD4G-CKPU>] (last visited Dec. 1, 2020).

25. *See* Anjelica Cappellino, *Technology in the Courtroom: An Evolving Landscape*, EXPERT INST. (June 23, 2020), <https://www.expertinstitute.com/resources/insights/evolving-landscape-technology-courtroom/> [<https://perma.cc/W6MB-CRAV>]; *Technology in the Modern Trial*, BROWN & CHARBONNEUA, LLP, <https://www.bc-llp.com/technology-modern-trial/> [<https://perma.cc/TF5N-A2WD>] (last visited Dec. 1, 2020).

26. *Cf.* NAT'L INST. OF JUST., U.S. DEP'T OF JUST., NATIONAL CONFERENCE ON SCIENCE AND THE LAW 151 (1999), <https://www.ncjrs.gov/pdffiles1/nij/179630.pdf> [<https://perma.cc/7JUX-JKFM>] (explaining that a lot of the information may be data dredged rather than true science). The very nature of trials makes it difficult to determine the effects of technology or procedures incident to real proceedings. *Cf.* NEAL FEIGENSON & CHRISTINA SPIESEL, *LAW ON DISPLAY: THE DIGITAL TRANSFORMATION OF LEGAL PERSUASION AND JUDGMENT* 17 (2009). Further, as those at CLCT learned years ago, surveys of how participants feel they were affected by a given matter do not necessarily reflect how they actually behaved. *See* NEAL FEIGENSON, *EXPERIENCING OTHER MINDS IN THE COURTROOM* 54 (2016); *cf.* CHRISTOPHER R. AGNEW, DONAL E. CARLSTON, WILLIAM G. GRAZIANO & JANICE R. KELLY, *THEN A MIRACLE OCCURS: FOCUSING ON BEHAVIOR IN SOCIAL PSYCHOLOGICAL THEORY AND RESEARCH* 127 (2009). *But see* FEIGENSON & SPIESEL, *supra*, at 297 n.37. This Author notes the possible existence of a conflict of interest in his description in this footnote: the cover of *Law on Display: The Digital Transformation of Legal Persuasion and Judgment* shows the McGlothlin Courtroom.

27. *E.g.*, *State v. Walker*, 341 P.3d 976, 979 (Wash. 2015) (including slide reproductions).

28. *See generally* FEIGENSON & SPIESEL, *supra* note 26, at xi.



WolfVision Visualizer in W&M's McGlothlin Courtroom

than in traditional cases, thus giving the court a substantial incentive to use the technology.²⁹

Prior to computers, document cameras were used to produce images of documents and real evidence.³⁰ A document camera is a vertically mounted television camera that displays images of the document or real evidence placed below it to the displays that are connected to the camera via the courtroom's electronic infrastructure.³¹

29. Dixon, *supra* note 17. After speaking to numerous judges, CLCT staff concluded that many visually presented trials are 25 percent to 33 percent faster than traditional trials. Lederer, *supra* note 4, at 816. Many years ago, the chief judge of the US District Court for the District of Oregon, after trying a complicated fraud case, and the presiding judge of a year-long Australian Royal Commission both told this Author that they estimated a 50 percent time savings in complicated cases. Pursuant to a grant from the State Justice Institute to evaluate jury deliberation room technology, CLCT tried a simple one-hour, approximately seven-exhibit, and one-deposition civil jury case about times. FREDRIC I. LEDERER, *THE USE OF TECHNOLOGY IN THE JURY ROOM TO ENHANCE DELIBERATIONS 2* (2002), <https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=1557&context=facpubs> [<https://perma.cc/T9AE-N625>]. Comparing the visual technology version of the case with the traditional version, the visual technology trial showed a 10 percent time savings. *Id.* at 59.

30. See FREDRIC I. LEDERER, *BASIC ADVOCACY AND LITIGATION IN A TECHNOLOGICAL AGE* 81–82 (2017).

31. See *id.*

A document camera is simply a vertically mounted TV camera aimed down at a flat surface. The lawyer puts a photo, document, or object on the surface, and the camera instantly displays the image on the television(s) or monitor(s) to which it is attached. The camera has buttons permitting easy and fast closeups. The camera may also be able to change negatives to positives (and the reverse) which assists in the display of x-rays. Focus can be automatic or manual. A microscope capability can be added to display slides. The document camera is more than an overhead. Properly used, as Sam Solomon, Co-founder of DOAR Communications, once suggested, the lawyer should use the camera to zoom in on a key feature, using the zoom process to enhance jury interest. . . .

. . . .

. . . A device such as a “Boeckeler Pointmaker” permits the use of a light pen on a pad or on an attached computer monitor image. The user can select line width and color and can circle, underline, write on or otherwise mark the video image. . . . Increasingly, flat panel touchscreen monitors used by counsel at the podium permit similar annotation. Electronic marking of a video image is transitory. No record of it exists after the image is altered or erased. When the image should be preserved for the fact-finder or the appellate record, the system should be connected to a video or color printer and appropriate images printed as the image is changed.

Id.

Today, document cameras are largely obsolete, used as primary technology only in low-technology courtrooms or in high-technology facilities as backup equipment in the event of new evidence, information not yet available as electronic data, or device failure.³² Mirroring the transition to electronic data by the general public, the presentation device of choice in the courtroom is now a laptop, a tablet, or even a smartphone.³³ Computers and tablets can use specially designed presentation software such as Trial Director, Sanction, CaseMap, TimeMap, Summation, and Concordance, some of which link presentation technology to structured data storage and retrieval, as well as to legal research services.³⁴

Although the computer is the trial presentation workhorse, it is the smartphone that may have the greatest unanticipated effect. In the modern age, it is hard to imagine an important occurrence without an audio-video record being made by one or more smartphones. No matter how significant and outrageous the death of George Floyd at the hands of then-Minneapolis police officer Derek Chauvin would have been, the national reaction would likely not have been as large or sustained without the extraordinary impact of the video recording of his death.

It is not just the sheer amount of new audio and video evidence that affects cases but the fact that it is coming from unrepresented litigants. The judges participating in the 2020 CLCT Court Affiliates Conference confirmed that, in addition to lawyers using cell phone video, unrepresented litigants are regularly appearing with evidence, such as documentary and audio-video, on their phones.³⁵ This is occurring with such regularity that CLCT now recommends to judges, court administrators, and architects that courtrooms should have the technology to receive cell phone evidence electronically and display it on larger courtroom monitors.³⁶

Access to justice means that litigants must have the ability to present both evidence and arguments. Providing means to do so for those who cannot afford or obtain lawyers is a step forward for our trial arenas. Further, providing those who attend the trial with the ability

32. Cf. Cappellino, *supra* note 25 (explaining how computer-based trial presentation platforms and Apple iPads have become instrumental for attorneys presenting evidence in the courtroom, largely replacing the act of displaying physical documents).

33. See LEDERER, *supra* note 30, at 83–84.

34. See *id.* at 84, 86–87; Fredric I. Lederer, *Wired: What We've Learned About Courtroom Technology*, 24 CRIM. JUST. 18, 20 (2010).

35. See Fredric Lederer, Tony Douglass & Martin Gruen, Trial Presentation, Court Storage, and Access to Audio/Video Evidence and Information at 2020 Court Affiliates Virtual Conference (June 2, 2020).

36. See Lederer, *supra* note 34, at 19–20.

to see and understand what the litigants are presenting to the judge furthers transparency, a critical goal in a democracy. It seems clear that tomorrow's courtrooms will have increasingly available evidence and that data often will originate on personal devices.

Notwithstanding that the visual display of evidence within the courtroom may be a defining element of a technology-augmented hearing, it is important to also note the present ability to stream the proceedings to the general public. Although the federal courts largely retain the “no cameras in the courtroom” approach,³⁷ many state trial and appellate courts stream their proceedings.³⁸ It is hard to predict whether the Pandemic will affect court policies in this area, but it is likely that the increasing use of technology, especially video technology, during the Pandemic will impel greater public access to electronic streaming of the proceedings, especially if virtual trials continue.

C. Technology-Augmented or Created Court Record

All cases tried by courts of general jurisdiction require a “court record.” Traditionally, this has been a text transcript used primarily for appellate purposes, although it can be a very useful trial aid for counsel and judges when available during the trial. Human court reporters turned stenographic court reporting into a reliable art and science. Aided by computer-assisted machines, court reporters were able to deliver near instant rough drafts of electronic text transcript that could be searched and annotated by judge and counsel.³⁹ While many courts made use of stenographic court reporters, others took advantage of electronic recording technology.⁴⁰ As time went by, electronic audio recording— analog at first, and then digital—combined with digital video recording to provide audio-video court records.⁴¹ Despite the accuracy of such recordings, the combination of search difficulty and the

37. See FED. R. CRIM. P. 53 (“Except as otherwise provided by a statute or these rules, the court must not permit the taking of photographs in the courtroom during judicial proceedings or the broadcasting of judicial proceedings from the courtroom.”); see also *Judiciary Provides Public, Media Access to Electronic Court Proceedings*, U.S. CTS. (Apr. 3, 2020), <https://www.uscourts.gov/news/2020/04/03/judiciary-provides-public-media-access-electronic-court-proceedings> [<https://perma.cc/M4LS-JXNP>] (allowing media and public access to certain criminal proceedings, while providing that “broadcasting of court proceedings generally, such as through live streaming on the internet” remains prohibited under Federal Rule of Criminal Procedure 53).

38. See *supra* note 24; *State Court Organization*, *supra* note 5 (displaying incomplete data for some state courts, including courts that have acknowledged use of digital recording and digital evidence, among other technology).

39. See Lederer, *supra* note 4, at 809.

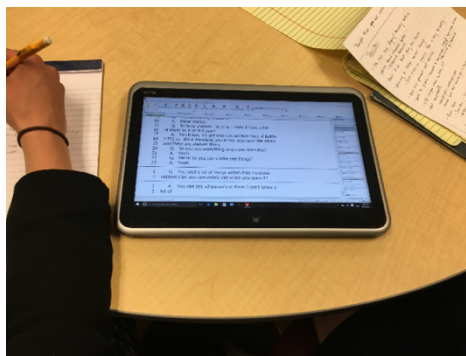
40. See *id.*

41. See *id.*

preferences of judges and lawyers for paper meant that in most jurisdictions, Kentucky excepted,⁴² appeals required transcribed text transcripts.⁴³ In recent years, the combination of inexpensive electronic recording and the decreasing number of stenographic court reporter students has accelerated the development of electronic recording court record solutions.⁴⁴ Some jurisdictions, such as the armed forces, have even made electronic recordings the official court record.⁴⁵

What is now called “voice writing” began when court reporters used a rubberized mask, sometimes called a “stenomask” or a “silencer” and repeated every word said into a recording device.⁴⁶ The reporter would transcribe the recording afterwards, thus eliminating the risk of inaudible recordings.⁴⁷ More recently, voice recognition technology has enabled voice writing in real time; a voice writer uses trained software and a computer to record the reporter verbatim and immediately turns it into electronic text.⁴⁸

Until relatively recently, it appeared that the court record would largely evolve into efficient digital recordings with the audio quality improved by modern technology. The availability of stenographic realtime reporting was enhanced, however, by the use of RevolutionaryText, Inc., an inexpensive videoconferencing technology to permit remote stenographic realtime.⁴⁹



Remote stenographic realtime from RevolutionaryText, Inc being used in W&M student practice depositions

42. KY. R. CIV. P. 98.

43. See Lederer, *supra* note 4, at 809–10.

44. See For the Record, *Current Trends in Courtroom Technology*, YOUTUBE (Aug. 30, 2017), https://www.youtube.com/watch?v=AvjjFLK5UhA&feature=emb_logo&ab_channel=ForTheRecord-FTR [<https://perma.cc/7SSH-UN3W>].

45. MANUAL FOR COURTS-MARTIAL, UNITED STATES, R.C.M. 1112 (a) (2019) (“Court-martial proceedings may be recorded by videotape, audiotape, or other technology from which sound images may be reproduced to accurately depict the court-martial.”).

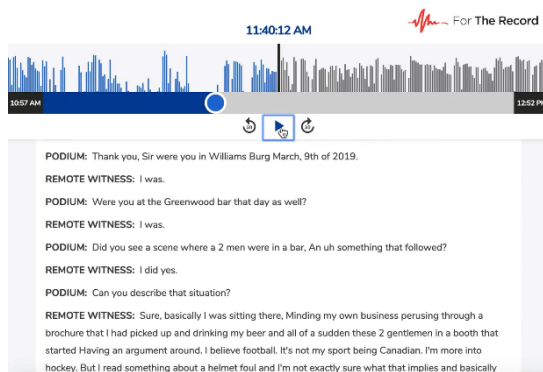
46. See Lederer, *supra* note 4, at 809; Constance Lee, *A Peek Behind the Court Reporting Methods in the Technology Age*, 21 LAWS. J. 7, 7 (2019).

47. See Lee, *supra* note 46.

48. See Lederer, *supra* note 4, at 809; Lee, *supra* note 46.

49. See REVOLUTIONARYTEXT, <https://www.revotext.com/> [<https://perma.cc/K9CE-4UB7>] (last visited Dec. 1, 2020). Used, for example, by William & Mary Law School, Technology-Augmented Trial Advocacy students in deposition classes.

The likely nature of the modern court record changed in 2019, when For the Record (FTR) and Microsoft combined to create an open-microphone, artificial intelligence-based, automatic speech-to-text transcription system which they demonstrated in April 2019 as part of a CLCT experimental Laboratory Trial conducted for Navy Judge Advocates. CLCT created a simulated criminal case, *United States v. Paul*. Presided over by a Navy military judge with Navy court members (“jurors”), trained William & Mary law students⁵⁰ served as counsel and tried the case using the McGlothlin Courtroom’s technology.



Page of FTR and Microsoft AI transcript from *United States v. Paul*, CLCT Laboratory Trial, April 2019

accurate text transcript at the time, its accuracy has continued to improve. In April 2020, William & Mary Law School, with CLCT’s assistance, conducted one of the nation’s first virtual bench trials pursuant to its Technology-Augmented Trial Advocacy course. FTR and Microsoft’s AI system provided what this Author considered amazingly accurate, contemporaneous, and verbatim closed captioning.

The future of the court record is clear; at some point in the near future, the court record will be made by AI-based computers.⁵¹ What is less clear is what the definition of that record should be. In a traditional trial, the trial record would be the text transcript of what was said. In contemporary technology-augmented trial practice, counsel may make opening and closing arguments augmented by digital visuals and may present digital visual evidence. Should any of that be part of the court record? If the court uses electronic recording, to what extent, if any, should the recording, which may be video as well as audio, be part of the record? Most cases include exhibits, and those exhibits can be of

50. Three of four of whom were active duty military officers.

51. See Fredric I. Lederer, *Court Record in the Age of Artificial Intelligence*, SPEECH TO TEXT INST. (Oct. 23, 2019), <https://spechtotextinstitute.org/court-record-in-the-age-of-artificial-intelligence/> [<https://perma.cc/DB8D-ACF9>].

FTR used the McGlothlin Courtroom’s FTR digital audio court record system to provide Microsoft with high-quality recorded audio. Microsoft then used its AI voice recognition system to produce a text transcript. The electronic text transcript provided a searchable means of locating the accurate digital audio, and although it did not provide a sufficiently

importance to an appeal. Should the court record include the electronic data that reflects exhibits?⁵² If so, what about the visual content of opening and closing arguments? What about jury instructions that judges visually augment with PowerPoint? CLCT believes that the “court record” should be a comprehensive record of everything that occurred at a trial or hearing. Accordingly, as of the time this Article was going to press, CLCT is planning to assist at least two state courts in an experimental effort to create such a record. Whether an appellate court would welcome such a record, however, is unclear.

The traditional court record requirement appears to be based largely on what was reasonable and possible in a pre-technology age, coupled with the concern that appellate courts would interfere with the fact-finding role assigned to trial courts. The appellate court defers to factual findings below because only the trial court finder of fact had the opportunity to evaluate demeanor evidence. What if the appellate court can efficiently view that evidence?⁵³ CLCT has previously demonstrated what it has termed a “multi-media court record”: the combination of digital audio-video recording with associated realtime text and images of the evidence as presented, including counsel’s annotations of the evidence. In 2018, with FTR’s help, CLCT created the world’s first virtual reality court record.⁵⁴ After trial, a person can put on a headset and will effectively be in the middle of the courtroom during trial, able to see and hear everything.⁵⁵ Does this permit adequate evaluation of demeanor evidence? Furthermore, it would be impractical to have appellate courts retry cases, but many appellate cases rest on only a small part of the evidence. To what extent should appellate courts have the ability and responsibility to reevaluate a



First known VR court record, made in W&M CLCT's McGlothlin Courtroom

52. This Author was advised by the judges attending the 2020 CLCT Court Affiliates Conference that the customary practice is for counsel—or in the case of the prosecution, law enforcement—to retain the original exhibits until the final appeal.

53. This assumes that seeing and hearing a high-resolution recording is for demeanor evidence purposes the same as doing so in person. See Robert Fisher, *The Demeanor Fallacy*, 2014 N.Z. L. REV. 575 (2014) (discussing the fallacy of demeanor evidence).

54. See *McGlothlin Courtroom*, WM. & MARY CTR. FOR LEGAL & CT. TECH. (May 18, 2019, 11:19 AM), <https://www.legaltechcenter.net/about-us/mcglathlin-courtroom/> [<https://perma.cc/MK9V-JKK9>].

55. See Bruce Kaufman, *The Next Frontier for Virtual Reality: Courtrooms*, BLOOMBERG L. BUS. & PRAC. (Nov. 18, 2017, 7:39 PM), <https://news.bloomberglaw.com/business-and-practice/the-next-frontier-for-virtual-reality-courtrooms/> [<https://perma.cc/G96H-YMF4>].

trial fact-finder's verdict, given the ability to see and hear what occurred below at trial? Assuming *arguendo* that a high-quality audio-video recording (with or without virtual reality) is adequately similar to in-person observation of testimony,⁵⁶ one would assume that the accuracy of appellate proceedings would be vastly improved by better knowledge of the proceedings below. Accuracy, however, is only one factor; appellate time and efficiency are others. Accordingly, the nature of the future court record is unclear. It is a complicated puzzle that includes concerns about cost burdens on trial courts⁵⁷ and disturbing the traditional role of appellate courts. "If you build it, they will come," does not seem to apply here. Although we already have the ability to reenact the trial court experience for an appellate court, even as we continue to improve the experience, that does not mean that we should necessarily do so.

*D. Remote Appearances, Including Virtual Hearings and Trials*⁵⁸

1. Introduction

Were it not for the Pandemic, a discussion of remote appearances and hearings would center on how best to conduct a hearing with one or more remote participants—most likely witnesses and interpreters—appearing in the courtroom or hearing room.⁵⁹ Such a discussion would have also pondered whether judges would be more inclined in the future to entertain the use of remote appearances. The answer would have been pessimistic, given the many years of slow progress in this area. The Pandemic changed that. Most US courts, adjudicatory agencies, and Alternative Dispute Resolution

56. Of course, to be a relevant concern this presupposes that people can evaluate truth telling via observation of demeanor evidence, which is, at best, questionable. *See* Fisher, *supra* note 53.

57. If the trial court electronically preserves everything, including, possibly, actual foreign language testimony by those witnesses whose testimony is officially given by interpreters, will the court need server farms? Audio-video data is very large, and courts to date have not been assumed to have that degree of electronic storage capacity and the cybersecurity ability to safeguard it.

58. An earlier version of this Section was distributed during the Pandemic to CLCT's Court Affiliates and other courts pursuant to CLCT's mission to improve the administration of justice through appropriate technology.

59. *See, e.g.*, CTR. FOR LEGAL & CT. TECH., REPORT TO THE ADMINISTRATIVE CONFERENCE OF THE UNITED STATES: BEST PRACTICES FOR USING VIDEO TELECONFERENCING FOR HEARINGS AND RELATED PROCEEDINGS iv (2014), https://www.acus.gov/sites/default/files/documents/Final_Best%2520Practices%2520Video%2520Hearings_11-03-14.pdf [<https://perma.cc/YRB2-JWKD>].

(ADR) processes are largely suspended except for emergency matters.⁶⁰ They have increasingly turned to the use of remote audio-video technology to allow matters to move forward.⁶¹ Indeed, in light of the Pandemic, Congress and the Judicial Conference of the United States authorized the use of videoconferencing and teleconferencing for a wide variety of federal court criminal matters.⁶² As a result, the issue is now how best to conduct entirely remote hearings in which no two people are in the same physical space.⁶³ From an evolutionary perspective, the current use of remote appearances and virtual hearings is likely the single most important issue to present itself and compels more detailed discussion than do the other technologies already discussed above. In his keynote address to the 2020 CLCT Court Affiliates Conference,⁶⁴ the Texas Administrative Director of the Office of Court Administration, David W. Slayton, observed that although no one wanted to have the challenge of having to work remotely, it may have been the challenge the courts needed to progress technologically.⁶⁵

There has been remote participation in trials for many years. Remote witnesses, especially testifying from distant nations in civil cases, are far from unheard of. Federal Rule of Civil Procedure 43(a) expressly declares that “[f]or good cause in compelling

60. See *Courts Suspend Jury Trials in Response to Coronavirus*, U.S. CTS. (Mar. 26, 2020), <https://www.uscourts.gov/news/2020/03/26/courts-suspend-jury-trials-response-coronavirus> [<https://perma.cc/WV46-4YSD>].

61. Bob Egelko, *Trial by Video Conference? Not Yet, but Coronavirus Forces Bay Area Courts to Embrace More Virtual Proceedings*, S.F. CHRON., <https://www.sfchronicle.com/nation/article/Trial-by-video-conference-Not-yet-but-15178201.php> [<https://perma.cc/N4QL-V42T>] (last updated Apr. 10, 2020, 10:05 PM).

62. See, e.g., Ann E. Marimow, *Federal Courts Shuttered by Coronavirus Can Hold Hearings by Video and Teleconference in Criminal Cases*, WASH. POST (Mar. 31, 2020, 5:59 PM), https://www.washingtonpost.com/local/legal-issues/federal-courts-shuttered-by-coronavirus-can-hold-hearings-by-video-and-teleconference-in-criminal-cases/2020/03/31/9c831814-7372-11ea-87da-77a8136c1a6d_story.html [<https://perma.cc/AL6Z-MMUZ>].

63. See DAVID TAIT, BLAKE MCKIMMIE, RICK SARRE, DIANE JONES, LAURA W. McDONALD & KAREN GELB, *TOWARDS A DISTRIBUTED COURTROOM* 3, 9, 68 (2017), https://courtofthefuture.org/wp-content/uploads/2017/07/170710_TowardsADistributedCourtroom_Compressed.pdf [<https://perma.cc/L8BA-G9SJ>]. When the judge presides from the courtroom with remote participants, our colleague Professor David Tait of the University of New South Wales uses the term “distributed courtroom.” See *id.* at 5. When dealing with the scenario we largely are discussing, where each participant is outside the courtroom, he used the term “virtual.” See *id.* at 25, 28, 30. This Author will follow his convention.

64. David W. Slayton, *Tex. Admin. Dir. of the Off. of Ct. Admin., Keynote Address at the 2020 CLCT Court Affiliates Conference: The Role of Video Technology in the Pandemic Era* (June 1, 2020).

65. David W. Slayton, *Texas Judiciary: The New Landscape of Operations During COVID-19*, LEGAL TALK NETWORK (May 14, 2020), <https://legaltalknetwork.com/podcasts/state-bar-texas/2020/05/texas-judiciary-the-new-landscape-of-operations-during-covid-19> [<https://perma.cc/BM4U-53NK>].

circumstances and with appropriate safeguards, the court may permit testimony in open court by contemporaneous transmission from a different location.”⁶⁶ Some courts, such as the Ninth Judicial Circuit Court of Florida, are using remote interpretation for witnesses who cannot speak English.⁶⁷ As reported on June 1, 2020, during its CLCT Court Affiliates annual report, Florida’s Ninth Circuit uses remote interpretation—primarily for Spanish-English purposes, but also for sign language interpretation for those with limited hearing—within its primary courthouse and for courtrooms in other courthouses, including those of other circuits.⁶⁸ Remote interpretation yields significant benefits—interpreters do not have to travel, leading to significant cost savings and increased efficiency. Furthermore, remote interpretation permits courts to share interpreters instead of forcing each court to employ a sufficient number of interpreters to translate all languages that might be spoken by witnesses or other participants. This pooling ability alone is a strong reason for courts to adopt videoconferencing for interpretation, and the additional benefits make the adoption of videoconferencing in the courtroom almost inevitable. The same should be true of remote motion practice and at least some other key procedural stages in civil and criminal cases.

Remote motion practice by telephone or video has been commonplace in many courts. CourtCall has specialized in this area for many years and may have been the first major commercial solution provider.⁶⁹ Founded in California to provide telephonic appearances by counsel, CourtCall is now active in many states and Canadian provinces and provides solutions for both telephone and audio-video appearances.⁷⁰ CourtScribes delivers similar services in Florida and California and is expanding to other parts of the country.⁷¹ FTR now also provides a platform for virtual hearings and trials.⁷² Remote first

66. See FED. R. CIV. P. 43(a).

67. See *Court Interpreters*, NINTH JUD. CIR. CT. FLA., <https://www.ninthcircuit.org/about/programs/court-interpreters> [<https://perma.cc/WZ7S-T6S8>] (last visited Dec. 2, 2020).

68. See Matt Benefiel, Trial Ct. Adm’r., Ninth Jud. Cir. Ct. of Fla., Value of Video Technology in the Ninth Judicial Circuit at the 2020 CLCT Court Affiliates Conference (June 1, 2020); *Court Interpreters*, *supra* note 67.

69. See Accesswire, *Remote Court Appearances Indispensable During Times of Public Health Concerns*, YAHOO FIN. (Mar. 11, 2020), <https://finance.yahoo.com/news/remote-court-appearances-indispensable-during-164500838.html> [<https://perma.cc/H5QT-PCD2>].

70. See Gilien Silsby, *CourtCall Founder Shares Story*, USC GOULD SCH. OF L. (Mar. 5, 2010), <https://gould.usc.edu/about/news/?id=3545> [<https://perma.cc/LW5J-YZ8C>].

71. See *About*, COURTSCRIBES, <https://courtscribes.com/about/> [<https://perma.cc/KAY8-PZBL>] (last visited Dec. 2, 2020).

72. See *About Us*, FOR THE REC., <https://www.fortherecord.com/company/> [<https://perma.cc/VSH5-25MZ>] (last visited Dec. 2, 2020).

appearances and arraignments have been common in criminal cases,⁷³ and although less frequent, remote witnesses are also not uncommon, especially in civil cases.⁷⁴

The use of the expressions “courtroom technology” and “technology-augmented courtrooms” unfortunately emphasizes court-based dispute resolution at the cost of other forms of resolution in common use. Appearances by remote witnesses are often routine in administrative agency adjudications such as Social Security disability hearings and immigration court proceedings.⁷⁵ Remote arbitration and mediation are also available, and the Federal Mediation and Conciliation Service is encouraging remote arbitrations by video.⁷⁶

With the advent of the Pandemic, there was great interest in the use of videoconferencing to protect social distancing while permitting cases to move forward. As a consequence, the US Supreme Court finally agreed to hold telephonic arguments, and at least two state supreme courts are holding remote video arguments.⁷⁷ The United Kingdom permits video participation in civil cases,⁷⁸ and the Ministry of Justice has expanded that use during the Pandemic.⁷⁹ Famed legal futurist Richard Susskind maintains a website and blog that provide remote hearing information and developments.⁸⁰ Although virtual jury trials

73. See, e.g., Fredric I. Lederer, *Technology Comes to the Courtroom, and . . .*, 43 EMORY L.J. 1095, 1101–03 (1994).

74. See, e.g., FED. R. CIV. P. 43(a) (“For good cause in compelling circumstances and with appropriate safeguards, the court may permit testimony in open court by contemporaneous transmission from a different location.”). For an international perspective, see HAGUE CONF. ON PRIV. INT’L L., 1970 EVIDENCE CONVENTION GUIDE TO GOOD PRACTICE: THE USE OF VIDEO-LINK (2020), <https://assets.hcch.net/docs/569cfb46-9bb2-45e0-b240-ec02645ac20d.pdf> [<https://perma.cc/R8VD-R79S>].

75. See JEREMY GRABOYES, ADMIN. CONF. OF THE U.S., LEGAL CONSIDERATIONS FOR REMOTE HEARINGS IN AGENCY ADJUDICATIONS 1 (2020), https://www.acus.gov/sites/default/files/documents/Legal%20Considerations%20for%20Remote%20Hearings%20in%20Agency%20Adjudications_1.pdf [<https://perma.cc/SK3X-SXH8>].

76. See, e.g., FED. MEDIATION & CONCILIATION SERV., VIDEO ARBITRATION: A GUIDE FOR LABOR AND MANAGEMENT ADVOCATES (2020), <https://www.fmcs.gov/wp-content/uploads/2020/04/Guide-to-video-arb-final2-4-13-20.pdf> [<https://perma.cc/E2UW-SLXT>].

77. Adam Liptak, *The Supreme Court Will Hear Arguments by Phone. The Public Can Listen In*, N.Y. TIMES, <https://www.nytimes.com/2020/04/13/us/politics/supreme-court-phone-arguments-virus.html> [<https://perma.cc/KK54-YMQK>] (last updated Apr. 20, 2020).

78. Chitranjali Negi, *Concept of Video Conferencing in ADR: An Overview—Access to Justice 1* (Sept. 18, 2015), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2662344.

79. See, e.g., Owen Bowcott, *Court Hearings Via Video ‘Risk Unfairness for Disabled People,’* GUARDIAN (Apr. 21, 2020, 7:01 PM), <https://www.theguardian.com/uk-news/2020/apr/22/court-hearings-via-video-risk-unfairness-for-disabled-people> [<https://perma.cc/2PLD-MG6T>] (“This month 85% of cases heard in England and Wales were using audio and video technology.”).

80. See REMOTE CTS. WORLDWIDE, <https://remotecourts.org/> [<https://perma.cc/YRY8-HFN6>] (last visited Dec. 2, 2020).

present special legal and practical issues, discussed further below, in March 2020 the US District Court for the Southern District of New York permitted an ill juror to continue deliberations from home via remote video.⁸¹

Despite the complexity of the technology, remote motion practice, first appearances, and arraignments are relatively simple to provide. More elaborate proceedings, including full trials and complex arbitrations, are another matter. Note, however, the obvious fact that the complexity of our legal system defies any one-size-fits-all answer. A five-minute traffic court case is a far cry from a sophisticated thirty-witness civil trial.

Virtual proceedings of all types are possible,⁸² including trials. Organizations considering virtual proceedings must consider whether a contemplated virtual proceeding is fit for its purpose, which in turn requires consideration of the following factors: (1) legality; (2) technology; (3) technological and human support; (4) human factors and participant culture; and (5) public acceptance.

2. Legality

The legality of virtual proceedings requires consideration of the US Constitution, any relevant state constitution, and any potentially applicable statutes and court rules.

81. See Stewart Bishop, *SDNY Judge Lets Sick Juror Deliberate Via Videoconference*, LAW360 (Mar. 16, 2020, 1:22 PM), <https://www.law360.com/articles/1253726> [<https://perma.cc/2658-PHH5>] (requiring the defendant to sign a waiver of any objection).

82. Remote appearances in criminal cases potentially can be used for grand juries; search warrants and similar applications; pleas; motion practice, including suppression motions; jury selection; bench trials; and sentencing. See, e.g., Corinne Ramey, *Covid Is No Excuse for Grand Jury Duty When You Can Serve from Your Bedroom*, WALL ST. J. (Aug. 20, 2020, 9:53 AM), <https://www.wsj.com/articles/covid-courts-virtual-jury-duty-zoom-wifi-indictments-grand-jury-pandemic-lockdown-11597931499> [<https://perma.cc/87CM-XBGV>]. Remote appearances in civil cases can be used for settlement discussions, motion practice, jury selection, and bench trials. See, e.g., Lyle Moran, *Bench Trial by Video? This Lawyer Says It Went Better than Expected*, ABA J.: LEGAL REBELS PODCAST (Aug. 19, 2020, 9:00 AM), https://www.abajournal.com/legalrebels/article/rebels_podcast_episode_055 [<https://perma.cc/AC5S-S4NP>]. Video proceedings have found success in family law. See Allie Reed & Madison Alder, *Virtual Hearings Put Children, Abuse Victims at Ease in Court*, BLOOMBERG L. (July 23, 2020, 4:45 AM), <https://news.bloomberglaw.com/us-law-week/virtual-hearings-put-children-abuse-victims-at-ease-in-court> [<https://perma.cc/9JQW-VML4>]. Virtual jury trials are possible but at a minimum would require affirmative waivers by the defendant in a criminal case and both parties in a civil case. As of this writing, one such trial has been held. Frank Miles, *Texas Court Holds Jury Trial in Traffic Crime Case over Zoom*, FOX NEWS (Aug. 11, 2020), <https://www.foxnews.com/us/texas-court-jury-trial-traffic-crime-case-zoom> [<https://perma.cc/9CY5-KETF>]. Absent explicit waivers, it is unlikely that virtual juries can be used lawfully in the United States. This Author addresses this matter in the legality discussion.

a. Constitutional Issues

Any possible constitutional challenge to a virtual proceeding will be based on the Bill of Rights or any applicable state constitution's equivalent guarantees.⁸³ ADR proceedings, many of which are private, raise no related constitutional issues. Because criminal defendants have a Sixth Amendment right to confrontation, a virtual criminal trial defendant would likely allege that the inability to be physically in the same room with the witness and to subject the witness to in-person cross-examination violates the confrontation clause.⁸⁴ When the Bill of Rights was written and ratified, the only way to receive evidence was either directly from a witness in court or via hearsay. In criminal cases, the founders opted for requiring prosecution witnesses to be physically present.⁸⁵ It is hard to argue that the original intent was to bar remote testimony since remote testimony did not exist at the time. Rather, the issue is whether properly executed remote testimony is sufficiently equivalent to in-court testimony for constitutional purposes. No court has of yet held that remote testimony is the constitutional equivalent of in-person testimony. Instead, the focus has been on when sufficient necessity permits an exception to the Sixth Amendment's confrontation clause.⁸⁶

The Supreme Court has interpreted the confrontation clause's basic physical presence requirement in two cases. In *Coy v. Iowa*, the Court held that the use of a screen to shield two juvenile victims from seeing the defendant was unconstitutional.⁸⁷ The Court emphasized the need for face-to-face confrontation, stating that "face-to-face presence

83. Note that although state constitutions cannot violate the US Constitution, they can, and sometimes do, grant protections in nonfederal proceedings beyond those afforded by the federal Constitution. See John Greabe, *Constitutional Connections: State Constitutions and the Protection of Rights*, CONCORD MONITOR (Feb. 25, 2018, 12:15 AM), <https://www.concordmonitor.com/State-constitutions-and-the-protection-of-rights-15587900> [https://perma.cc/6MEG-8D4T]. Accordingly, it is possible that a virtual state proceeding might raise unique and possibly fatal state constitutional issues.

84. See, e.g., *Crawford v. Washington*, 541 U.S. 36, 38 (2004).

85. See *id.* at 61. The issue of what types of prosecution hearsay were permissible appeared to have been finally settled in 2004 in *Crawford* when the Court held that the Sixth Amendment barred prosecution use of "testimonial" hearsay. *Id.* Discussion of *Crawford* is outside the scope of this Article, but it may be useful to suggest that in light of later cases, *Crawford's* future is uncertain and the decision to permit nontestimonial hearsay suggests that remote testimony from secondary witnesses may not come within the Sixth Amendment's protections. See, e.g., *United States v. Harris*, No. 17-00001 HG-01, 2019 U.S. Dist. LEXIS 5552, at *10–13 (D. Haw. Jan. 11, 2019) (denying a motion for bond pending sentencing and appeal based on remote testimony deemed lawful, among other matters, when the remote witnesses were not principal witnesses and children's infirmities, which made travel difficult, were not temporary).

86. See, e.g., *Crawford*, 541 U.S. at 57.

87. *Coy v. Iowa*, 487 U.S. 1012, 1014, 1022 (1988).

may, unfortunately, upset the truthful rape victim or abused child; but by the same token it may confound and undo the false accuser, or reveal the child coached by a malevolent adult. It is a truism that constitutional protections have costs.”⁸⁸ In *Maryland v. Craig*, the Court upheld the one-way video testimony of a child abuse victim who the judge determined would have been unable to testify in the courtroom due to severe emotional distress.⁸⁹ Subsequent lower court cases have focused on whether there is a sufficient need for the testimony to be remote and whether the remote testimony itself was sufficiently well done to be accepted. For example, in *Harrell v. State*, the robbery victims, a married Argentine couple who were unable to travel from Argentina to Florida due to the wife’s health problems and the distance between the two locations, were permitted to testify remotely by satellite video.⁹⁰ The Florida Supreme Court held that there was sufficient justification for the two-way testimony and also concluded that applicable treaty provisions permitted trying the witness for perjury in the United States if necessary.⁹¹ Subsequent cases have made it clear that the necessity burden is a high one.⁹²

As of this writing, no court has ruled on whether the Pandemic presents sufficient need to permit remote prosecution testimony, although the CARES Act, enacted in March 2020, might constitute a sufficient emergency declaration.⁹³

Under the Bill of Rights, trials must also be “public.”⁹⁴ In ordinary circumstances, that means that members of the public and media must be able to attend a court proceeding in person. Interestingly, the court only has to offer seats in the given courtroom. There is no requirement to provide a courtroom adequate for all

88. *Id.* at 1020.

89. *Maryland v. Craig*, 497 U.S. 836, 859–60 (1990) (upholding the use of remote child abuse victim testimony).

90. *Harrell v. State*, 709 So. 2d 1364, 1371 (Fla. 1998), *cert. denied*, 525 U.S. 903 (1998).

91. *Id.* at 1371.

92. *See, e.g.*, *United States v. Yates*, 438 F.3d 1307, 1316 (11th Cir. 2006) (en banc) (rejecting remote witness testimony from Australia in a criminal case); *United States v. Carter*, 907 F.3d 1199, 1208 (9th Cir. 2018). *Compare Carter*, 907 F.3d at 1208 (holding that the witness being seven months pregnant was insufficient necessity), *with United States v. Harris*, No. 17-00001 HG-01, 2019 U.S. Dist. LEXIS 5552, at *10–13 (D. Haw. Jan. 11, 2019) (holding that remote testimony was lawful, among other matters, when the remote witnesses were not principal witnesses and children’s infirmities, which made travel difficult, were not temporary).

93. *See Jessica A. Roth, The Constitution Is on Pause in America’s Courtrooms*, ATLANTIC (Oct. 10, 2020), <https://www.theatlantic.com/ideas/archive/2020/10/constitution-pause-americas-courtrooms/616633/> [<https://perma.cc/TN33-FJDV>].

94. *Richmond Newspapers, Inc. v. Virginia*, 448 U.S. 555, 580–81 (1980) (applying the Sixth Amendment to criminal trials). Common law and the First Amendment provide that right in civil cases. *See Publiker Indus., Inc. v. Cohen*, 733 F.2d 1059, 1071 (3d Cir. 1984).

interested people or access to an overflow courtroom, although some courts do supply the latter. A virtual trial clearly raises public access issues. In the United Kingdom, the Coronavirus Act 2020 granted judges in criminal matters the power to order remote hearings to be recorded so that they could be viewed by the public at a later time.⁹⁵ That will likely be inadequate in the United States, especially given heightened concerns that digital data may have been altered. Were US courthouses open, it might suffice to make a room available to the public to view ongoing remote proceedings. In the present world, streaming might well suffice and would arguably enhance transparency. However, since television is not generally permitted in federal courts and some state courtrooms may not be accessible for such coverage, we can assume that streaming will not be a favored solution in all cases. As courts are only required to permit visitors to attend a case in the assigned courtroom with its corresponding fixed number of seats, perhaps a court could permit streaming for a fixed number of people equal to the number of seats available in its largest courtroom.

The last major constitutional issue likely to be raised in the event of virtual proceedings is the Fifth Amendment's due process clause. Because the Fifth Amendment does not define "due process,"⁹⁶ numerous court cases have struggled to define its application to various situations. For example, lack of access to adequate devices or internet connection could raise a fundamental due process issue.⁹⁷ Here, however, one could also expect a litigant, civil or criminal, to raise the previously addressed confrontation and public trial issues in the due process context. Yet, such a litigant might also complain that virtual proceedings would prevent the judge (or jury) from adequately determining the credibility of a remote witness. Reliance on "demeanor evidence" is fundamental in the US court system, and based on the very large number of judges who have visited CLCT's McGlothlin Courtroom, many judges believe that they cannot adequately evaluate witness demeanor remotely. The irony here is that scientific studies

95. Coronavirus Act 2020, § 55, sch. 25 (UK).

96. See U.S. CONST. amend. V.

97. See, e.g., Elizabeth Brico, *Virtual Hearings Have Created a 'Caste System' in America's Courts*, APPEAL (July 31, 2020) [https://theappeal.org/virtual-hearings-have-created-a-caste-system-in-americas-courts/?utm_source=The+Appeal&utm_campaign=2de1963ab1-\[https://perma.cc/6NAS-USVC\]](https://theappeal.org/virtual-hearings-have-created-a-caste-system-in-americas-courts/?utm_source=The+Appeal&utm_campaign=2de1963ab1-[https://perma.cc/6NAS-USVC]). The right to equal protection could also be asserted. See Henry E. Hockeimer, Jr., Terence M. Grugan & Izabella Babchinetskaya, *Insight: Virtual Criminal Jury Trials Threaten Fundamental Rights*, BLOOMBERG L. (June 23, 2020, 4:00 AM), <https://news.bloomberglaw.com/white-collar-and-criminal-law/insight-virtual-criminal-jury-trials-threaten-fundamental-rights> [https://perma.cc/B9SR-NB2V].

have concluded that people simply cannot determine truth telling by demeanor regardless.⁹⁸

The constitutional issue least likely to arise would be the right to a jury trial as set forth in the Sixth and Seventh Amendments. Since such a complaint would be nearly guaranteed to prevail, courts likely will not impanel juries in virtual cases absent express waiver by the parties.⁹⁹ Our jury system requires selected jurors to deliberate together until they reach a verdict or are declared by the judge to be a “hung jury,” which terminates the case and permits a retrial.¹⁰⁰ A virtual, distributed jury of people sitting at home, for all its merits,¹⁰¹ clearly would not be the type of jury that we inherited from the English legal system. Even so, civil parties or even criminal defendants faced with long trial delays might well prefer a remote jury over waiting until a traditional jury becomes available. Given that even a criminal defendant can ordinarily waive the right to a jury trial in noncapital cases, such a waiver ought to be lawful.¹⁰²

Another issue that is likely to present itself, however, is the need to cope with technological problems. Given the technological issues that

98. See, e.g., Fisher, *supra* note 53. Among other matters, the author reports that experimental studies show that “[b]ehavioural cues popularly thought to be associated with lying—posture, head movements, shifty eyes, gaze aversion, fidgeting, and gesturing—have no correlation with dishonesty or lack of credibility.” *Id.* at 578. Which is not to say that judges and jurors do not believe they are adversely affected by the use of remote testimony. See Tania E. Eaton, Peter J. Ball & M. Gemma O’Callaghan, *Child-Witness and Defendant Credibility: Child Evidence Presentation Model and Judicial Instructions*, 31 J. APPLIED SOC. PSYCH. 1845, 1855 (2001). For ways in which remote communication may affect perception and confidence, see also Kate Murphy, *Why Zoom Is Terrible*, N.Y. TIMES (Apr. 29, 2020), <https://www.nytimes.com/2020/04/29/sunday-review/zoom-video-conference.html> [<https://perma.cc/UGM4-QYPU>].

99. See Hockeimer et al., *supra* note 97. Note that remote jury selection should not pose constitutional issues. David A. Carrillo & Matthew Stanford, *Remote Jury Trials Are Possible, but Maybe Not the Best Idea*, LAW.COM: THE RECORDER (May 27, 2020, 10:00 AM), <https://www.law.com/therecorder/2020/05/27/remote-jury-trials-are-possible-but-maybe-not-the-best-idea/?slreturn=20201005113502> [<https://perma.cc/QWU7-AK4Z>].

100. *How Courts Work*, AM. BAR ASS’N (Sept. 9, 2019), https://www.americanbar.org/groups/public_education/resources/law_related_education_network/how_courts_work/jurydeliberate/ [<https://perma.cc/2RSQ-CEGM>].

101. See *First Remote Jury Trial Shows Potential for Widespread Use*, NAT’L CTR. FOR STATE CTS. (May 20, 2020), <https://www.ncsc.org/newsroom/at-the-center/2020/may-20> [<https://perma.cc/33N5-2FJQ>]. Assuming of course that distractions, improper influence, and unlawful use of internet information gathering did not take place.

102. See FED. R. CRIM. P. 23(a). And indeed, Texas held the nation’s first true virtual jury trial relying on the parties’ consent. Miles, *supra* note 82. This followed the use by a Texas court of an equivalent procedure in which the “jury” issued a nonbinding verdict in an alternative dispute resolution procedure. See *First Remote Jury Trial Shows Potential for Widespread Use*, *supra* note 101; Zoe Schiffer, *A Court in Texas Is Holding the First Jury Trial by Zoom*, VERGE (May 18, 2020, 2:24 PM), <https://www.theverge.com/2020/5/18/21262506/texas-court-jury-trial-zoom-remote-virtual-verdict> [<https://perma.cc/S8ML-KKZ9>].

often occur during lengthy video meetings, the court should have a technologist troubleshooter on hand to assist if problems arise during jury deliberations. How should the courts deal with a nonjuror technologist having access to secret and privileged jury discussion? This question is not new. CLCT was confronted with a similar situation some years ago. CLCT's court reporter, pursuant to the requirements of the Americans with Disabilities Act, sat in on deliberations during one of the experimental laboratory trials to provide realtime transcription for a juror unable to hear. Viable solutions, such as a secrecy oath for the expert, remain to be seen.

b. Statutes and Court Rules

Determining whether a virtual proceeding is lawful with respect to statutes and court rules can be difficult. There are four possible situations: (1) virtual proceedings are clearly authorized; (2) virtual proceedings are clearly prohibited; (3) some forms of proceedings are authorized using language such as "telephonic"; or (4) there are no apparently applicable statutes or rules.

The third possibility in particular raises significant potential issues. At the risk of great oversimplification, there are two primary approaches to judicial interpretation: textualism and contextualism (which includes legislative intent).¹⁰³ Take, for example, a statute that declares: "When necessary, a witness may testify telephonically." Under a stricter textualist approach, that would mean exactly what it says: telephone testimony, and only telephonic testimony, is acceptable given sufficient necessity. However, if the statute is somewhat dated, "telephonic testimony" could have been the best technology available at the time of enactment. Under a looser contextualist approach, an analysis of the legislative intent would likely permit videoconferencing testimony, in addition to telephonic testimony. If there are no applicable statutes or court rules, judicial philosophy may come into play. Many judges and court managers would work from the premise "anything not prohibited can be done." Some, on the other hand, would reason, "absence of guidance simply means explicit permission is needed before doing something new." Accordingly, in the case of a statute referencing telephonic use, many judges would read that as an invitation to use video technology; others would interpret it as a binding constraint.

103. See John F. Manning, *What Divides Textualists from Purposivists?*, 106 COLUM. L. REV. 70, 71-73 (2006).

Assuming a situation in which a court is reluctant to proceed because of an adverse or unclear statutory scenario, a statute can be amended or abrogated by the legislature. In the 2020 CARES Act, Congress created emergency provisions for some federal criminal case proceedings.¹⁰⁴ At least in theory, altering a court rule should be much easier than seeking legislative action.

3. Technology

Assuming that well-implemented videoconferencing will not adversely affect the results of a virtual hearing,¹⁰⁵ such technology must be evaluated based on its fitness for purpose, ease of use, adequate technical support and, critically, cybersecurity adequacy. A brief preliminary discussion of videoconferencing technology may be helpful.

a. Videoconferencing Technology

i. Introduction

Until relatively recently, videoconferencing required expensive, dedicated hardware. For example, the earliest forms of videoconferencing used a hardware codec (coder-decoder), which takes the audio and video supplied by a camera and microphone, converts it to electronic data, and sends the data to another similar piece of equipment.¹⁰⁶ The user of that equipment sees and hears the person using the originating hardware and can reply in the same fashion.¹⁰⁷ The earliest forms of videoconferencing often could not show rapid movement without causing video artifacts on the screen, and sound sometimes arrived after the video.¹⁰⁸ These problems were corrected long ago, but it is still difficult to interrupt someone else, and limited bandwidth can interrupt both audio and video.

Videoconferencing is often installed in conference rooms, connecting the codec to a display screen, speakers, and microphone. Alternatively, one can purchase a portable “rollabout” that comes with the codec and a monitor with an integrated microphone and speakers.

104. See Coronavirus Aid, Relief, and Economic Security Act, Pub. L. No. 116-136, § 15002, 134 Stat. 281, 527-530 (2020).

105. See GRABOYES, *supra* note 75, at 12. Whether this is true is unclear at this time. See *id.*

106. *How Does Video Conferencing Work?*, VOIP SUPPLY, <https://www.voipsupply.com/how-video-conferencing-works> [<https://perma.cc/F6TC-URHV>] (last visited Dec. 3, 2020).

107. See *id.*

108. See Milton, *The Dark Side of Video Conferencing*, VSEE (Feb. 8, 2011), <https://vsee.com/blog/the-dark-side-of-video-conferencing/> [<https://perma.cc/G6SG-F423>].

For courtroom and hearing room use, the first approach is preferable. CLCT's McGlothlin Courtroom, which connects five video cameras, multiple document cameras, computer inputs, and its high-end audio system to multiple codecs, can display a remote speaker or data on one or more display monitors in the courtroom. Polycom, Cisco, and Lifesize are CLCT Participating Companies that offer commercial level videoconferencing hardware.

The highest-end systems provide extraordinary communication. Cisco's room systems are designed so that a user sits along a semicircular table facing three large screens.¹⁰⁹ When connected to another similar system, the user perceives people as seated at the other side of the table.¹¹⁰ As one of the remote participants walks around the far end room, sound follows that person.¹¹¹ It is very much like being in the same room.

In earlier days, the connection would be via Integrated Services Digital Network, better known as ISDN, which used high-capacity telephone lines.¹¹² ISDN was highly secure but expensive, costing roughly the equivalent of six telephone lines.¹¹³ As time passed, most dedicated videoconferencing abandoned ISDN transmission and moved to the internet. An Internet Protocol (IP) connection requires more bandwidth than ISDN but is effectively free if the organization using it generally has sufficient bandwidth.¹¹⁴ Quality of service (QOS) can be problematic in the event of a sudden increase in network use, such as when staff arrives in the morning and checks the network for email. Today, almost all high-end commercial videoconferencing systems use IP connections.¹¹⁵ However, at least some federal agencies still use

109. See *Immersive TelePresence*, CISCO, <https://www.cisco.com/c/en/us/products/collaboration-endpoints/immersive-telePresence/index.html> [<https://perma.cc/82WL-3ZQS>] (last visited Dec. 3, 2020).

110. See CISCO SYS., VIDEO CONFERENCING ROOM PRIMER 5 (Oct. 2011), https://www.cisco.com/c/dam/en/us/td/docs/telepresence/endpoint/misc/user_guide/video_conferencing_room_primer_ver02.pdf [<https://perma.cc/5XE3-4Z6M>].

111. See *Webex Room Series*, WEBEX, <https://www.webex.com/video-conference-equipment/webex-room-series.html> [<https://perma.cc/8G59-QFGZ>] (last visited Dec. 3, 2020).

112. See Fredric I. Lederer, *The Potential Use of Courtroom Technology in Major Terrorism Cases*, 12 WM. & MARY BILL RTS. 887, 907, 908 (2004).

113. See Kevin Dunetz, *ISDN PRI Pricing*, COMPUT. WORLD (Jan. 24, 2001, 12:53 PM), <https://www.computerworld.com/article/2800729/isdn-pri-pricing.html> [<https://perma.cc/M2Z9-U647>].

114. See *Video Conferencing over ISDN (vs) Video Conferencing over IP – Which Is Better?*, EXCITINGIP (Aug. 2, 2011), <https://excitingip.com/2285/video-conferencing-over-isdn-vs-video-conferencing-over-ip-which-is-better/> [<https://perma.cc/3QWW-73A6>].

115. See Margaret Rouse, *Internet Protocol Suite (IP Suite)*, WHATIS.COM, https://whatis.techtarget.com/definition/Internet-Protocol-suite-IP-suite?_ga=2.201555281.119549962.1603913283-2036050361.1603913283 [<https://perma.cc/ZV7C-UGEU>] (last updated June 2016).

ISDN systems, supposedly for security reasons.¹¹⁶ When IP-based systems were introduced, “bridges” were easily available that could connect IP and ISDN systems. Today, that can be hard to find.¹¹⁷

ii. Software-Based Videoconferencing: The Response to Social Distancing

And then everything changed! Although high-end commercial systems are still used, the advent of software codecs designed to give computers videoconferencing capability made videoconferencing available to nearly every user of a notebook computer or iPad at little to no cost (to say nothing of Apple’s FaceTime).¹¹⁸ Skype not only made video communications available to many, it became a verb—“I’ll Skype you.” Courts that had never invested in commercial-level videoconferencing began to allow Skype-based testimony. Skype has its many competitors, including WebEx, OmniJoin, GoToMeeting, Google Meet, Skype for Business, and now Microsoft Teams and Zoom.¹¹⁹ As the Pandemic spread and remote classes, meetings, work, religious services, entertainment, and socialization became necessary, Zoom became the purveyor of choice for much of the US population. Video communications today are dependent upon access to the internet and adequate bandwidth.¹²⁰ Although the United States has not had any reported major bandwidth issues, many people are using unpredictable

116. See NOBLIS, PROTECTING AGENCY COMMUNICATIONS FROM TIME-DIVISION-MULTIPLEXING (TDM) OBSOLESCENCE 2–5 (2018), <https://noblis.org/wp-content/uploads/2019/01/Protecting-Agency-Communications-from-TDM-Obsolescence-FINAL.pdf> [<https://perma.cc/8SBP-RDAF>].

117. See *Moving Away from ISDN: Why SIP Is Better for the Public Sector*, CHANNEL LIFE (June 24, 2019), <https://channellife.com.au/story/moving-away-from-isdn-why-sip-is-better-for-the-public-sector> [<https://perma.cc/9XX6-3ZJV>]. Commercial-level IP video communications are encrypted for security. See *Focus on Security: Why VoIP Telephony Is Much Securer than ISDN*, TOPLINK (Feb. 9, 2015), <https://www.toplink.de/en/good-to-know/blog/focus-on-security-why-voip-telephony-is-much-securer-than-isdn/> [<https://perma.cc/FRJ7-XS3A>]. The current incompatibility of IP and ISDN systems enhances ISDN system security. See *id.*

118. *Codec*, TKO VIDEOCONFERENCING, <https://www.video-conferencing.com/definition/codec.html> [<https://perma.cc/XX38-M62X>] (last visited Dec. 3, 2020).

119. See Jordan Novet, *Skype Is Still Around—It’s Just Been Upstaged by Microsoft Teams*, CNBC, <https://www.cnbc.com/2020/10/10/skype-upstaged-by-microsoft-teams.html> [<https://perma.cc/UE6K-4ZZQ>] (last updated Oct. 10, 2020, 12:26 PM). These and similar products compete with each other for users. See *id.* Microsoft owns Skype, Skype for Business, and now Microsoft Teams, a replacement for Skype for Business. *Id.* Although aimed at potentially different market segments, this Author suspects many users see the various products as demanding a single choice of solution for all uses. See Tom Warren, *Microsoft’s Skype Struggles Have Created a Zoom Moment*, VERGE (Mar. 31, 2020, 8:43 AM), <https://www.theverge.com/2020/3/31/21200844/microsoft-skype-zoom-houseparty-coronavirus-pandemic-usage-growth-competition> [<https://perma.cc/VXM2-44PH>].

120. See Warren, *supra* note 119.

WiFi connections with the ever-present possibility of at least a brief freeze of image and loss of audio, a matter that presiding officers must plan for.

Zoom has been characterized by ease of use, good quality, and for many, free availability. From a user perspective, it has been the right application, at the right time, at the right price. It has not been an unmixed blessing. It has had serious security flaws, and its very widespread adoption has made its users vulnerable to service interruptions.¹²¹

In today's court and ADR world, an organization may find itself choosing between creating and operating its own virtual hearing system (e.g., "We use Microsoft Teams with the following operating protocol.") or contracting with a virtual legal hearing company to technologically conduct the hearings.

The degree to which courtroom video deals with the following factors will determine whether courtroom remote video appearances survive the Pandemic and become a defining element of modern court practice.

b. Fitness for Purpose

Any use of videoconferencing must at least be fit for the intended purpose. This begins with determining the technical infrastructure available to those who are expected to use the technology. At the most basic level, this can include those without internet access, those with inadequate bandwidth, and those who do not have appropriate devices to communicate with the court.¹²² Providing adequate access to each group could raise equal protection concerns. At what point would a court be obligated to supply participants with adequate internet connections or devices? Would it suffice for a court to arrange appearances from a technologically equipped public library or nearby public or private office?

Beyond technological limitations, we must also address accessibility for individuals we expect to use the technology. A recent article appearing in the United Kingdom's *Guardian* quoted an interim report by the Equality and Human Rights Commission.

"Video hearings can significantly impede communication and understanding for disabled people with certain impairments, such as a learning disability, autism spectrum disorders and mental health conditions," the report says. "People with

121. See Hamza Shaban, *Zoom Went Down for Hours, Disrupting Schools and Businesses*, WASH. POST (Aug. 24, 2020, 4:43 PM), <https://www.washingtonpost.com/business/2020/08/24/zoom-outages-monday/> [<https://perma.cc/5GAQ-6FX5>].

122. See Brico, *supra* note 97.

these conditions are significantly over-represented in the criminal justice system.”¹²³

The world of legal technology is not a “one-size-fits-all” scenario. With the understanding that individual cases may necessitate alternative solutions, evaluation of a videoconferencing solution ordinarily requires a comprehensive comparison between the user’s expected requirements and the product’s actual capabilities. As previously noted, a straightforward traffic court case could be very different from a complex trial which may require private lawyer-client consultation; lawyer-client-interpreter discussion; judge-clerk private communication; lawyer, judge, and court reporter sidebars; and even coordination among multiple lawyers to discuss matters ranging from evidentiary objections to immediate settlement terms. Where will witnesses be while waiting to testify? In mediations, the mediator will need to speak privately and separately with the individual parties; in Zoom, the “breakout” feature may accommodate at least some of these requirements. It is clear that the ability for some participants to communicate confidentially with each other during a proceeding could well be a critical technological necessity, especially as the case’s complexity increases.

In determining those requirements, it is important to distinguish core requirements from less important capabilities. Requiring a videoconferencing product or general operational protocol to meet every conceivable use will likely disqualify most, if not all, products and create complexity that will inhibit ordinary use. Video resolution, audio, good color, and similar basic matters are obviously critical. If there are minimum hardware specifications for devices, they must be reasonable under the circumstances. It would not be difficult, for example, to require color rather than black-and-white images and to specify a minimum video resolution, although it is unclear whether there is sufficient scientific knowledge at present to justify any given specification. But what about other capabilities? How effectively must the product deal with bandwidth variations? Videoconferencing often involves parties talking over each other: Does the product have to minimize voice crossover while preventing content loss?¹²⁴

123. See Bowcott, *supra* note 79. In the United States, title II of the Americans With Disabilities Act, 42 U.S.C. § 12131, may constrain state proceedings in specific cases while section 504 of the Rehabilitation Act, 29 U.S.C. § 794, may do the same for federal ones. See *Disability Laws, Regulations, and Guidance*, U.S. DEP’T. OF HEALTH & HUM. SERVS. (June 16, 2017), <https://www.hhs.gov/civil-rights/for-individuals/disability/laws-guidance/index.html> [<https://perma.cc/25ZK-ZDWP>].

124. See Victoria Turk, *Video Conferencing Sucks. Here’s How to Do It Properly*, WIRED (Jan. 20, 2020), <https://www.wired.co.uk/article/video-call-etiquette> [<https://perma.cc/6MAP->

How will counsel get the judge's attention during proceedings? Is a visual image (e.g., Zoom hand) adequate? Does the software permit recording communications? If so, can the participants be assured that secret recording cannot occur? How will the court record be made? Will an audio recording suffice, will a court reporter attend the virtual session to record the proceedings, or will the digital audio and video be captured for later transcription?

Most forms of dispute resolution include documents, visual images,¹²⁵ and possibly prior audio-video content. How will these be shown to others? Will the videoconferencing product be used to display content? Although it may be far more efficient to have a single "bundle" of documents that is available prior to the hearings,¹²⁶ parties will likely want to refer to specific content, and unexpected new evidence is not unusual. Will the videoconferencing product permit compliance with the usual process of laying an evidentiary foundation? Happily, the available software-based videoconferencing products ordinarily permit "screen sharing," which allows display of documents and other images to remote users.¹²⁷

i. Ease of Use

In the real world, the critical technological issue is often not what a product can do but whether an average user can adequately use the product. Responding to an invitation to join a video session by clicking on a supplied link is simple. However, having to schedule a

YJHC]. Counsel, judge, and arbitrators must cooperate to ensure that those speaking are not cut off by interruptions. Videoconferencing does not permit Perry Mason-type interjections. See Fritz Riesmeyer & Curry Sexton, *Tips for Remote Video Hearings and Trials: Technology, Witnesses, Evidence, and Etiquette*, AM. BAR ASS'N (June 5, 2020), <https://www.americanbar.org/groups/litigation/committees/business-torts-unfair-competition/practice/2020/tips-for-remote-video-hearings-and-trials/> [https://perma.cc/7TY3-MA38].

125. See Elizabeth G. Porter, *Taking Images Seriously*, 114 COLUM. L. REV. 1687, 1699 (2014). This includes images of existing real or physical evidence that at the moment cannot be matter duplicated or transmitted to other participants. See JOINT TECH. COMM., JTC QUICK RESPONSE BULLETIN: MANAGING EVIDENCE FOR VIRTUAL HEARINGS 11 (2020), https://www.ncsc.org/_data/assets/pdf_file/0014/41171/2020-06-24-Managing-Evidence-for-Virtual-Hearings.pdf [https://perma.cc/MH2B-B4DB].

126. See *id.* at 7. If physical documents are supplied in advance on the condition that they cannot be examined until testimony, they could be physically sealed so that the seal would prevent their perusal until broken on camera. See, e.g., COVID-19 WORKGROUP, BEST PRACTICES: MANAGEMENT OF EVIDENCE IN REMOTE HEARINGS IN CIVIL AND FAMILY CASES (2020), <https://www.flcourts.org/content/download/635272/file/management-of-evidence-remote-hearings.pdf> [https://perma.cc/C9XA-6XGV].

127. See Shalini Nangia, Julia A. Perkins & Erika L. Salerno, *The Pros and Cons of Zoom Court Hearings*, NAT'L L. REV. (May 20, 2020), <https://www.natlawreview.com/article/pros-and-cons-zoom-court-hearings> [https://perma.cc/N5QA-JNZW].

meeting without prior knowledge of how to do so can be difficult for some.

Critically, a videoconferencing product's visual interface may be determinative. Can an average person use the product easily with minimum training? Are specific problems likely and can they be dealt with easily? The user of a videoconferencing device can often select how remote participants will be viewed on the user's device. The user can choose between a full screen display or various configurations of small images. Personal experience indicates that it takes some time for a user to understand the options and readily use them.

ii. Cybersecurity

The advent of software codecs has enabled easy and inexpensive videoconferencing, but it also raises fundamental security concerns.¹²⁸ A videoconferencing user should be able to communicate without the risk of interception, computer penetration, data theft, infliction of malware, and other unacceptable risks. Zoom's multitude of security problems in its short history only magnifies the severity of the issue.¹²⁹

Zoom's enormous adoption and expansion was followed by news of numerous cybersecurity problems.¹³⁰ Initially, many of these seemed fairly benign from a court-hearing perspective. Unlike ADRs, in which privacy and confidentiality are critical, court sessions are public. The fact that someone else might be viewing proceedings seemed unimportant under ordinary circumstances. "Zoom bombing," in which other people enter a Zoom meeting and post unwanted images such as pornography,¹³¹ is certainly undesirable, especially during legal proceedings, but is unlikely to be a "proverbial showstopper." Unfortunately, the litany of Zoom issues proved to be larger. News reports include statements that personal data has been captured from Zoom use. *Forbes*, for example, reported that "[r]esearch suggests that Zoom sometimes shares users' data, including encryption keys that could allow access [sic] conversations, with China."¹³² The potential

128. See *Codec: The Good, the Bad, the Ugly*, AUDIO VIDEO GRP.: BLOG (Sept. 11, 2018), <https://audiovideogroup.com/codec-good-bad-ugly/> [<https://perma.cc/BTT3-JJ8U>].

129. See Marley Coyne, *Zoom's Big Security Problems, Summarized*, FORBES (Apr. 3, 2020, 12:24 PM), <https://www.forbes.com/sites/marleycoyne/2020/04/03/zooms-big-security-problems-summarized/#348bdb8d4641> [<https://perma.cc/KEY5-4VTE>].

130. See Kate O'Flaherty, *Zoom's Security Nightmare Just Got Worse: But Here's the Reality*, FORBES (June 5, 2020, 4:49 AM), <https://www.forbes.com/sites/kateoflahertyuk/2020/06/05/zooms-security-nightmare-just-got-worse-but-heres-the-reality/#3643a2252131> [<https://perma.cc/E9XJ-7NDX>].

131. See Coyne, *supra* note 129.

132. *Id.*

scope of that vulnerability is unclear, but it is highly problematic. If a court chooses Zoom and mandates its use, it may effectively be requiring all parties involved to put their personal data at risk as a condition for their participation. Further, outside interference with court proceedings would not only be unseemly, it might force delay or even cancellation of proceedings.¹³³ On April 22, Zoom announced its implementation of a major security upgrade.¹³⁴ However, because the scope of Zoom's present security remains unclear, Zoom's ease of use seems like an inadequate justification for the risk involved, especially in light of what may be safer competitors.

iii. Technological and Human Support

In the midst of the Pandemic, most people work from home without any technical or administrative support personnel physically present. When evaluating a videoconferencing product or the operational protocol that uses it, it is important to determine what will be necessary to make it work properly under normal circumstances, what is likely to go wrong, and how problems will be resolved.

This unavoidably raises several critical questions: Who is going to support a videoconference hearing? Who will set it up and begin it? Once live, who will manage it? Does the organization (i.e., the court) have virtual bailiffs or courtroom technologists? Or, if a third-party vendor is supplying video-hearing services, does the vendor supply a courtroom technologist to be virtually present throughout the hearing, or is the judge or even a staff member responsible for managing matters? These issues may be even more critical should a virtual jury be attempted. A third-party vendor that offers competent, timely, and concurrent live electronic presence for this form of support may present a substantial value-added case.

iv. Human Factors and Participant Culture

The best videoconferencing capability may be defeated by human beings. Judges, arbitrators, lawyers, and staff may resist or refuse virtual hearings out of adherence to tradition. They may be

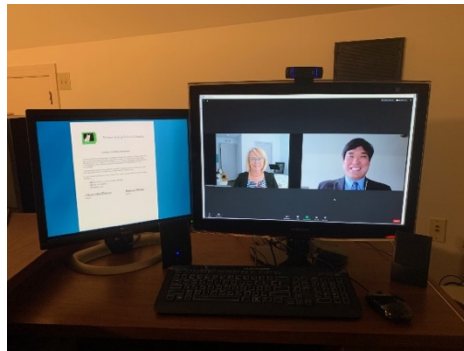
133. See, e.g., Chris Murphy, *Britney Spears's Conservatorship Hearing Postponed Due to Zoombombing Fans*, VULTURE (July 24, 2020), <https://www.vulture.com/2020/07/britney-spears-conservatorship-hearing-postponed-due-to-fans.html> [<https://perma.cc/97H7-K8N3>]. This Author thanks Ms. Carrie Cobb of the *Vanderbilt Journal of Entertainment and Technology Law* for this example.

134. See Colleen Rodriguez, *Zoom Hits Milestone on 90-Day Security Plan, Releases Zoom 5.0*, ZOOM BLOG (Apr. 22, 2020), <https://blog.zoom.us/zoom-hits-milestone-on-90-day-security-plan-releases-zoom-5-0/> [<https://perma.cc/P7JH-ZBJ5>].

worried about their ability to use or operate technology and either refuse to do so or make mistakes in the process.

Even small issues may have significant adverse effects. When a video camera is not collocated with or very close to the display being viewed, most people will look at the display. As a result, the person on the other end sees a person looking past them and not at them.¹³⁵ Inadequate lighting can also have adverse effects. Too little light and a participant will be in shadow, possibly affecting her credibility. Too much light may cause strange effects, especially if the person is using a virtual backdrop. Displays too small to view who and what is being displayed can also negatively affect the proceedings.

Camera angle is also important. When talking, most people look directly at each other with relatively minimal angle of vision differences due to height. When using a notebook computer or tablet, most people can be seen looking down because the camera is in the device in front of and below them. Past studies dealing with the effect of camera angle in television production suggest that camera angle can affect credibility.¹³⁶ Simple solutions, such as placing the device on a stack



CLCT staff show how counsel can address a document from the judge's perspective.

of books, can bring the camera in line with the user's face. Purchasing a separate camera will provide more options, often for little cost. And, of course, the active participant has to remember to look directly at the camera.

Judge and counsel must be able to use the remote technology effectively for trial and hearing purposes. That may include, for example, obtaining and using a

135. See Derek Loosvelt, *How to Look Better on Zoom and Other Video Conferencing Tips*, VAULT: CAREER ADVICE (Apr. 27, 2020), <https://www.vault.com/blogs/workplace-issues/how-to-look-better-on-zoom-and-other-videoconferencing-hacks> [<https://perma.cc/YU88-PV5P>]. A factor that can affect bail and pretrial release decisions when an arrested person is looking at a display separated from the camera. See Shari Seidman Diamond, Locke E. Bowman, Manyee Wong & Matthew M. Patton, *Efficiency and Cost: The Impact of Videoconferenced Hearings on Bail Decisions*, 100 J. CRIM. L. & CRIMINOLOGY 869, 898 (2010).

136. See, e.g., Thomas A. McCain & Jacob J. Wakshlag, Paper Presented at the International Communication Association Convention: The Effect of Camera Angle on Source Credibility and Interpersonal Attraction (Apr. 1974).

second monitor so that documents and visuals can be viewed while seeing other participants.¹³⁷

Legal culture is also relevant. In the United States, one of the justifications for the formalities in courthouses and courtrooms, such as judicial robes, is to emphasize the solemnity of the legal matters that occur in courtrooms. In most, although certainly not all, courts, counsel stand when speaking to the judge and jury and when questioning witnesses. Many lawyers find it awkward at best not to comply with this practice. In a virtual hearing, how should counsel conduct themselves? If counsel are required to stand, will they move out of their camera's frame and need to reposition their device? Will counsel have to use something akin to a music stand, adjusting the device camera vertically by sliding its support shelf up and down? CLCT's position is that counsel's virtual behavior should model in-person courtroom behavior to the degree possible.

Finally, what constitutes professional appearance during a virtual hearing is unclear. Although one would assume that the requirement of professionalism remains unchanged, a *New York Times* report of one judge's experience suggests otherwise: during Zoom meetings with counsel, "[o]ne male lawyer appeared shirtless and one female attorney appeared still in bed, still under the covers."¹³⁸ "Professional appearance" extends to the virtual setting as well. If the goal is to replicate the "majesty" of a court proceeding, ideally participants ought not to appear from bedrooms or kitchens, especially when augmented by children and pets, although the latter likely are unavoidable during the Pandemic. Depending upon the videoconferencing program used, participants may be able to use a previously prepared backdrop photograph. When using Zoom, for example, I can appear to be in our courtroom, even when physically at home.



This Author on Zoom appears to preside from W&M's McGlothlin Courtroom while actually at home.

Remote witness testimony and juror participation also raise fundamental and critical issues. Witnesses, no longer in court, can be

137. See Cara Salvatore, *May It Please the Camera: Zoom Trials Demand New Skills*, LAW360 (June 29, 2020, 3:41 PM), <https://www.law360.com/articles/1278361/may-it-please-the-camera-zoom-trials-demand-new-skills> [<https://perma.cc/AZD2-9MR4>].

138. Jacey Fortin, *When Court Moves Online, Do Dress Codes Still Matter?*, N.Y. TIMES (Apr. 15, 2020), <https://www.nytimes.com/2020/04/15/us/coronavirus-lawyers-court-telecommute-dress-code.html> [<https://perma.cc/SC6M-QPMK>].

subjected to outside direction or even threats by someone off camera. Jurors sometimes ignore the judge's instructions and use personal devices to peruse the internet for case-related information even when present in a courtroom. This only becomes easier to do when at home. There are no known easy answers to these and related questions. CLCT's preferred solution for remote witnesses is to have them testify from a courthouse, complete with court officer present. Unfortunately, that will not work in the Pandemic era. A partial solution, long used in Queensland, Australia and New Zealand, is to insist on a second camera for each witness and juror that shows the room the person is in.¹³⁹ Of course, this does not completely solve the problem and also requires a second device which the court or counsel may have to supply.

Trials and hearings are bastions of formality. Witnesses are called, enter the courtroom, and are sworn in before they testify. Lawyers enter appearances. Jurors often enter the courtroom together while those present stand. Even when remote participants, almost always witnesses, are involved in a traditional hearing, the participant is announced, authorized to appear, and only then is connected or, if waiting, made visible. Formality impresses on many the gravity of the proceeding and the importance of complying with truth telling and applicable rules of procedure and professional ethics. Video meetings with their grid appearances are decidedly informal. Assuming that the court wishes to convey that virtual trials and hearings are as important as in-person ones, it must consider how to convey that formality. Thus, it likely is not enough to have remote participants appear on the screen. When and how did they "arrive?" Who is displayed, when are they displayed, and what is their relationship to the others? A typical Zoom meeting starts by assembling the participants along with troubleshooting questions and pleasantries. The court or organization should have the appropriate participants, usually counsel, present and ready before the judge "arrives." Witnesses must be secluded in different virtual spaces and appear only after formal permission is given by the judge. Someone, preferably not the judge, must control when and how witnesses are presented, and that person should have the technical knowledge to fix the inevitable problems that will occur.

Once in session, there are unanswered questions about how participants should be displayed. Assume that the plaintiff's counsel is conducting direct examination of a witness. Who should be visible? The

139. See Emma Page & Claire Robertson, *Appearing in Court via Audio Visual Link: Issues for Young People* (June, 2016) (research paper, University of Queensland Beirne School of Law) (on file with the University of Queensland). Termed a "non-coercion camera" in New Zealand and visible only to the judge. *Id.*

judge, and any jury, likely would want to see the examining lawyer, the witness, both parties, and opposing counsel. The jury will need the judge to be included. In a jury trial, the jury must be visible so that counsel can understand how the testimony is being received. Presumably, the Zoom “Hollywood” squares approach is not ideal. Should the witness’s image be large with other participant images smaller? Where should the judge appear? Can the requisite appearance be fixed for all participants? Should the examining lawyer have a mandatory or optional picture in picture? These questions need to be addressed via experimental research.

v. Public Acceptance

In the United States, the public largely accepts court verdicts because of a fundamental trust in the legal system. In turn, this helps fuel conservatism in the judiciary. Our judges understand the nature of this unwritten social contract and are loathe to implement changes that the public would question. Before the Pandemic, remote video court appearances were growing, but only slowly. Utility competed with both lack of personal experience and concerns that the public would not accept video appearances as “fair.” Now, however, millions of people are communicating and working by videoconference.¹⁴⁰ It is hard to see how most people would object to conducting at least routine legal business by videoconferencing, especially as courts demonstrate its utility in actual proceedings. Trying a death penalty case remotely is probably a poor idea, even ignoring the jury legality question.

At this writing, it seems highly probable that by the end of the Pandemic, the public will come to accept remote video appearances as a means of conducting important human affairs. It seems likely that this attitude will translate into public acceptance of videoconferencing in important legal proceedings.¹⁴¹ Indeed, this was the unanimous conclusion of the judges and court administrators attending the 2020 Court Affiliates Conference.¹⁴²

140. Katherine Stone, *The State of Video Conferencing in 2020 [50 Statistics]*, GETVOIP (July 7, 2020), <https://getvoip.com/blog/2020/07/07/video-conferencing-stats/> [https://perma.cc/JCK8-4ESN].

141. See, e.g., Allie Reed & Madison Alder, *Zoom Courts Will Stick Around as Virus Forces Seismic Change*, BLOOMBERG L. (July 30, 2020, 4:50 AM), <https://news.bloomberglaw.com/us-law-week/zoom-courts-will-stick-around-as-virus-forces-seismic-change> [https://perma.cc/S9Y4-Z4BR].

142. See Gruen, *supra* note 18.

vi. And the Future?

As courts cope with the Pandemic's social distancing requirements, videoconferencing and even full-blown virtual proceedings provide a relatively simple and inexpensive partial solution. The long-term effects of massive use of basic videoconferencing are hard to predict, but it seems reasonable to conclude that the public's multifaceted use of videoconferencing for work, school, and social purposes will make many people and organizations amenable to its continued use.¹⁴³ Post-Pandemic, the public's intimate familiarity with videoconferencing will force the public to ask why so many people must appear physically in courthouses when relatively simple matters can be heard by video. Unrepresented litigants may be able to obtain assistance from distant pro bono counsel. US courts may draw inspiration from British Columbia's ability to provide a judge from elsewhere in the province when a local judge is unavailable.

4. Assistive Technology

Videoconferencing may be the technology of the moment, but assistive technology can be of incredible importance for access to justice. As we use the term, "assistive technology" is the use of technology to assist those with special needs, including those with limited or no mobility, vision, hearing, or the ability to speak.¹⁴⁴ Although a courtroom needs no technology to accommodate wheelchairs, sign language interpreters, or blind participants, modern technology permits far more.¹⁴⁵ Computerized screen readers and portable braille devices can assist those with limited or no vision. Those with limited or no hearing can use remote sign language interpreters for courtroom

143. See, e.g., Mike Colias, *Ford Rethinks the Office, Betting That Work Will Be Partly Remote Longer-Term*, WALL ST. J. (Aug. 26, 2020, 8:31 AM), <https://www.wsj.com/articles/ford-gears-up-for-the-post-pandemic-office-11598445075> [<https://perma.cc/CHW4-JSLU>]; Zlati Meyer, *Here's an Ever-Growing List of Companies That Will Let People Work from Home Forever*, FAST CO. (May 22, 2020), <https://www.fastcompany.com/90508784/heres-an-ever-growing-list-of-companies-that-will-let-people-work-from-home-forever> [<https://perma.cc/U8LZ-L89Q>].

144. See *What Is AT?*, ASSISTIVE TECH. INDUS. ASS'N, <https://www.atia.org/home/at-resources/what-is-at/> [<https://perma.cc/T3B8-34ST>] (last visited Dec. 4, 2020). The Assistive Technology Association defines assistive technology as "any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities." *Id.*; see also Assistive Technology Act of 1998, 29 U.S.C. § 3002(4) ("The term 'assistive technology device' means any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.").

145. See generally Fredric I. Lederer, *Access to Justice*, in DISABILITY, HUMAN RIGHTS, AND INFORMATION TECHNOLOGY 111, 111–24 (Jonathan Lazar & Michael Ashley Stein eds., 2017).

audio interpretation or use real-time court reporters to get immediate electronic verbatim text on a nearby monitor. In past experimental trials, CLCT used a “court explicator” to describe proceedings to a vision-limited judge with counsel able to object to potentially incorrect interpretations. CLCT’s McGlothlin Courtroom witness stand uses a Lift-U wheelchair lift not only to accommodate wheelchair-using witnesses at the stand but also to assist wheelchair-using judges to reach the bench. The goal, of course, is to provide those with disabilities the same access afforded to those without disabilities. CLCT’s experience has been that assistive technology, especially when coupled with courtroom design that takes that technology into account in the architectural design, can do that very successfully.

It is not clear how many courts have courtrooms designed specifically to include or accommodate assistive technology rather than having a staff expert charged with resolving specific needs. Although assistive technology continues to evolve, the willingness of courts to install the technology in courtrooms is very unclear. Given the risks of the Pandemic, it would not be unreasonable to conclude that everyone now has a special need for medical safety that must be addressed. As this Article demonstrates, courts are largely responding to this with videoconferencing technology. However, physical alterations to ensure social distancing among those attending in-person hearings are also taking place.¹⁴⁶ Whether there might be carryover to other types of needs remains to be seen.

III. CONCLUSION

Courtroom technology can improve the administration of justice, enhance its quality and efficiency, and sometimes lower its cost. At the same time, it can improve access to justice by permitting use of cell phone-stored evidence, enable remote appearances of those who cannot otherwise appear at proceedings, and, via assistive technology, provide meaningful attendance and participation at trial and hearings for those with disabilities. As technology continues to advance, one could reasonably assume that courtroom technology will continue to evolve—most likely in fits and starts—as individual courts choose to experiment with one innovation or another. The exception to that, of

146. See, e.g., Csaba Sukosd, *Court Adjustments Provide Shelter from Pandemic Storm*, CT. NEWS OHIO (Aug. 7, 2020), http://www.courtnewsohio.gov/bench/2020/courtAdjustments_080720.asp#.X5sVYi2z1TZ [<https://perma.cc/JH7C-MUGB>]; Ann E. Marimow & Justin Jouvenal, *Courts Dramatically Rethink the Jury Trial in the Era of the Coronavirus*, WASH. POST (July 31, 2020, 8:54 AM), https://www.washingtonpost.com/local/legal-issues/jury-trials-coronavirus/2020/07/31/8c1fd784-c604-11ea-8ffe-372be8d82298_story.html [<https://perma.cc/3F9X-G8LW>].

course, has been the reality of the COVID-19 Pandemic and the courts' reluctant adoption of technology to deal with its effects. The consequences of that effort are unclear at present but have been and are likely to continue to be expansive and profound.