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WORKSHOP ON INTELLECTUAL PROPERTY DATA IN 3D MODELS AND IMAGES

Geneva[1]**, May 14, 2025**

SUMMARY OF DISCUSSIONS

prepared by the International Bureau of WIPO

[1] *The headquarters of WIPO, 34, Chemin des Colombettes, Geneva (Room U. Uchtenhagen).*

Date: May 14, 2025
Venue: WIPO Headquarters, Geneva. and online via Zoom
Organized by: The Committee on WIPO Standards (CWS) of the World Intellectual Property Organization (WIPO)

Participants

The Workshop was attended by 104 participants (online and in person) representing 29 countries and five regional and international organizations (the African Intellectual Property Organization (OAPI), Eurasian Patent Organization (EAPO), European Patent Office (EPO), European Union Intellectual Property Office (EUIPO) and World Intellectual Property Organization (WIPO)).

List of Speakers

- **Lyaysan Galieva**, Project Manager of the Intersectoral Technology Transfer Centre, Innopolis University, Russian Federation
- **Violeta Ghetu**, Legal Officer, Policy and Legislative Advice Section, Department for Trademarks, Industrial Designs and Geographical Indications, WIPO
- **Jens Petter Sollie**, Business Architect, Norwegian Industrial Property Office, Norway
- **Germán Hernández**, Director of Art and Multimedia Design, Mr. Project S.A. de C.V., and Coordinator of the Mágico González Museum, National Sports Institute, El Salvador
- **Aleksei Lukashin**, Associate Professor, PhD., Institute of Computer Science and Cybersecurity, Peter the Great St. Petersburg Polytechnic University, Russian Federation
- **Vladimir Muliukha**, Director, Institute of Computer Science and Cybersecurity, Peter the Great St. Petersburg Polytechnic University, Russian Federation
- **Guido Moradei**, Confederacy of European Patent Information User Groups (CEPIUG)
- **Erjola Murataj,** Intellectual Property Information Officer, Standards Section, WIPO
- **Jumi Lee,** Senior Deputy Director, Korean Intellectual Property Office, Republic of Korea
- **Olga Fedoseeva**, Deputy Head, Division for Information Search Systems Design, Center for Design, Development and Maintenance of Applied Information Systems, Federal Institute of Industrial Property, Federal Service for Intellectual Property (Rospatent), Russian Federation
- **Andrey Sekretov**, Director, Integration Solutions Division, Information Technology Department, Eurasian Patent Organization (EAPO)

- **Bahodur Ismoilovich Nazarov**, Head, Department of Information and Patent Documentation, National Center for Patents and Information, Tajikistan

- **Carlos Valladares**, founder and CEO, Poliédrica Agency, El Salvador

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The Workshop program and presentations are available at:
https://www.wipo.int/meetings/en/details.jsp?meeting_id=86489

Introduction and opening remarks

The Workshop on Intellectual Property Data in Three-dimensional (3D) Models and Images drew 3D experts, intellectual property (IP) officials, user group representatives, IP data specialists, academics and data specialists from around the world to discuss the use of 3D models and images in IP.

Kenichiro Natsume, Assistant Director General, Infrastructure and Platforms Sector, WIPO, said that the IP system had to evolve in step with rapid advances in technology and innovation and that 3D models and images had great potential to improve IP examination and publication procedures, facilitate data exchange and represent complex innovations more accurately.

WIPO Standard ST.91 provided a framework for the standardized use and exchange of digital 3D models and images and needed to be implemented. Harmonization of practices through WIPO Standards was key to ensuring interoperability among IP offices, improving the quality of IP data and reducing the administrative burden for applicants and offices alike.

Session 1: 3D technologies and intellectual property

The session was led by Kunihiko Fushimi, Director, International Classifications and Standards Division, WIPO. He emphasized the need for harmonized standards and practical solutions to support their effective use.

3D technologies used in the life cycle of intellectual property

The keynote speaker, Lyaysan Galieva, Project Manager, Intersectoral Technology Transfer Centre, Innopolis University, Russian Federation, said that the University was unique, functioning also as a software developer and research and development (R&D) center specialized in information technology (IT), artificial intelligence (AI) and robotics. An integral part of the innovation ecosystem in the Russian Federation, it operated as a federal technology transfer center, had more than 337 industry partners, and had some 500 projects to its name.

The university's comprehensive IP strategy included protection of software algorithms, source code, user interfaces and technical devices through inventions, copyright, industrial designs and trademarks. Innopolis University was pioneering the use of 3D models in IP applications, particularly in the field of patents and industrial design. It had been the first institution in the Russian Federation to file an industrial design application using a 3D model with the Eurasian Patent Office.

Using 3D models improved clarity, facilitated examination procedures and strengthened the overall protection of the IP.

Examples of patent products developed at the university included educational tools, software interfaces and technical devices.

There was potential for using 3D models in metaverses, gaming, digital urban infrastructure, autonomous systems and biotechnology. The ability to protect visual and interactive designs using 3D models would be crucial in those rapidly evolving fields.

Because 3D models were already developed during product design, filing applications for them was straightforward. Nonetheless, the application process and standardization could be further improved.

Participants acknowledged the growing role played by universities in innovation and the importance of 3D model integration in modern IP systems.

3D models and images in IP rights protection: challenges and opportunities

Hague Working Group: design representation formats

Violeta Ghetu, Legal Officer, Policy and Legislative Advice Section, Department for Trademarks, Industrial Designs and Geographical Indications, WIPO, reviewing the Hague Working Group's work on the inclusion of new formats, especially 3D models and images, in the representation of industrial designs, said that the issue had first been discussed in 2012. Animated and dynamic designs had been examined but substantive work had been deemed premature at that time.

Discussions on alternative visual formats continued in other WIPO bodies, such as the Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications (SCT) and the Committee on WIPO Standards (CWS). They had led to the revision of relevant WIPO standards, notably ST.88 and ST.91, and the conduct of surveys.

In 2024, the Hague Working Group launched a questionnaire on current practices, legal frameworks and technical challenges regarding 2D and 3D image and video formats, future plans and related legal implications. According to preliminary results, 44 per cent of respondents either already accepted or planned to accept 3D files.

The survey showed that key challenges included file size limitations, technical interoperability and legal interpretation. In some jurisdictions, 3D files defined the scope of protection; in others they served as illustrative references only and 2D images defined the scope of protection.

James Cranwell-Ward, IT lead for the Hague System, said that, although technology could support 3D files, integration would depend on legal and policy decisions. The technical basis was being laid for the 2026-2027 biennium. Future adoption would involve packaging 3D files with accompanying data, likely using compressed formats in line with emerging WIPO packaging standards.

Participants emphasized the importance of establishing whether 3D models were legally determinative or merely supplementary. Hiroshi Okutomi, Head of the Hague Legal Affairs Section at WIPO, said that each contracting party retained authority over the legal effect of design representations under their national law.

The findings of the survey, which remains open, will inform the decisions taken by the Working Group at its 14th session in October 2025.

3D formats: practical challenges for the Norwegian Industrial Property Office and users

Jens Petter Sollie, Business Architect, Norwegian Industrial Property Office (NIPO), focusing on practical aspects of the use of 3D formats in IP processes, said that NIPO accepted 3D files for trademarks because there was no legal barrier to doing so. It recommended, however, submitting multiple 2D views for clarity. It also accepted 3D files, alongside 2D images, for designs but not for patents. The Office validated the file type by checking the MIME type and performed a security scan during upload, mainly for risky formats such as 3D PDFs, which could pose a problem because of embedded scripts.

Publishing 3D content remained difficult, as files must be downloaded and opened in external software. The Office hoped to implement a browser-based viewer but faced obstacles with format compatibility and file size. Videos, like moving trademarks, were easier to display and were embedded directly in the Gazette and online services.

With a few exceptions, accepted formats were based on ST.91. The Office took a pragmatic approach, in particular with trademarks, for which amendments to the law had facilitated the acceptance of 3D formats. The number of accepted file types should be reduced and international collaboration on shared viewer tools would help to improve access and standardization.

Impact of 3D technologies on innovation and creation

Germán Hernández, Director of Art and Multimedia Design at Mr. Project S.A. de C.V., and Coordinator of the Mágico González Museum for the National Sports Institute, El Salvador, said that 3D technology enabled small companies to create meaningful user experiences despite limited resources.

Unlike with traditional model-making, which could take decades, 3D technology enabled instant creation. Technology was important in industries such as fashion, architecture and medicine, where IP registration was needed early in order to protect ideas throughout the creative process. In immersive projects such as museum exhibits and augmented reality used in real estate, 3D enriched the user experience.

Technologies for 3D-to-3D search and comparison

System for comparing 3D models in patent expertise: algorithms for and approaches to processing 3D models

Aleksei Lukashin, Associate Professor, PhD., Institute of Computer Science and Cybersecurity, Peter the Great St. Petersburg Polytechnic University, Russian Federation, said that the Institute had begun a project in 2018 to develop a 3D model comparison and search system for the Federal Service for Intellectual Property (Rospatent). At that time, the focus had been on research into algorithms to compare 3D models.

The system, which had been launched in 2021 following regulatory changes the previous year that made it possible to use 3D models in applications to register industrial designs, could accept, visualize and search 3D models across various application types. It converted multiple 3D formats into intermediate forms, enabling experts to rotate, annotate and search models by similarity, including through partial model searches. The main search method

used descriptors, numerical “fingerprints” summarizing shape characteristics, to compare models efficiently. The system also supported the use of descriptors as shareable “fingerprints” for exchanging data between patent offices without revealing full models. It did not support search for 2D images.

Challenges, such as varying model formats, scale differences, positioning and complex multi-part models were being addressed with a combination of mathematical histograms and machine learning: neural networks trained on expert-labeled data to improve semantic similarity detection beyond pure mathematics. Further research would be needed to overcome the lack of standardized metrics for search quality in 3D models, and a common approach would be needed to handle multi-part models, which complicated searches.

3D models: a useful tool for understanding IP more quickly and correctly

Guido Moradei, representing the Confederacy of European Patent Information User Groups (CEPIUG), said that 3D models played an increasingly important role with regard to IP rights, especially patents, designs and trademarks. Such models offer advanced means to represent inventions and designs, improving understanding beyond what was possible with traditional 2D drawings.

Legally, drawings helped to interpret patent claims but did not themselves define the scope of protection. Technical details such as movement were better transmitted using 3D models than with 2D images. The new European Union design regulation supported 3D representations and animations, including protection for complex or non-physical designs and 3D printing software.

In trademarks, 3D and motion marks were recognized, allowing dynamic and multimedia representations. Interactive views provided with 3D models enhanced clarity and standards should be established so that the same 3D files could be used across jurisdictions. Public access to 3D IP data should be enhanced through easy-to-use software. That would help researchers and professionals to improve their search practices and understanding of IP.

Session 2: Best practices on processing of 3D models and images

WIPO Standard ST.91: Recommendations on Digital Three-dimensional (3D) Models and 3D Images

Erjola Murataj, Intellectual Property Information Officer, Standards Section, WIPO, said that WIPO Standard ST.91 provided guidelines for handling digital 3D models and images relating to IP. Adopted in 2021 and revised in 2024, its aim was to ensure compatibility and the smooth exchange of 3D IP data between different offices and stakeholders. By standardizing formats and procedures, it simplified the filing, processing and publication of 3D design applications across multiple jurisdictions.

ST.91 contained recommendations on specific file formats like STEP, IGES, U3D, OBJ and STL for different types of IP applications, with a suggested maximum file size of 50 megabytes, and advice to IP offices to publish their preferred formats and processing guidelines for the sake of transparency. It also addressed how to handle conversions between 3D and 2D images to maintain compatibility with existing systems and ensure clear representation during processing and publication.

A survey conducted by WIPO in 2024 had shown that the use of 3D models and images by IP offices remained limited, with only a minority having adopted ST.91 fully. Some IP offices published 3D PDFs and some others accepted 3D files but relied on 2D images for public records. The survey highlighted the need for broader adoption of ST.91 in order to improve efficiency, accuracy and collaboration in IP rights management.

It was essential to promote the use of 3D images and for offices to implement ST.91. The dedicated CWS3D Task Force was working to update ST.91 to include new features like 3D search. Collaboration and sharing of best practices among IP offices would be key to advancing those efforts and supporting applicants who wished to file their applications using 3D formats.

Processing 3D models: practices at the Korean Intellectual Property Office

Jumi Lee, Senior Deputy Director, Korean Intellectual Property Office (KIPO), Republic of Korea, said that the Office had developed a 3D design application system to simplify the filing process by allowing applicants to submit original 3D model files instead of converting them into 2D drawings. Introduced in 2010, the system supported widely used file formats aligned with WIPO standards and let examiners review designs using specialized 3D viewer software. The same 3D files were published interactively, improving accuracy and efficiency throughout the application process.

Examiners used the CAD viewer to examine 3D models in detail, reducing the errors commonly associated with 2D drawings. Applicants could preview their submissions to ensure quality. For searches, 2D snapshots extracted from the 3D models were used, and full 3D designs remained accessible for detailed review.

KIPO embedded 3D designs directly into published documents, allowing interactive viewing. Recent legal updates permitted switching between 2D and 3D drawings, offering greater flexibility. KIPO maintained strict control over the use and sharing of sensitive 3D data. Compatible viewers and clear data protocols were needed for international filings, especially through the Hague System.

Best practices for processing 3D models and images

Olga Fedoseeva, Deputy Head, Division for Information Search Systems Design, Center for Design, Development and Maintenance of Applied Information Systems, Federal Institute of Industrial Property, Federal Service for Intellectual Property (Rospatent), Russian Federation, said that modern digital 3D modeling tools, such as CAD systems, allowed for faster and more precise design, testing and visualization, thereby significantly improving product development processes.

Since 2021, Rospatent had accepted 3D models as part of application materials for trademarks, industrial designs, patents and utility models. In line with ST.91, accepted formats included STEP, STL, OBJ and U3D. Rospatent had developed an internal 3D information system featuring AI-driven 3D-to-3D search capabilities and generating 3D PDFs for official publication. The system integrated with existing application workflows for different IP rights.

Several challenges had arisen during implementation, including the need to align digital processes with national law, ensure long-term preservation and accessibility of 3D files, and protect against unauthorized use of published models. Selecting standardized, open and interoperable file formats to facilitate domestic and international processing was critical.

Industry feedback had shown growing interest among individual creators and small-scale entrepreneurs in using 3D models. The use of such models aided examiners by improving their understanding of inventions, reducing the number of requests for additional information and offering better visualization for infringement cases.

International cooperation and sharing experiences with offices like the Eurasian Patent Office were key to harmonizing standards and improving global IP information systems. Rospatent would continue to enhance AI-powered search tools, ensure compatibility between 2D and 3D data and invest in digital infrastructure to accommodate the increasing use of 3D technology in IP protection.

Integrating 3D models into IP application processes supported innovation, improved examination efficiency and aligned IP offices with digital design trends worldwide.

Implementation of WIPO Standard ST.91 by the Eurasian Patent Organization

Andrey Sekretov, Director, Integration Solutions Division, Information Technology Department, Eurasian Patent Office, EAPO, said that the Office had been accepting 3D models for inventions and industrial designs, alongside mandatory 2D images, since November 2022. Applicants typically submitted 3D models electronically, with no additional cost or complexity.

Initially, the Office had accepted only the STEP format, but three other formats were now also supported: U3D, OBJ and STL. The Office had adapted regulations to accommodate 3D filings, modified its online filing system and developed technology to convert 3D files into secure 3D PDFs. Publication platforms had been upgraded to display 3D models, which were marked with a special icon for easy identification.

The filing workflow involved converting submitted 3D files into 3D PDFs for examination and publication, with quality checks performed before release. There was no search filter for 3D models but adding one was technically feasible.

The Office had plans to track 3D standard developments and improve 3D data exchange and search capabilities. It was assisting national patent offices in member States to adopt 3D technologies and, to that end, an internal online tool had been created to convert 3D files into 3D PDFs with appropriate national identifiers.

Submission of an application containing 3D format to the Patent Office of Tajikistan

Bahodur Ismoilovich Nazarov, Head, Department of Information and Patent Documentation, National Center for Patents and Information, Tajikistan, said that the Tajik Patent Office had been working with EAPO to implement 3D technology and that applicants could now submit 3D models in online applications to register industrial designs, trademarks and inventions. The Office had received its first 3D application, but challenges remained, in particular with regard to updating legislation and digital systems to fully support WIPO standards. Continued cooperation with EAPO would be key to further progress.

Best practices in 3D projects in the FABLAT network

Carlos Valladares, founder and CEO, Poliédrica Agency, El Salvador, said that the Fab Lab Network had been launched in 2002 at the Massachusetts Institute of Technology (MIT) as a global initiative to promote fabrication laboratories. He was an innovation specialist and a cofounder of the Latin American Network of Fab Labs (FABLAT), which supported rapid

prototyping and digital fabrication skills, especially among vulnerable young people who lacked access to formal education.

The aim of the Fab Lab movement was to empower people through hands-on learning and maker culture, focusing on industry 5.0, which envisioned a blend of human talent and advanced machines. The aim of its initiative was to develop skills through programs like Fab Academy, leading to creations such as wearable Internet of Things (IoT) sensors, which combined electronics and 3D printing, to address local issues like climate change and pollution. There was a need to connect diverse communities through technology, with a focus on inclusion beyond traditional commercial industries.

Closing remarks

Mr. Fushimi said that the Workshop had confirmed that 3D models and images were a key emerging issue for the IP community. It was important to air a broad range of views early on, such as those of IP applicants, information users and offices on opportunities and challenges, and those of global IP service providers and technical experts on IP and the broader technological context, including with regard to 3D search issues. The Workshop, had, therefore, been very useful for everyone involved and provided a good basis for future development.

In terms of standardization, the WIPO 3D Task Force's welcome efforts in preparing ST.91 had left a solid foundation on which to build. Further international collaboration to advance the matter and meet industry needs was to be encouraged.

Key points discussed:

- **WIPO Standard ST.91**
  Participants underscored the role of ST.91 in enabling the broad integration of 3D models and images into global IP data systems, paving the way for more dynamic and comprehensive digital representations.

- **Progress in the Hague System**
  The Hague Working Group was working to incorporate 3D models into industrial design filings. Several national and regional IP offices are already adopting or preparing to adopt 3D-compatible formats.

- **Technical and interoperability challenges**
  Participants highlighted persistent technical barriers, particularly in terms of interoperability and the lack of unified 3D file format standards. Addressing those issues was essential for seamless global implementation.

- **Optimal publication methods for 3D content**
  Determining the best practices for publishing 3D models involves balancing accessibility with usability and security. Options include embedded web viewers, downloadable files or hybrid approaches, each with trade-offs to consider.

- **Public access to and filtering of 3D records**
  Clear policies and technical tools are needed to manage public access, ensuring that sensitive information is filtered appropriately while promoting transparency and the usability of 3D IP records.

- **Potential for 3D-to-3D search**
  Advances in 3D search technology promise improvements that would enable direct 3D model comparisons and searches online. AI-powered tools for 3D model comparison and search are emerging as transformative solutions. They significantly improve examination speed, accuracy and consistency across IP rights.

- **Practical implementation and use cases**
  The IP offices of Norway, the Republic of Korea, the Russian Federation and EAPO shared practical experiences demonstrating the growing acceptance and utility of 3D models across trademark, industrial design and patent filings supported by ST.91.

- **Developing legal and digital infrastructure**
  There is a pressing need to modernize legal frameworks and digital infrastructure to support the end-to-end life cycle of 3D models and images in IP from filing and publication to examination and enforcement.

- **Enhanced user engagement through 3D visualization**
  Interactive 3D viewers can improve comprehension of complex designs, benefiting examiners and users. However, challenges remain in ensuring robust, browser-based visualization and long-term accessibility.

- **Accelerating innovation and creative output**
  3D technologies are driving faster product development and boosting innovation in design and the creative industries. Early protection of 3D-based creations is becoming increasingly important for businesses and inventors.

- **Importance of international collaboration**
  International cooperation and global standardization are vital to achieving interoperability, reducing fragmentation and enabling efficient cross-border processing of 3D IP assets.

Next steps

- **Promote and implement ST.91**
  Continue to advocate for the broad adoption and consistent application of ST.91 in order to facilitate the seamless integration of 3D models into IP filings worldwide.

- **Revise ST.91 to include 3D search functionality**
  Revise ST.91 to incorporate 3D-to-3D search capabilities in order to take those technological advances into account and provide clear guidelines for IPOs.

- **Intensify international collaboration and standardization efforts**
  Deepen cooperation among IP offices, standard-setting organizations and industry stakeholders in order to achieve greater harmonization of legal, technical and procedural frameworks for handling 3D content across jurisdictions.

- **Advance deliberations at the 14th session of the Hague Working Group**
  Focus forthcoming discussions on addressing technical challenges and legal considerations relating to 3D model implementation, with a view to ensuring effective integration in the Hague System and promoting consistent application.