

NEW TOOLS AND TECHNOLOGIES IN LEGAL PRACTICE



Article

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Interdisciplinary Aspects of the Introduction of Virtual Reality Technologies in Court Proceedings

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Abstract: Modern law is closely interrelated with the active development of high technologies. Judges, prosecutors, lawyers, as well as other participants of court proceedings are gradually introducing elements of digitalization into their activities. In some countries, neural networks are already being used to help the judge in making a decision in the case under consideration, and also consider court cases in the metaverse. However, any high-tech tools that are easy enough to integrate, for example, into the business sphere, are introduced into law with certain restrictions. They include normative and legal regulation, technological solutions, and digital literacy of the population. However, even all these conditions being provided, the consideration of civil and criminal cases in virtual reality is quite a difficult task. Jurisprudence traditionally remains one of the most conservative institutions, extremely reluctant to introduce high technologies. This paper, taking into account the experience of the courts of Colombia in the consideration of cases in the metaverse, elucidates technical and legal aspects of the introduction of virtual reality technologies in the consideration of civil and criminal

cases by Russian courts. The authors analyze the implementation of the principles of legal proceedings, the rights of participants, identity verification and the flow of information.

Keywords: legal proceedings; virtual reality; metaverse; principles of legal proceedings; verification of participants; rights of participants; transfer of information

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I. Introduction

Digitalization of legal proceedings in Russia and in the world as a whole has been taking place for the last 5–7 years following the rest of the institutions of society and the state, with the exception of some countries and territories. During the period from 2010 to 2023, there were several key changes in Russian judicial proceedings related to the introduction of high technologies. Thus, in 2010, the information system “KAD. Arbiter” that at that time allowed to remotely become acquainted with judicial acts posted on this platform was introduced. It was really a revolutionary step in digitalization, because if we consider a longer horizon of events, then back in 2005–2008 it was common

to see a lawyer or prosecutor in the courtroom with a notebook where clippings from *The Rossiyskaya Gazeta* with the texts of the adopted laws were pasted.

After the initial implementation of the “KAD. Arbiter” there were several updates to it, which eventually made it possible in 2021 to file claims and documents to the court remotely using verification via “Public Services” or an electronic digital signature, as well as to participate in the court session via videoconference. An important point should be noted that the parties to the case were connected to the court sessions from home or any other place with Internet access and a webcam. This option is available in Russia for arbitrazh courts (Amelin and Channov, 2023, pp. 61–64).

For criminal and civil cases considered in courts of general jurisdiction, it is possible to participate in the court proceedings remotely, but with some restrictions: a participant in civil proceedings will need to appear in person at a nearby courthouse, where he will be connected to a videoconference with the court considering his case. For criminal proceedings, videoconferencing will be used last of all other options, giving priority to the full-time presence of all participants in the courtroom (with the exception of appeals against sentences when the convicted person is already serving a sentence related to deprivation of liberty, and remote connection from a correctional institution is more often used).

Thus, if we project high technologies into legal proceedings in Russia, then the arbitrazh courts are the most “technological,” where a full cycle of remote filing of a claim, participation in the consideration of a case and obtaining a decision signed by a judge using an electronic digital signature is possible. In criminal proceedings, as of the first half of 2023, this is not applicable yet.

However, the most conservative from the point of view of digitalization are the English courts that are extremely reluctant to introduce various technologies. At the same time, the question should be asked, “Does the use of a regular webcam and remote broadcast from the courtroom also mean ‘high-tech’?” Taking into account the active spread of ChatGPT-type neural networks in the world, digital spaces for virtual objects (metaverses), as well as other technologies,

conventional videoconferencing can hardly be considered a high-tech solution in 2023.

II. Consideration of a Court Case in the Metaverse: The Experience of Colombia

II.1. Legislative Regulation

In this regard, the experience of the court in Colombia is interesting. This court in February 2023 was the first among all countries to hold an official court session in the metaverse. Apart from small distortions of the avatars' movements, no problems were noticed. The two-hour hearing was attended by the avatars of the parties to the dispute and the avatar of the head of the magistrate Maria Quinones Triana in a black robe. Everything went quite well, there was a live broadcast, and according to the judge, it was even more realistic than a video call, since during ordinary video conferences people tend to turn off the cameras. It should be noted that this meeting was held in compliance with all legal requirements.

The Colombian judicial system recognizes the opportunity to step up the definition and the use of tools that allow digital tools to become a reality in practice as part of the digital transformation of judicial management and strengthening public confidence in the system of administration of justice. The main goal and task of the judicial authorities in the coming years is to gradually promote digital transformation in the judicial process. Colombia has laws that oblige lawyers to use modern technology to work more efficiently.

The National Development Plan for 2018–2022 “Pact for Colombia, Pact for Justice” adopted by Law No. 1955 of 2019 (Plan Nacional de Desarrollo 2018–2022 “Pacto por Colombia, pacto por la equidad”) defines digital transformation as one of the key directions for the development of the entire system of the state, including the system of administration of justice. Thus, Art. 147 of the National Development Plan establishes a number of principles that should guide the implementation of strategic innovation projects by state authorities:

— standards for personal data protection and public data disclosure;

- security and digital trust policies and standards;
- standards of interoperability between public information systems;
- priority of using cloud services.

The General Procedural Code of Colombia, put into effect by Law No. 1564 of 2012 (Código General de Procedimientos — CGP) stipulates in Art. 103 that the judiciary must “implement a digital justice plan that must be integrated into all processes and management tools of jurisdictional activities through information and communication technologies that allow the formation and manage digital files and online courts.”¹

The normative consolidation of the possibility of holding court sessions in the metaverse creates the need to solve the technical aspects of this task. The most important issues requiring fundamental study concern both the software and hardware components of this problematic situation, and the ideal (but unattainable in a reasonable time) solution to this problem is seen in the development of a specialized software and hardware complex, which includes both the design of a virtual court (taking into account the realities of Russia), the development of augmented reality software when a computer in real time imposes additional layers with virtual objects on the image of the surrounding space on the screen of various devices to expand and supplement the physical world with graphic objects, 3D animation, sounds (working with evidence, reconstruction of a crime scene, reconstruction of road accidents, etc.), and hardware development (equipment for end-to-end (E2E) encryption in communication channels, virtual reality glasses, exoskeletons for conducting an investigative experiment).

II.2. Conditions for the Metaverse

We highlight here the most important tasks that must be solved to create a prototype of the metaverse. The most important thing in

¹ EY 1564 DE 2012 “Por medio de la cual se expide el Código General del Proceso y se otras disposiciones.” El Congreso: de la República. Available at: https://www.cancilleria.gov.co/sites/default/files/tramites_servicios/apostilla_legalizacion/ley_1564_de_2012_codigo_general_del_proceso.pdf [Accessed 19.07.2023].

the distributed conduct of court sessions is the authorization of all participants in the process. Technically, this can be arranged by using a simple or enhanced digital signature. Both variants are created using cryptographic technologies in accordance with the State Standard 34.10-2018 that describes algorithms for generating and verifying an electronic digital signature using operations in a group of elliptic curve points and a hashing function. The U.S. National Security Agency recommends using 384-bit keys for elliptic cryptography algorithms to protect information classified as *Top Secret*. The secret key lengths of 256 bits and 512 bits, defined in the State Standard 34.10-2018 are sufficient to ensure the level of digital signature protection required for the judicial process. To verify the participant of the process, it is necessary to generate a message, a signature key and a key for verifying the signature. The signature verification key is public so that any recipient can decrypt and verify the authenticity of the signature. If the recipient manages to decrypt the message using a public signature verification key belonging to a certain sender, then he can be sure that the message was signed with the signature key of that sender. To form an electronic signature, an external drive in the form of a USB drive is used. A qualified enhanced electronic digital signature, in comparison with an unqualified one, provides an increased degree of protection due to the possibility of issuing an electronic signature exclusively in certification centers accredited by the Ministry of Digital Development, Communications and Mass Communications of the Russian Federation.

The next most important task is to ensure the secure transmission of video information over the Internet. Possible technical problems constitute the main disadvantage of online proceedings. If there are problems with communication, the hearings may be postponed, which gives wide grounds for abuse and delaying the process. Technical interruptions can significantly complicate the process. Even minor sound problems prevent participants from catching and responding to all the questions of the court and statements of the opponents. In addition, the parties may unwittingly start interrupting each other. This creates general discomfort with the judges trying to call to order, but it is difficult to establish a normal work under such conditions. However, even if the connection is uninterrupted, it is much more difficult to

establish personal contact with the judge in the online process than when the process is being conducted in the courtroom. However, even with stable and reliable communication and uninterrupted traffic, there is a problematic situation of a man-in-the-middle (MITM) attack — a form of cyberattack in which methods are used to intercept data that allow you to infiltrate an existing connection or communication process (Bertovskiy, 2023, pp. 188–189). An attacker can be a passive listener in your conversation, stealing some information unnoticed, or an active participant, changing the content of your messages or posing as a person or system with whom you think you are talking (Sliusar et al., 2021, pp. 2257–2261).

II.3. Development of Video Services

The Covid-19 pandemic served as a powerful impetus for the developers of secure video conferencing services (Sartor et al., 2022, pp. 555–556). As an example of the diversity of these services, we can name *Zoom*, *Microsoft Teams*, *iMind*, *Skype*, *Google Meet*, *Jitsi Meet*, *Meeting U* and the Russian relevant products *eXpress*, *VK Teams*, *VideoMost*, *TrueConf*, *IVA*, *Vinteo*, *Yandex.Teleconference*, *Webinar.ru*, and *Sber Jazz*. All of these services are conditionally suitable for holding court sessions, but there are many questions concerning their ability to ensure security and cryptographic security for all of them.

For example, the Zoom video conferencing service claims to implement E2E encryption, but it turned out that the platform actually uses its own definition of the term, which allows Zoom to access unencrypted video and audio from video conferences. In an interview, a platform spokesperson stated, “It is currently not possible to enable E2E encryption for Zoom video conferencing. A combination of TCP and UDP is used to zoom in on video meetings. TCP connections are made using TLS, and UDP connections are encrypted using AES using a key negotiated over a TLS connection” (Lee and Grauer, 2020). TLS is a technology that web servers use to protect HTTPS websites. This means that the connection between the Zoom application running on the user’s computer or phone and the Zoom server is encrypted in the same way as the connection between the user’s web browser and the

article on the https resource is encrypted. This is the so-called transport encryption — in this technology, messages are encrypted at the sender, sent to the server, decrypted there, then encrypted again and only then sent to the addressee. This protects the data well, but the information gets to the server, which means that the server owner can easily see what you sent, i.e., the Zoom service itself can access unencrypted video and audio content of meetings and there is a possibility of a man-in-the-middle attack. The fact that Zoom has the technical ability to spy on private video meetings is, to put it mildly, undesirable in a lawsuit (Shipatov et al., 2020, pp. 55–56).

Most Russian developments allow you to place a server on personal servers of ships, which allows you to provide the necessary level of security for video and audio video conferences. However, the use of ready-made solutions does not provide for the possibility of implementing a metaverse with augmented reality in the form of graphic objects, 3D animation, sounds for working with evidence, reconstruction of a crime scene, reconstruction of a traffic accident, etc.

In Russia, the experience of the courts of Colombia certainly needs to be taken into account. Back in 2021, Russian President Vladimir Putin pointed out to the need for the development of metaverses in various sectors of the economy, medicine, and education. The judicial system needs the active introduction of high technologies. The average period of consideration of a civil case in Russia is more than four months from the moment of registration of the statement of claim to the actual decision by the court (not taking into account the additional period for appeal). At the same time, the burden on judges is enormous, in 2022 more than 40 million cases were considered, although in 2018 it was a quarter less.²

Digitalization of legal proceedings in Russia is a set of regulatory and legal changes in conjunction with technical solutions. However, this will not be enough. Digitalization is impossible without the presence of a well-formed high-tech law, the definition of which Lev V. Bertovskiy described as a logistical, knowledge-intensive and technological regulator

² Judicial statistics of the Judicial Department at the Supreme Court of the Russian Federation. Available at: <http://cdep.ru/> [Accessed 19.07.2023]. (In Russ.).

of public relations, which, on the one hand, uses high technologies in the process of law enforcement, and on the other hand, regulates the relations that arise with them (Bertovskiy, 2021, p. 739).

In general, the development of AI technologies in Russia goes in four directions: “natural language processing and speech synthesis,” “computer vision,” “promising methods of artificial intelligence” and “intelligent decision support.”³ The main directions of the development of digital legal proceedings include normative regulation, personnel and education, the formation of research competencies and technical reserves, information infrastructure and security (Selkova, 2022, pp. 56–57).

III. Conditions for the Consideration of Court Cases in Virtual Reality in Russia

III.1. Hidden Witnesses and Technology

The analysis of the current legislation in conjunction with the problems of the law enforcement officer allows us to identify the following issues that need to be worked out before the possibility of phased implementation of the experience of the courts of Colombia:

- 1) ensuring the rights of participants in legal proceedings;
- 2) implementation of the principles of judicial proceedings;
- 3) formation of judicial infrastructure;
- 4) provision of technical requirements.

Holding a court session in a metaverse (or other virtual reality), on the one hand, may not ensure the right of access to justice for certain categories of the population in hard-to-reach areas. On the other hand, the problem of so-called “secret” witnesses in a criminal case is being solved. The current legislation allows such an order of participation. In this case, the investigator (inquirer, prosecutor, court) issues a resolution on the secrecy of personal data (surname, first name, patronymic, place

³ Roadmap for the development of “end-to-end” digital technology “Neurotechnologies and artificial intelligence.” Available at: https://digital.gov.ru/ru/documents/6658/?utm_referrer=https%3a%2f%2fwww.kommersant.ru%2f [Accessed 19.07.2023]. (In Russ.).

and date of birth) that is packed in an envelope, sealed and attached to the case in this form. Only the person who classified the participant in the process and the court can open the envelope — the data should be inaccessible to anyone else.

One of the most famous cases of the secrecy of witnesses was the case of the organized criminal group “Hadi Taktash.” The accusation was based only on the testimony of the killer of this organized criminal group, who later completely withdrew his testimony. Since other witnesses, fearing reprisals from the remaining gang members at large, did not agree to testify, the investigators were forced to ensure their complete confidentiality. To achieve this, the guards pulled a sheet in the doorways of their offices, put knitted balaclavas on eyewitnesses of crimes and put professional makeup on their faces. Despite unprecedented security measures, it was not possible to protect all the witnesses. Both during the investigation and during the trial, several people who testified against the leader of *Hadi Taktash* died under unclear circumstances.

Secrecy of the participant of the trial is an important institution of criminal procedure law. Law enforcement agencies should be very responsible about maintaining confidentiality with respect to such persons, because they often transmit invaluable information about an upcoming or committed crime, risking their own lives and the lives of their loved ones.

However, classifying witnesses, the defendant does not actually have the right to ask a question to a witness in the courtroom, visually observing this witness. Placing all participants in the criminal case in a common virtual room will allow them to be on equal terms. In addition, the issue of the participation of victims in cases related to rape will be resolved. It is not always possible to interrogate a woman or a minor in the courtroom about the circumstances of the crime that cause them moral suffering. An interesting solution was proposed by 3VR that develops global video surveillance systems for cities. They presented the technology of cryptographic protection of the video stream, where images of people are encrypted with secret key and visually transformed into unrecognizable masks, as in Figure 1.



Figure 1. Images of people encrypted with secret keys

Each person has his or her own individual mask — the system first recognizes face, and then assigns each a separate key. The key to “decrypt” a particular person is given only to the competent authorities, if necessary. Thus, the police can track specific suspects, but the rest of the people in the frame remain “invisible” (Bertovskiy, Novogonskaya and Fedorov, 2022, pp. 335–336). This technology may well be adopted by Russian courts to exclude the risk of identification of a secret witness.

There is also a problem of people with disabilities, whose presence in the courtroom may cause them particular inconvenience. Safety of persons involved in the conduct of court sessions is an urgent problem. There are situations when the defendants attack the convoy, try to hide in the ventilation of the courthouse, attack the judges, try to bring cold and firearms into the courthouse. The metaverse in court will almost completely eliminate such risks (Kurbatova, 2023, pp. 116–117).

III.2. Ensuring Compliance with the Principles of Legal Proceedings in the Metaverse

Ensuring the principles of legal proceedings is one of the key problems before holding a meeting in virtual reality (Polyakova, Naumov and Minbaleev, 2022, pp. 140–141). According to the current legislation, the principles include: humanity; justice; legality; presumption of innocence; administration of justice only by the court; independence of judges; publicity; equality (adversarial); reasonable time of proceedings; the right to appeal.

When holding a meeting in the metaverse, the implementation of the principle of a reasonable period of legal proceedings is promising. The speed of consideration of cases will increase significantly, it will not take months to wait for witnesses, and it will be more accessible to gather everyone in virtual reality (Galyashina et al., 2023, pp. 77–79).

The experience of the courts of the Republic of Kazakhstan is interesting. They actively introduce high technologies in legal proceedings. The principle of extraterritorial jurisdiction, put into effect on 1 August 2022, deserves attention. According to this principle, the participants in the process have the right to sue not in the place of their geographical residence, but in any other court in Kazakhstan. Which court will the dispute fall into is determined by a robotic program that does not divide courts into districts and regions. As a result, the workload of judges should be balanced. In large cities, the workload of judges exceeds the workload in rural areas by tens of times. Given the automated distribution of cases to other regions of the Republic of Kazakhstan, judgments about the possible influence of local authorities and the business elite on the court should become a thing of the past. Labor and material resources will be used more efficiently (Akhmetzakirov, 2023, pp. 30–31). Projecting the experience of the Republic of Kazakhstan in introducing the principle of extraterritorial consideration of cases to Russian courts, its provision through the use of virtual reality in the consideration of cases looks promising. In this case, the judge receives not only information from another subject of the country, but also the possibility of holding meetings, excluding the possibility of pressure on the participants from interested parties.

However, will the court's consideration of the case in the metaverse be the realization of the principle of the administration of justice only by the court? An analysis of Art. 8 of the Code of Criminal Procedure and Art. 19 of the Constitution suggests that no one can be found guilty of committing a crime and subjected to criminal punishment except by a court verdict and in accordance with the procedure established by law. In the usual sense, a judge is a professional lawyer endowed with judicial power who administers justice in specially provided buildings, for example, district courts. In addition, there is a special procedure providing for rules of conduct in the courtroom. According to Art. 158 of the Code of Civil Procedure:

1. "When the judges enter the courtroom, all those present in the courtroom stand up. The announcement of the court's decision, as well as the announcement of the court's ruling that ends the case without making a decision, all those present in the courtroom listen standing.

2. The participants in the trial address the judges with the words 'Honorable Judge!', and they give their testimony and explanations standing up. A deviation from this rule may be allowed with the permission of the presiding judge.

3. The trial takes place in conditions that ensure proper order in the court hearing and the safety of the participants in the process."⁴

Based on this, it can be concluded that court hearings should be held in the courtroom, but this is not always the case. As previously noted, since 2021, it is allowed to hold online meetings using videoconferencing. At the same time, the Supreme Court did not see this as a violation of any principle of judicial proceedings. Technical guarantees of such a meeting are required, as well as verification of the participant's identity. In practice, online identification of an individual when considering cases in an arbitrazh court occurs by showing a passport to a webcam. Naturally, it is not easy to establish the authenticity of such a passport "by eye." However, even at a regular off-line meeting, the passport is checked by the clerk of the court session without special equipment.

⁴ The Civil Procedure Code of the Russian Federation. Available at: https://www.consultant.ru/document/cons_doc_LAW_39570/376ca11229e1a916doc3afe37ef292oba88f5a29/ [Accessed 23.02.2024]. (In Russ.).

When deciding on ensuring the principle of the administration of justice only by the court when using virtual reality as a platform for considering a case, but with the involvement of a professional judge for consideration on the merits, it is necessary to proceed from the general objectives of the proceedings (Komarov, 2023, pp. 157–158). For example, Art. 2 of the Civil Procedure Code of the Russian Federation sets the key task of “proper and timely consideration and resolution of civil cases.” This principle prevails over the rule of considering cases in the courthouse by following certain general technical procedures. If all participants agree to a remote format in virtual reality with the simultaneous solution of many problematic aspects (reasonable time, security of persons, trust in the judiciary, etc.), the tasks of the proceedings will be solved, which also implies ensuring its principles.

Of course, court sessions in the metaverse or any other virtual reality will face a serious problem of proving when considering and resolving criminal cases. As Lydia A. Voskobitova rightly notes, criminal justice is an activity carried out with the interaction of people, it primarily develops social technologies and forms a certain set of methods, means, techniques of such interaction, ensuring the achievement of the goals of this activity (Voskobitova, 2023, pp. 195–196).

Full-fledged interaction of people through virtual reality is still difficult to imagine. Legal proceedings are a lively, dynamic mechanism with the presence of certain tactical legal techniques used by the participating parties, which are implemented precisely in an offline meeting (Przhilenskiy, 2023, pp. 246–247). However, the metaverse will allow you to reconstruct the event of a crime, its individual episodes. Participants in criminal proceedings will be able to literally be in the apartment where the murder took place for a detailed immersion in what happened. This is especially true for courts with the participation of jurors. The problem of digital inequality and access to justice will be solved by creating special accredited premises for access to the court session in virtual reality. This can be compared with the presence of “My Documents” centers and multifunctional centers (MFC) on the territory of Russia. The participant in the proceedings will receive an ID number that includes an analysis of his profile (voice, behavioral characteristics, fingerprint, retinal scan) which allows him to form a unique digital

profile for identification by the court. In fact, this is the procedure of identification by the secretary of the court session by presenting the passport by the participant of the trial. However, *pasting* a physical passport for a fake person is not a difficult task for the criminal world (according to various sources, the cost varies from 100 to 150 thousand rubles). Creating a digital profile of a participant with biometrics and unique behavioral traits tied to it looks like a more reliable way. Artificial intelligence is able to recognize human emotions, which will allow to establish anxiety or fear of the participant in the case, which may indirectly mean the exercise of third-party's influence on him.

Only the judge will have the right to determine the possibility of holding a meeting in virtual reality with the mandatory consent of all participants and an analysis of the totality of conditions: the complexity of the case, the number of persons, security, digital inequality (Voskobitova and Przhilenskiy, 2022, pp. 116–117). If at least one of the participants opposes such a form, then the meeting should be held in the usual form. However, in this case, technologies cannot be fully used to reproduce the crime events that are possible when participants are immersed in virtual reality. There is also a fair question about fixing court sessions in the protocol and familiarization with it by participants who had not previously participated in the case (replacement of a lawyer, new witnesses, etc.). A phased experimental introduction of court sessions in virtual reality is possible for some categories of civil and administrative cases with the so-called “absence of a dispute about law,” in criminal cases of minor gravity if the accused admits to the charge.

IV. Conclusion

Holding a court session in virtual reality is technically a simple task — Colombia already has such experience. High technology allows you to participate in court proceedings from anywhere in the world. Virtual reality is actually an advanced version of the already existing video conferencing in court. Russian legislation does not provide for the possibility of holding a court session in virtual reality: questions arise about the implementation of the principles of judicial proceedings,

as well as ensuring the rights of participants. The principle of the administration of justice only by the court will not be violated, and the principle of a reasonable period of legal proceedings is ensured. Modern technical solutions allow for identity verification through biometric parameters. The metaverse is able to solve the problem of secret witnesses who are not physically present at ordinary trials. In addition, disabled people can get more opportunities when a court session is conducted in virtual reality. In any case, metaverses allow us to reach a new level of administration of justice, but the final decision on this should be made by a judge, guided not only by the characteristics of the case under consideration, but also by obtaining the consent of all participants.

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