Europäisches Patentamt
European Patent Office
Office européen des brevets

50 years 1973 / 2023
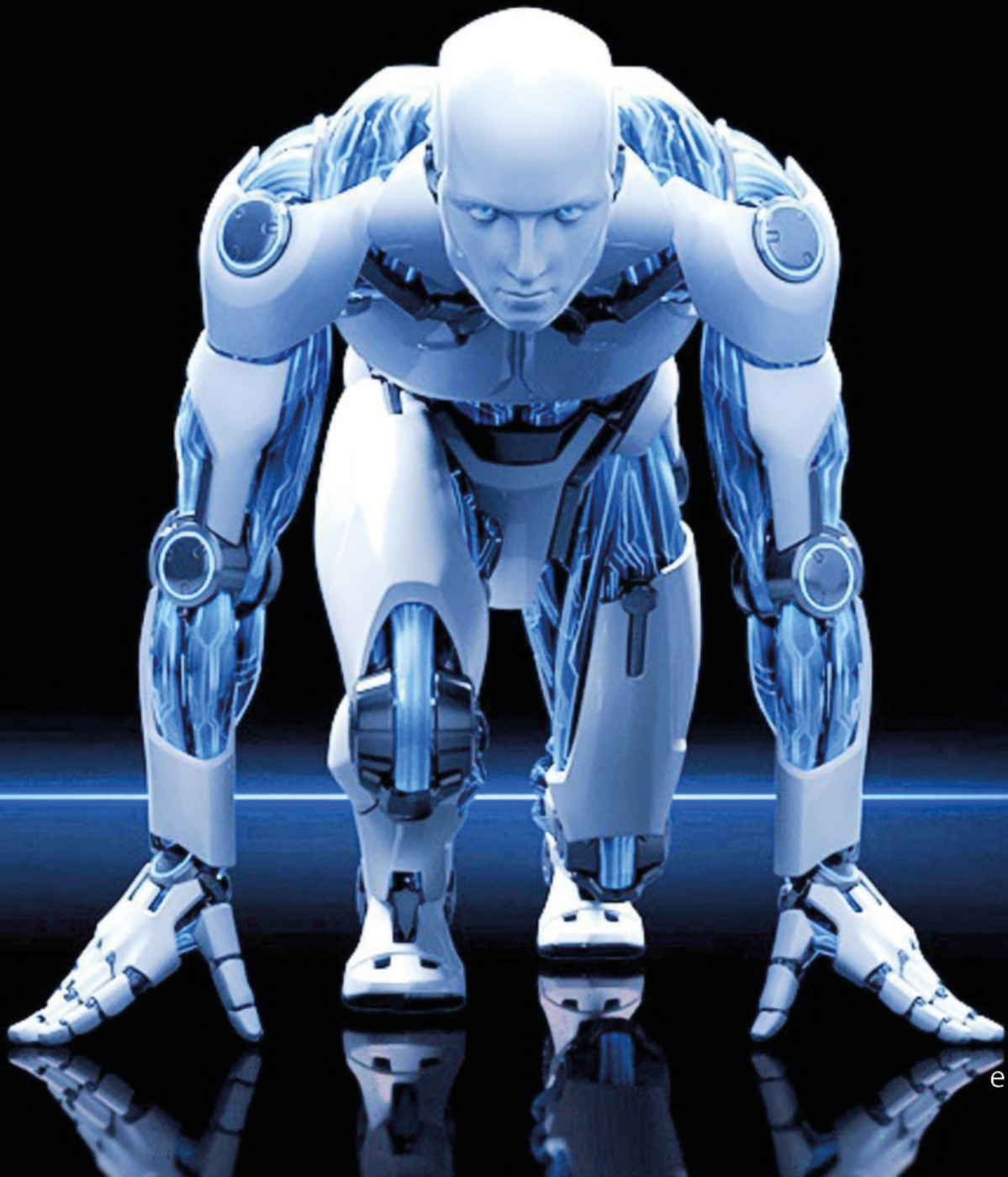EUROPEAN PATENT CONVENTION

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# IT Report 2022

Annex to the Annual Review

# Executive summary

The EPO's digital transformation gathered pace in the unprecedented circumstances of 2020 and 2021. This was thanks to a pragmatic approach to the plans laid out in Strategic Plan 2023 (SP2023), as well as technological advances. The pandemic forced us to develop new tools and solutions overnight. During the past two years, we have evolved towards proactively managing the situation, accelerating certain initiatives, and leveraging the opportunities offered by technology to support a remote workforce.

In 2022 more than 100 projects progressed at full speed under SP2023. To ensure that the entire process remains a shared journey, "pipelines" have been used to communicate the key deliverables. The accelerated delivery pace became our cruising speed. Our progress was built on a robust foundation comprising cross-functional teams, extensive user involvement in projects, agile development, use of minimum viable products and strong support in terms of business change management.

A "Processes digitalised" balanced scorecard (BSC) top-level key performance indicator confirmed the impact and progress of our activities. Thanks to the rapid acceleration of digital transformation, this indicator has developed very positively, reaching a value of 85.9% and exceeding the target set for the year (81%).

A milestone was reached early in the year when the mainframe was decommissioned. This enabled the completion of the migration of our business applications to the new data centre and allowed us to focus on improving the performance of our IT systems. The effort, led by a dedicated taskforce, resulted in achieving 97.04% availability at the end of 2022 and meeting the excellence target set in the BSC (96.5%).

The IT security systems at the EPO were confirmed to be world-class by the award of ISO 27001 certification in information security management for the first time in 2022. This was a significant achievement for the EPO and reinforced the trust placed in us.

We continued to improve our core business systems by enhancing the search and classification capabilities of ANSERA. This will ensure that ANSERA becomes the central hub for search- and classification-related activities, and enable the sunset period of several legacy tools, including EPOQUE. Another milestone was reached with the introduction of the new digital file repository (DFR), which is the backbone of our procedural information, including annotations. In preparation for the launch of the Unitary Patent we adjusted and tested data exchanges and other changes to our systems.

In 2022 we further enhanced our web services. MyEPO Portfolio was rolled out after a successful pilot, paving the way to make it the access point of choice for parties to work on their proceedings before the EPO. It complements the range of online services offered to our customers, including Online Filing 2.0 and Central Fee Payment. We also improved the EPO's customer service capabilities by deploying state-of-the-art tools to support an end-to-end process for resolving user enquiries.

We are on a journey to digitalise corporate services as well as the core business process. In 2022, work continued on simplifying and digitalising HR processes;

on the enhancement of communication and collaboration tools including the launch of the revamped intranet; and on the modernisation of EPO audio and videoconferencing systems in the context of hybrid and online meetings, both internal and external. Finally, as the new ways of working guidelines entered into force for the pilot period, we provided new tools designed to help staff organise their flexible working schedules and book offices when they wish to work in our buildings.

By the end of 2022 the IT co-operation programme had substantially delivered on its planned scope. Iterative development and pilots with partner national patent offices (NPOs) resulted in the release of mature products. We started to support the practical implementation of projects in participating member state NPOs, assisted by knowledge-building and technical support activities.

Over the course of our digital transformation journey, it has become apparent that artificial intelligence (AI) is a gamechanger. Tangible results have already been achieved in the areas of pre-classification, classification and search, where new tools are embedded with AI. We will continue to focus on enabling greater benefits of digital transformation of tools and workflows in examination in 2023 and beyond.

# Contents

# 1.    Using IT to build an engaged, knowledgeable and collaborative organisation

In 2022 our efforts focused on adapting the working environment to post-pandemic conditions and the new ways of working. We ensured that our tools continue to support efficient communication and collaboration between colleagues independently of their working location. We also introduced new tools to support the hybrid working model and make efficient use of flexible working environments.

Staff benefited from more advanced, upgraded IT solutions, which boost efficiency and quality in areas such as office applications, human resources, finance and procurement. Meanwhile, we also made improvements to further consolidate the process of digital transformation that is already advanced in our core business.

We focused on supporting our users on the digital transformation journey by providing a wide range of training opportunities, written and recorded learning materials as well as tool demonstrations during "unboxing events". We invited early adopters to try new features and provide their feedback to shape the future development of fit-for-purpose solutions. We involved champions in advocating the new solutions by sharing their practical experience. With the steady wave of the legacy tool decommissioning, we particularly focused on late adopters, to ensure that they are adequately supported to make a successful transition. The digital transformation journey is our common journey, and nobody is left behind.

Throughout the pandemic, IT teams have shown tremendous resilience and pride in their work, enabling the whole organisation to continue working and delivering. A comparison of the results for the IT units between the staff surveys of 2019 and 2022 shows improvements in 11 out of the 13 categories, indicating sustainable staff engagement. Staff pointed out that agile culture in particular constitutes a strength of our IT organisation, creating a solid foundation for high motivation and steady performance.

*Agile culture drives IT staff engagement*

# 2.    Simplifying and modernising IT systems

The EPO continued its digital transformation journey in 2022, releasing state-of-the-art tools and platforms, while decommissioning obsolete legacy solutions.

## 2.1    Delivering PGP and search

Keeping up the momentum towards full digitalisation of the patent granting process (PGP), we continued to achieve significant advances in our operational tools and processes.

A key milestone was reached in 2022 with the digitalisation of our back-end patent granting process via the new digital file repository (DFR), a digital archive storing all the relevant documents of a file and a tool allowing collaboration and sharing of intellectual work. This gives everyone access to a single source of data and avoids cumbersome transfers between systems. DFR integrates fully with the internal Patent Workbench – the central hub for procedural workflows – as well as with the external user area, MyEPO Portfolio, and other tools. It includes

*Rollout of the digital file repository to all business units*

new dossier-viewer capabilities and systematic optical character recognition (OCR) of incoming documents and allows for the creation of opposition and appeal folders. The continued evolution of the DFR and Patent Workbench brings opportunities for formalities officers and examiners to work more effectively and efficiently together.

After extensive internal consultation, a substantial number of improvements in the area of ergonomics and performance enabled us to smoothly decommission the legacy digital archive tool (DI+) in our core business. Towards the end of the year, DFR was rolled out fully to all other areas of the organisation, including the Boards of Appeal, which will allow for the full decommissioning of the legacy tool in the beginning of 2023.

Figure 1 – Digital file repository
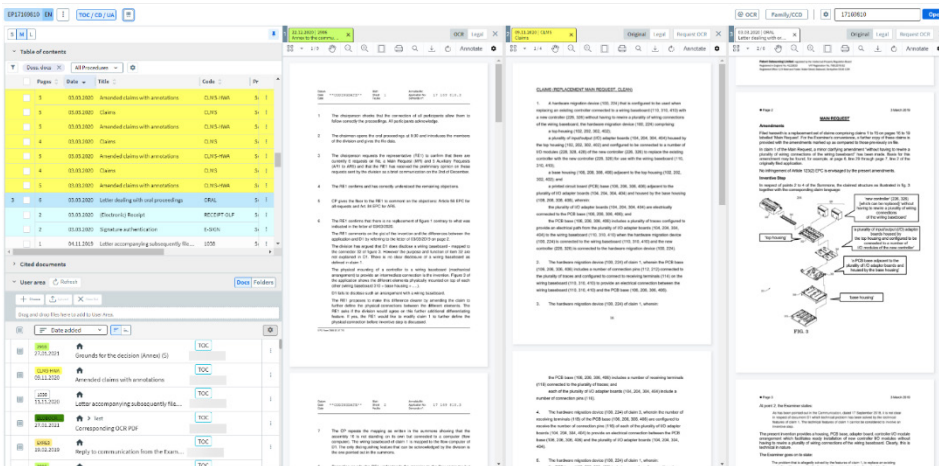


Source: EPO

To further support the mobility of staff and enable access to digital files, Aly has been adapted and made available to members of the Boards of Appeal. Aly is a mobile application intended for use before and during oral proceedings. It allows users to access electronic files and citations, annotate documents and consult legal texts from a single interface.

As of 2022, the Patent Workbench incorporates almost all internal file-related workflows, including the circulation of files from PGP teams to the EPO's legal teams. We have gradually integrated workload-management functions in the Patent Workbench, including the first release of the digital file allocation (DFA). File allocation is a key element of the work in operations, since it influences workload management and supports the timely treatment of allocation tasks. From another point of view, file allocation is also a tool used for supporting learning, coaching and training in operational units and teams.

First release of digital file allocation system

The first release of DFA contains the basic functionalities for allowing allocation to be performed from the Patent Workbench in a "push" form and the performance of a facilitated technical acceptance. This will replace the digital file marketplace, reducing complexity.

In 2022 the integration of digital exchanges with WIPO in our PGP process started with the PCT Receiving Office and international search reports. The new process moves away from image manipulation towards structured data for ex-officio corrections in the PCT-RO phase. The solution is integrated with Patent

Workbench, relies on a modern platform and is ready to use the ePCT application programming interfaces (APIs). We addressed the six main PCT data flows which altogether represent two thirds of the total volume of PCT data exchanged between the EPO and WIPO.

The digitalisation and review of the publications processes and services continued with the insourcing of the provision of the bulk datasets of our prior art to the outside world, reducing risks and costs for the EPO. We completely rebuilt our old bulk data distribution services platform from a legacy system to a new cloud-based platform to deliver a new experience to our external users.

Concerning the Unitary Patent, we performed end-to-end user testing of new tools with a focus on their interoperability and implemented necessary changes to the existing tools, such as the extension of search tools to detect national prior rights as of 1 September 2022 and the adaptation of Online Filing 2.0 to receive early requests for unitary effect as well as delay grant requests as of 1 January 2023.

To further support the digital transformation in the EPO's patent grant procedure, two packages of legal changes were adopted by the Administrative Council in October 2022.

Within the scope of the first package, the power to decide on presentation requirements for documents is delegated to the President and a first decision of the President restates these requirements. These changes will ensure more flexibility to adapt the presentation requirements as digitalisation processes evolve. Furthermore, the EPO may make documents cited in search reports available to the public via digital services instead of transmitting them. This will reduce paper consumption and supports full availability of all citation types, including multimedia citations. The technical solution to implement the service is under development.

The second package covering a new regime for notification and the calculation of time limits enters into force in November 2023. The "10-day rule" will be abolished and documents will be deemed to be notified on the date they bear. Shifting the focus of the notification system from the paper to the digital world, where electronic documents are delivered on the same day, is key for the EPO's digital transformation.

In recent years, we have focused efforts in the core business area on ANSERA, our main tool for all search work, which led to improvements to its stability, performance of search algorithms, visualisation of results, user interface and overall reliability. A new ANSERA performance dashboard has been created to provide visualised metrics for selected components to track performance by capturing load and response times.

Improvements in performance and stability of ANSERA leading to greater resilience of the tool

The ANSERA viewer received a series of performance improvements and saw the implementation of functions helpful in the final-search stage, such as document-specific highlighting and location of text snippets. A new search navigation improving the ergonomics and usability of ANSERA is a big step forward. All search actions taken will be listed in a panel and examiners can easily switch between the respective document sets and continue from the last viewed position.

Figure 2 – ANSERA search results view
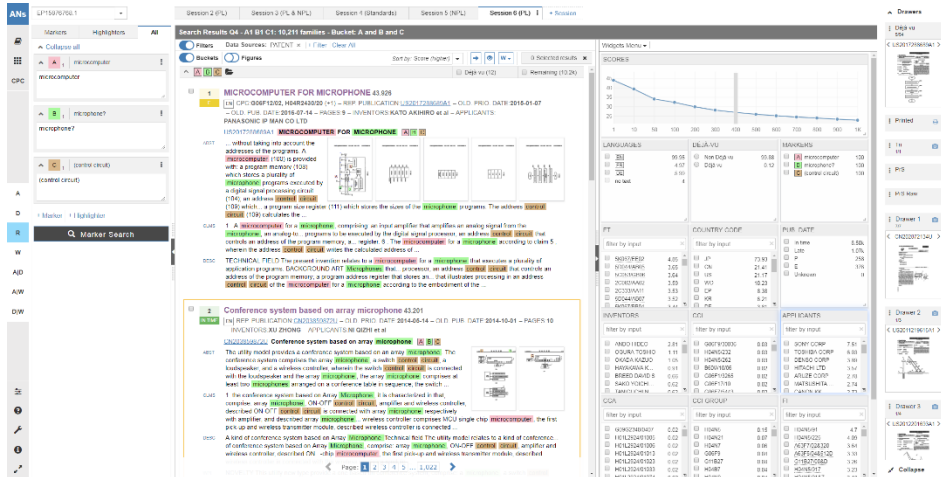


Source: EPO

The pre-search functionality has also been enhanced, allowing more accurate trimming and increasing examiners' efficiency. A new internal machine-translation engine is capable of translating unpublished documents from several languages into English, improving pre-search results.

The concept manager database has been integrated into the query builder, allowing for an efficient reuse of existing search concepts by sharing the content of search-concept libraries and leading to a closer collaboration between examiners.

A new top-up tool, ANSERA TopUp (ATopUp), has been introduced. Regular top-up searches for European and PCT applications at the end of examination constitute an essential element in the quality assurance of the EPO grant procedure. Over time, our top-up search tools have evolved to better meet the needs of examiners, to take advantage of new technologies and thus to become more efficient. As our most advanced top-up tool, ATopUp offers ranked results and filtering capabilities from ANSERA itself, as well as enabling examiners to detect earlier national rights prior to grant which are of the interest of the applicants when finalising the scope of protection of their European patent, particularly in the case of a Unitary Patent. The release of ATopUp paves the way to make it our single top-up search tool and to the decommissioning of our legacy top-up tools in early 2023.

*ANSERA TopUp enables examiners to detect earlier national rights prior to grant*

Finally, we introduced EPyQUE as the future preparation platform, connected to ANSERA. EPyQUE allows access to all prior art, search services and knowledge bases, enabling users to explore prior art and other data in a rich and collaborative way. These functionalities render EPyQUE suitable to replace preparations for personal search and data analytics. With this achievement, an important strength of the legacy tools has not only been recreated but taken to a new level, as it has never before been this easy to be creative and to explore new ideas.

Making ANSERA the central hub for search- and classification-related activities will enable us to enter a transitional sunset period for EPOQUE prior to its final decommissioning in 2024.

## 2.2    Upgrading online tools

Engagement with external stakeholders and the satisfaction of users of the EPO's products and services are central to our success and commitment to excellence.

The EPO regularly gathers feedback from users of these services through a number of channels, including user days, surveys, the customer support page, direct meetings with EPO key account managers, and consultation with advisory committees like the epi Online Communications Committee and the SACEPO Working Party on the e-Patent Process, which includes members from industry (nominated by BusinessEurope) and the patent attorney profession (nominated by epi). We are committed to making early prototypes available to our users and to transparently discuss their feedback and practical experiences.

On 1 June 2022, after a seven-month pilot phase involving over 180 external participants, MyEPO Portfolio was launched. Formerly referred to as the "user area", MyEPO Portfolio provides users with a fresh approach to working on their applications and patents. It allows them to securely access their EPO Mailbox, view their application portfolio and documents, perform various tasks and file procedural requests in response to communications from the EPO, all in one place. As part of creating a better user experience, real-time quality checks reduce the likelihood of errors in submissions.

*MyEPO Portfolio made publicly available after a pilot with a restricted group of users*

The new service is fully integrated with our new PGP toolset, including the Patent Workbench and the digital file repository. MyEPO Portfolio is intended to eventually replace the existing Mailbox and My Files services as well as the Administration facility.

Uptake of the EPO Mailbox for receiving communications continued in 2022, with key account managers helping applicants and representatives get started. With almost 1 300 mailboxes and more than 6 100 attorneys using them, the Mailbox has become a trusted platform for electronic communications from the EPO.

Figure 3 – MyEPO Portfolio user interface
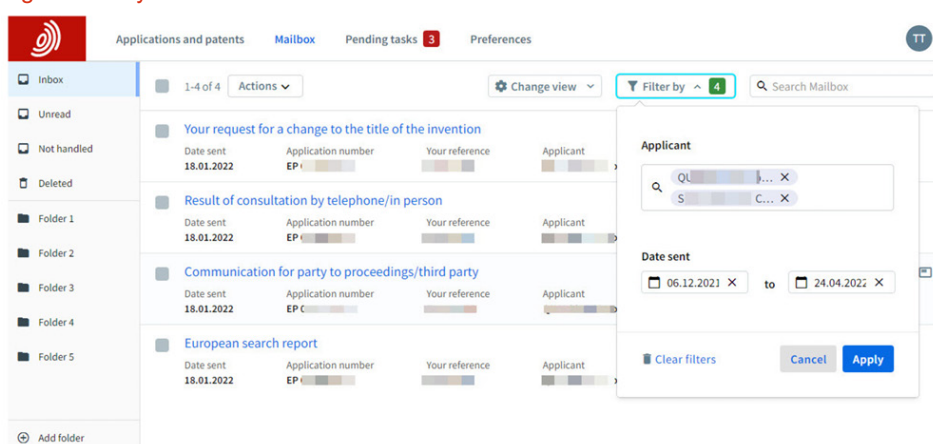


Source: EPO

A second pilot of MyEPO Portfolio started in November 2022. During this phase we will interact with over 100 pilot participants to trial and deliver major new features by June 2023. These include electronic PCT communications for international agents and non-European applicants, additional options to reply to communications from the EPO, self-service management of representative and

association data, and a first new B2B (business-to-business) technical API so users can exchange data between their IP management systems and MyEPO Portfolio.

In response to expectations of our external users, a digital patent grant certificate was introduced, upgrading the certificate to a modern and more appealing design. This new design reflects the EPO's commitment to digitalisation, modernisation, innovation and sustainability. It will also reinforce the link between the certificate and the patent, by indicating the title of the invention and the date of publication of the mention of the grant in the European Patent Bulletin. The certificate delivery method has also been improved, as proprietors or representatives can quickly and securely download grant certificates from their Mailbox.

Online Filing 2.0 is a new web-based filing service launched in 2021. It incorporates and improves the features of CMS, covers all procedures before the EPO, including procedures before the Boards of Appeal, and offers a more user-friendly interface. Following the transitional period when the two tools ran in parallel, CMS was decommissioned on 1 January 2022, contributing to optimising the toolset offered to our external customers.

On 10 September 2022, the final release of Central Fee Payment was successfully deployed and the legacy Online Fee Payment service and Multipay tool were decommissioned. Central Fee Payment is based on a standard e-commerce platform. The user interface is thus similar to commercial web shops, making the usage highly intuitive.

With Central Fee Payment all possible payment methods – credit card, bank transfer and deposit account – are available via a single platform. It offers deposit account management, automatic debiting management and a possibility to claim refunds. In addition to the features already known from the legacy tool, the new platform offers some new services such as the possibility to display the fees due for any application, a direct link to the patent register, instant payment confirmation and a history of transactions and revocations. It is also future-ready with all features required for the Unitary Patent.

Consolidation of payment services and new services under the Central Fee Payment portal

Another key tool for interacting with our users is the EPO's website. During 2022, work continued on developing responsive features for the new epo.org website to better support communication and interaction between the EPO and all stakeholders. In 2023, the new website will go live as the core interface for various user communities and other stakeholders.

Finally, as part of our drive to enhance customer care, we have improved the handling of external customer enquiries with the help of a new customer service management (CSM) solution.

This project running under SP2023 has remodelled and optimised the EPO's customer service capabilities in resolving user enquiries and complaints, managing customer data and sharing information from key account managers and other customer interactions. Lifting our customer services to a state-of-the-art platform allowed us to interact with our customers in a refreshed, more active and more dynamic way.

We have introduced modern best practice processes from ServiceNow CSM and built integrations with Microsoft Outlook, Microsoft Teams (telephony) and the IT service management solution which supports end-to-end delivery of IT services. This has created a platform for all first-line agents, formalities officers and other case handlers to have all required information at a glance allowing them to focus on the user's enquiry and concerns with assistance and documentation from the tool. Case handling has become easier, lighter, more efficient and more transparent.

A support group for our new CSM is in place to assist internal users and undertake corrective and evolutionary maintenance of the system. This has finally allowed us to decommission the legacy toolset.

<span style="color:red">Improved handling of external customer enquiries with an industry-leading platform</span>

## 2.3    Supporting corporate functions with advanced tools

In 2022 the EPO has left behind the pandemic's emergency teleworking mode and opened a fresh chapter in its history. After more than four decades of operating as a principally office-based organisation, the new ways of working guidelines came into effect for a two-year pilot, allowing greater flexibility regarding when and where we work, and reflecting our evolution towards a results-based performance management approach.

Making that shift required the introduction of new tools and the modification of existing ones to fully support the new guidelines. The freedom of all staff to choose their preferred "new ways of working" within the constraints of the guidelines as well as trust-based technical solutions to support the pilot scheme were essential features of putting the new policy into practice. A planning tool has been introduced to record working locations (on-site working, homeworking, teleworking abroad, other teleworking location within duty country) up to six months ahead. This tool also allows staff to see whether their team members and line manager are in the office so as to make it easier to arrange face-to-face meetups.

<span style="color:red">New tools to support the new ways of working pilot</span>

The planning tool is also accompanied by the extensive personal and manager dashboards, which provide an insight into working patterns as well as into the usage of mandatory day quotas applicable to some of the working locations. The analytical platform connected to the tool will also enable the in-depth trend analysis and a comprehensive EPO-level reporting on the pilot to our stakeholders, such as the Administrative Council.
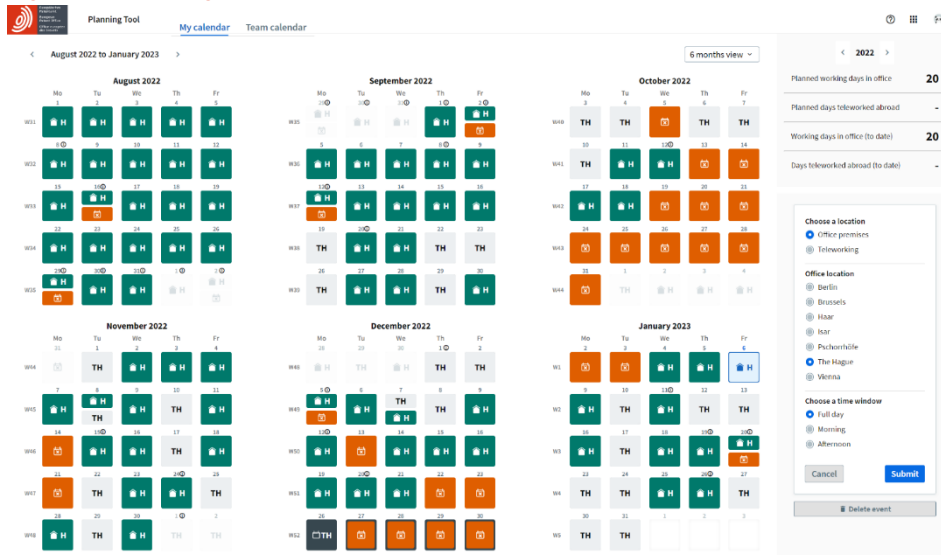
Source: EPO

To enable efficient use of our facilities, another new tool has been released which allows booking of shared workplaces, meeting rooms and charging stations for electric vehicles. The tool, which integrates seamlessly with the Microsoft Outlook calendar, also provides a web interface and a mobile app for maximum user convenience.

Thanks to the hard work of colleagues across the entire EPO, our new intranet was launched in September 2022. The modern, responsive design supports access on any authenticated device, providing a new digital home for everyone and helping to ensure full support for the new ways of working.

The homepage provides a gateway to the latest news, videos and upcoming events, as well as current topics of strategic importance and all EPO social media channels. The powerful new search engine is one of several major improvements over the old intranet. Generated using Elasticsearch, results are gathered from the entire intranet and all linked documents, and can be filtered instantly according to type, date or topic. The extensive features of tags and listings provide an additional mechanism to navigate the content.

A digital home for all staff – the new intranet

In the period between September and December 2022, there was an average of 1.5 million page views per month, which is almost three times more than in the same period in 2021 when the old intranet was in use with an average of 540 000 page views per month. This means that internal communication via this channel significantly improved in reach and impact. Moreover, the introduction of the new intranet provides a better experience for both end users (staff) and for the editors tasked with updating the content and also enabled us to decommission the legacy intranet.
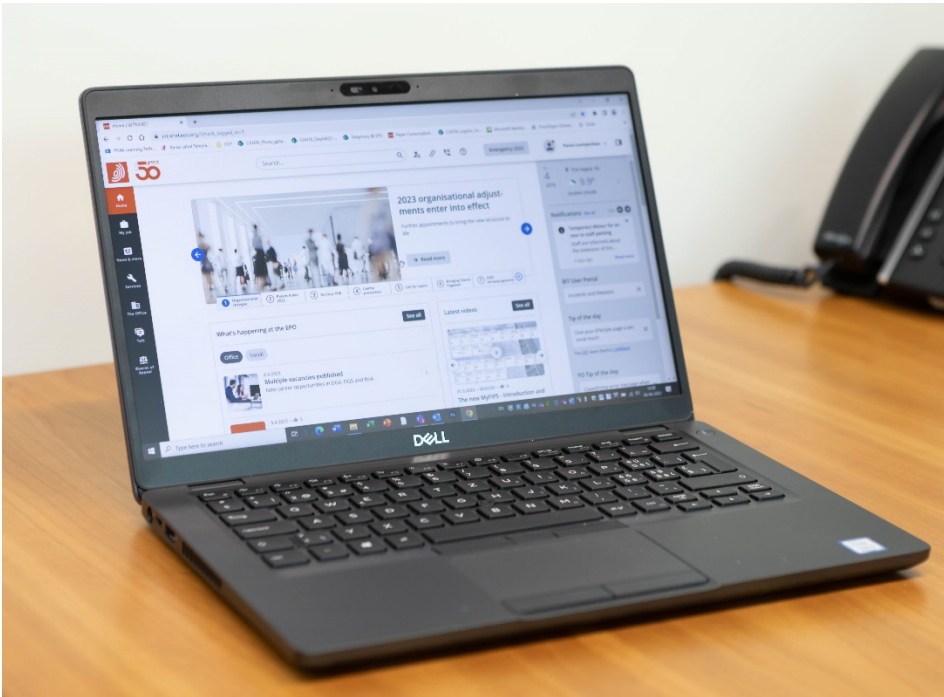
Source: EPO

Following two years of positive experiences and steady progress in the large-scale implementation of videoconference (VICO) for oral proceedings, the pilot project for oral proceedings in opposition by VICO was extended until 31 December 2022 and has become standard as of 2023. The VICO functionality increased accessibility, allowed parties to participate from around the globe, saved time and money, and led to a reduced carbon footprint. Our efforts to improve the quality of the service were also noticed by our users. A total of 77% of respondents found VICO to be "good" or "very good", up from 66% in the survey of autumn 2021.

In 2022 we continued modernising our audio and videoconferencing facilities, which are widely used for oral proceedings and team collaboration in a hybrid mode. The rooms were equipped with new devices providing improved audio and video quality. In the background, the technical teams completed migration of our telephony system from Skype for Business to Microsoft Teams. This included migration of 6 800 individual lines as well as contact centre numbers and emergency lines. Skype for Business servers were ultimately decommissioned before the end of the year. With telephony fully integrated into Microsoft Teams, all internal and external communication is now supported from anywhere. As a result, the number of mobile lines was reduced by over 1 000, a saving of €500 000 on a yearly basis.

*Savings and service improvements driven by the migration of our telephony system*

The migration of telephony has been used as an opportunity to improve our service to external customers, especially with regards to external calls received during office hours. In the past, unanswered calls directly to an examiner or a formalities officer were routed to individual answering machines, if activated. External callers were therefore sometimes left without a response and with no easy way to get their request dealt with.

To improve our service, a new approach to responding to calls has been defined. All internal and external calls to directors, examiners and formalities officers are

transferred to our first-line central enquiries unit (1LCEU) if unanswered after 20 seconds. 1LCEU then creates a case for external calls from users, which ensures customers are contacted back if necessary. After an initial pilot phase during the summer 2022, this new service was gradually rolled out.

In 2022, in line with HR pipeline deliveries, core HR processes continued to be simplified and digitalised, building on the foundations set in 2021 and supporting the objectives set out under goal 1 of SP2023.

The recruitment process was digitalised end-to-end with the introduction of revamped internal and external job portals. We implemented a leading cloud-based platform which facilitates posting of vacancies, recruitment marketing and a collaborative selection process. Other changes in the HR area included digital processing of medical certificates and a new self-service portal for reimbursement of education costs under the recently renewed regulations, providing greater transparency and control over data. The latter functionality is a first office-wide service based on SAP Fiori and Process and Forms technology and is a first step in the complete refresh of the old interface to HR systems.

**End-to-end digitalisation of the recruitment process**

The new Fiori tool comes with a fresh look and introduces automation to assist staff and HR. The new platform will provide better and more transparent access to HR data and will streamline request handling. For example, rather than requesting multiple allowances, staff will only have to file one request per life event (for example marriage, birth, education), and the tool will trigger related allowance requests. The platform is in test by a group of internal users as of 2022 and will be fully rolled out in 2023, enabling the decommissioning of the old interface.

In 2022 we continued the migration of reports and dashboards to the new data analytics platform WYRM which was launched in 2021. New dashboards were also introduced to visualise datasets, supporting effective data interpretation.

In addition to providing higher performance and scalability, the platform, which is based on open-source technologies, enabled us to reduce license costs by €150 000 per year. However, the major savings will come in 2023/24 when the legacy analytics platform is finally decommissioned, and all the related services are discontinued.

Last but not least, the rollout of the new document management platform started in 2022. Designed to manage administrative document repositories, the platform is being gradually extended to cover the various areas of the EPO. This is important for safeguarding the EPO's knowledge and history. Users are being assisted in adopting the new tools and the migration of the document repositories will continue into 2023.

Introduction of the document management platform was accompanied by the preparation and adoption of a documentation retention policy, which supports our sustainability agenda and extensive digitalisation. The policy provides a framework of general principles, rules, and conditions for the retention of various types of files and records at the EPO.

## 2.4 Modernising IT infrastructure

In this day and age, technology powers nearly every aspect of modern organisations. To keep up with the fast-paced digital landscape, IT infrastructure needs to be reliable, secure, and most of all, flexible and accessible. In 2022 we completed two major projects which directly contribute to the long-term sustainability of the EPO: decommissioning of the mainframe and migration of data centres.

Over the past two years over 100 dedicated staff, including examiners, formalities officers and BIT teams, have worked together addressing one of the greatest challenges in modernising the EPO's IT landscape: decommissioning the mainframe. Thanks to this collaboration and hard work, the last phase of decommissioning the mainframe took place in February 2022. All systems were ported onto the Linux platform and the mainframe itself was powered off on 29 March 2022. Migrating our IT tools to the Linux servers opened the door to a new era of more performant and reliable IT systems, and an altogether better IT landscape on which we can continue our digital transformation journey.

<span style="color:red">Bidding farewell to our mainframe on 29 March 2022</span>

Replacing the mainframe with commodity hardware resulted in multi-million savings for the IT budget and reduced vendor lock-in for hardware, software and services, offering the EPO new options to tender for more competitive offers when compared to the mainframe market. Over 100 mainframe-specific software components were supressed, providing a more modern environment where the alignment of software deployment to standard EPO practice is maximised. It also facilitated staff upskilling efforts.

The re-platforming of mainframe applications to Linux also enabled the preparation and execution of the final migration from the increasingly outdated and high-risk Rijswijk data centre to the new state-of-the-art Tier IV (highly secured) facility in Luxembourg. The migration was executed in 23 waves over multiple weekends in 2020 through 2022. These were successfully executed with minimal impact to the organisation. The final wave took place on the weekend of 4 June 2022 and thereby concluded the migration of all business applications to the Luxembourg data centre.

As part of the system consolidation effort, all production applications running in Vienna have also been migrated and the local data centre was decommissioned. Any usable equipment remaining on the premises was re-deployed and older equipment was taken out of service. As for the Rijswijk data centre, work has been started to move some local services which require local infrastructure (CCTV, access control, etc.) to the modern technical room in the New Main building, which paves the way to full decommissioning of the data centre in the Shell building.

The migration to the new data centre contributed to improving IT availability, reduced the number of incidents raised related to data centre infrastructure and limited the number of planned outages for maintenance. In addition, the project had a positive impact on the EPO's overall electricity consumption and $CO_2$ emissions.

Following the completion of the mainframe re-platforming and data centre migration, we continued working on the availability and stability of our IT systems with a full understanding that any failure of our IT systems has a direct impact on

<span style="color:red">97% system availability achieved at the end of 2022</span>

our activities and on our ability to provide high-quality services to users. A dedicated taskforce has been created to investigate characteristics and root causes of outages, and how they were handled. The service management, monitoring and observability toolset was expanded to improve our IT operations teams' responsiveness in the event of failures. This and other targeted improvement actions resulted in achieving 97.04% availability at the end of 2022 and meeting the excellence target set in the BSC (96.5%).

The efforts under the Strategic Plan's Infrastructure programme will be concluded early 2023. With the infrastructure in its final SP2023 configuration, and stabilised, the teams will perform the comprehensive Disaster Recovery (DR) verification test by switching from the new primary data centre in Luxembourg to the DR site in Munich. Until then, smaller scale simulation exercises – speed tests – are performed on a regular basis to ensure that we become increasingly familiar with disaster recovery procedures.

## 2.5    Strengthening cybersecurity

At the beginning of 2022, our cyber intelligence capabilities were put to a major test when a critical worldwide vulnerability in the commonly used Java software Log4j emerged. Log4j software is used across multiple industry and government sectors. The vulnerability, known as "Log4Shell", could allow attackers to take over a web server, gain access to internal networks and hijack data, for example.

Over the following weeks, organisations such as Germany's federal cybersecurity authority BSI raised their internet threat level to critical, due to increasingly sophisticated ways of exploiting the Log4Shell vulnerability as a rapidly growing list of affected applications and waves of attacks became visible across the internet. While software vendors were releasing the relevant updates, the EPO started close monitoring of the EPO infrastructure and reviewing possibly impacted applications. Thanks to the great collaboration between application owners and IT security experts, all exposed systems were patched in good time without any negative consequences for the EPO.

Log4Shell vulnerability successfully mitigated

In 2022 we continued enhancing security of workstations and servers to ensure that our staff can enjoy secure connectivity and local data encryption while working remotely as part of the new ways of working scheme. Also, the AI-based intrusion detection and prevention system has been extended to cover both the Luxembourg data centre as well as local networks at the EPO locations. This solution relies on state-of-the-art machine learning security anomaly detection. It allows us to react in real time to cyber-attacks while they are still in early stages of preparation and before any damage could be done. Our ambition is to get ahead and stay ahead of cyber-attackers.

The improved Security Incident Reporting and Management System launched in 2022 enables us to react, in a structured way, to any security incident according to predefined scenarios and to ensure efficient and effective responses. It provides an insight into the security data from applications hosted in our data centre as well as in the cloud. A set of agreed processes for continuous improvement following the "Plan, Do, Check, Act" cycle supports ISO 27001-compliant security incident management practice.

In 2022 we continued evolving our authentication systems. A series of improvements was delivered in the automation of identity life-cycle management and role-based access. These improvements increase the assurance that users have the right privileges to access the systems required to perform their duties and reduce the workload of recurrent system administration tasks. Because automation greatly reduces the risk of forgetting to withdraw access permissions when a user changes roles, considerable security gains can be achieved. A further result was the support of the implementation of ISO 27001 controls for life-cycle management and access management.

Initiated already in 2021, a feasibility study was concluded to explore a new identity verification service, eIDAS. It is a range of EU services that include verifying the identity of individuals and businesses online across EU countries. It was confirmed that this technology has potential to allow us to rely on external eIDs that technically and legally conform with the EU-wide regulatory identification and authentication framework.

For our external users, the new Customer Identity and Access Management portal has been deployed. It provides a uniform and secure platform allowing external users to manage their account and preferences. Users can benefit from anytime/anywhere device-independent self-service possibilities such as password reset. They can also select the authentication methods of their choice in addition to the traditional EPO smartcards. This functionality is already available in Central Fee Payment and is expected to be added to MyEPO Portfolio during 2023.

**Working on alternatives to EPO smartcards**

Our efforts in the cybersecurity area are well justified, as the EPO is experiencing an increasing number of cyber-attack attempts. For example, the second quarter of 2022 witnessed a 2.7% upturn in phishing emails, hitting a record high of 100 000+ within a three-month period.

In the fight against cyber-attacks, human intuition is always crucial. Rather than contemplating the pessimistic fact that "humans are the weakest link in cybersecurity", we focus on fostering a culture of cybersecurity. The communication campaign started in 2021 continued in full swing in 2022 and involved multiple intranet publications, tips for staying safe online, bite-size e-learning courses and lively clips and videos. We were also focusing on raising awareness to emerging information security threats such as vishing (voice + phishing = vishing).

**Fostering a culture of cybersecurity**

As part of the communication campaign, the EPO held a unique competition in which the roles were reversed, and all EPO staff were invited to draft a creative phishing message. Overall, some 50 proposals were submitted, many of which showed a very clear understanding of the key elements of a potentially successful scam. The winning submission was used in one of the "Think before you click!" phishing simulation exercises.

## 3.  Driving the delivery of high-quality products and services

Our performance in 2022 was supported by a focus on harnessing the benefits from digitalising the patent granting process, based on AI-based pre-classification, the Patent Workbench, improvements to ANSERA and a more

reliable IT landscape. As a result, despite a higher workload than expected and a smaller examiner workforce, the timeliness of our products remained robust.

The corner-stone of the EPO's world-leading reputation for quality is our ability to carry out high-quality searches. To deliver excellence, we need our examiners to have access to the full range of the latest documents, classified accurately and in a timely fashion, to allow them to identify the most relevant prior art.

The focus in 2022 was also on further reducing the backlog in opposition. This had accumulated as a result of the COVID-19 outbreak, before we adopted videoconferencing for opposition proceedings. That backlog has now been entirely processed in 2022, with the stock currently below pre-pandemic levels.

## 3.1    Classification

Built in-house, our AI-based pre-classification engine was launched in 2021. Running in parallel to the legacy service, it demonstrated an ability to allocate files with greater accuracy (improvement from 86% to 90% accuracy in sending file to the appropriate team), making the commercial product redundant. Ultimately, the contract with the external supplier providing pre-classification symbols was terminated in 2022 bringing annual savings of ca. €40 000.

Since its inception, the model was upgraded and fine-tuned, including training automation. This enables quick and automatic adaptation of the pre-classification system to changing definitions of technical fields, Cooperative Patent Classification (CPC) revisions and emerging technologies, resulting in a higher quality of file routing. This service allows the EPO to be in full control of the pre-classification process, leading to a better, more precise and consistent distribution of incoming applications.

In 2022 we continued our efforts to increase the maturity of Canopée – a new tool which is fully integrated with and allows classification of documents from ANSERA or Classera (the version of ANSERA for displaying the incoming prior art to be classified), without the need to switch to another application to perform the typical classification tasks. In addition, Canopée offers an improved user experience, better performance, and it provides a foundation for achieving efficiency gains as well as improved quality and precision of classification due to its readiness for integration with AI.

AI-supported classification tools to replace the legacy systems

The new classification tools (Classera/Canopée) will also allow us to decommission the legacy tools in 2023.

In 2022 we refined AI models for automatic classification and reclassification, using CPC full-symbol services.

As a classification tool of choice, Canopée was adapted to offer AI-generated predictions for CPC symbols, which can be accepted, rejected or modified by examiners. This service will be operational early 2023.

Also, for the first time in 2022, the assignment of CPC symbols to new incoming documents in Y02/Y04 (sustainable technologies) was fully automated using an AI model. It replaced the semi-automatic classification based on examiner-maintained EPOQUE-preparations, improving timeliness and consistency of the classification, while ensuring high data throughput. Y02/Y04 stands as an

example for other technical fields in which this technology could be implemented in the future, e.g. disruptive technologies or other hot topics that attract special attention in the IP world and where the EPO could provide instant patent information support.

Figure 6 – AI-supported classification for examiners
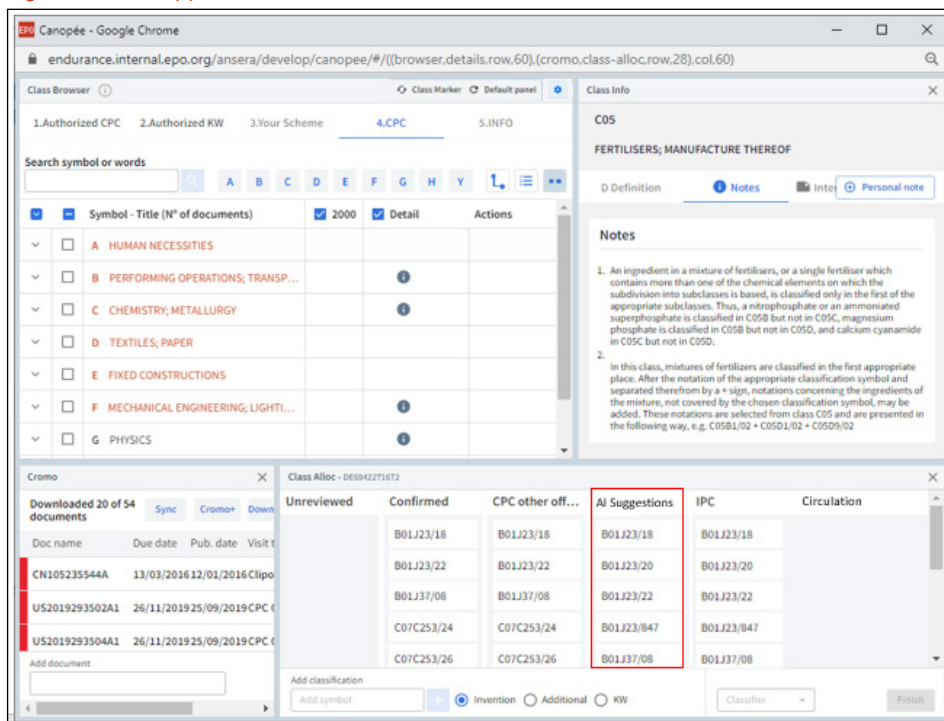


Source: EPO

In a similar way to the AI-assisted classification, the new tool makes suggestions to support reclassification for patent and non-patent literature. The solution is piloted for CPC reclassification in some revision projects.

## 3.2  Management of prior-art collections

A significant portion of our efforts in this area in 2021 was dedicated to migrating the more than 400 systems that manage the full prior-art repository from the mainframe to a new platform, re-implementing them in modern technologies (Python, Java) to replace the 19 000 COBOL files that we had previously.

Over 2022, we have aimed at stabilising and optimising the prior-art collection in a post-mainframe era using cloud-native technologies. This was no easy feat, as the prior-art collection contained a massive amount of information that needed to be analysed, processed, and stored efficiently and securely. With the use of cloud-native technologies, we were able to develop a highly scalable and resilient platform that could handle the large volume of data within the collection. By leveraging the power of the cloud, we were able to distribute processing across multiple servers, develop faster tools and manage the storage of the data in a way that is more efficient and scalable.

Leveraging power of the cloud to manage our prior-art data collections

The resulting platform has increased the efficiency and accuracy of managing the prior-art collection, achieving a higher level than in the mainframe era. Moreover, it has the potential to revolutionise how data is consumed in the coming years.

We also dedicated our efforts to reshaping the daily operations of the prior-art unit and reaping the corresponding benefits. Easier access to technology experts on the market as well as hands-on knowledge in our teams resulted in a significant cost reduction. Using standard modern technologies enabled faster turnover of improvements in tools and bug-fixing, as well as more interoperability with the PGP systems. Finally, usage of the new platform provided access to greater computing capacity for faster processing of prior art.

An integral part of our efforts to improve quality and efficiency relies on our ability to master the wealth of prior art published in many different languages. A new internal machine translation engine was introduced, capable of translating unpublished documents from several languages into English, improving both pre-classification and pre-search results. Extension of AI-based machine translation services to Chinese and Japanese was a significant step, as 46% of the full-text patent data in our databases are in these two languages.

Last but not least, the production-ready level of maturity was achieved for EPyQUE, which is a powerful and versatile computing platform open to all EPO employees. While it is used by prior-art data management teams for data profiling and data analytics in their daily operations, including maintenance and testing, it constitutes a development environment as well. It can be used by both experienced programmers to support office activities and projects, or by beginners aiming at growing their skills in digital technologies, thus fostering the digital transformation of the EPO. EPyQUE is the ideal environment for prototyping innovative solutions, and it is also a collaboration space and community. In 2023 the platform will be brought into production, making it possible to unlock its full potential inside the EPO. It is also planned to make it available to external users in the first quarter of 2024.

# 4.   IT co-operation

Ensuring that our partners benefit from a strong and accessible European patent system remains one of our highest priorities. In 2022 we continued to focus on enhancing the IT co-operation portfolio through new and updated initiatives that foster innovation, particularly with regard to user experience with tools and services.

## 4.1   Strengthening the EPN

The European patent network (EPN) made very significant progress on IT co-operation projects in 2022, moving past discussions into concrete implementations. Thanks to regular technical consultations, a number of pilot projects were successfully launched together with interested national patent offices (NPOs).

We made good progress implementing Front Office minimum viable products in Spain, Lithuania and Greece. Work on expansion of core Front Office functionalities also advanced, and included the addition of several modules that led to the release of the first mature version of the toolset. It is available for early adopters who are committed and ready to kick off their implementation projects in 2023.

The Single Access Portal, the one-stop shop covering all digital interactions with our partner offices piloted in 2021, was fully launched and continued to evolve. New features included the PATLIB module, a dedicated site for SACEPO and the NPO service desks to enable NPOs to contact the EPO and its helpdesks. With the new features, the portal replaced the National Offices Centre. The MICADO II pilot was launched in December as part of a central hub for EPN collaboration. MICADO II is where detailed documentation on IT co-operation projects can be consulted, posted and exchanged. The new MICADO for accessing the documents of the Administrative Council of the European Patent Organisation also entered the pilot phase with some delegations, and a full rollout of the service is scheduled for 2023.

The process mapping of major procedures is now complete and available to support implementation work. The final report and recommendations were presented at the meeting of the Technical and Operational Support Committee in 2022.

The third release of the web-based search system stemming from ANSERA has been made available to national offices in member states, using only public information at this stage. Users were offered a dedicated training course, which was attended by over 100 participants. The pilot phase provided valuable feedback and guided further development of the modern search solution to support national patent examiners. The tool was deployed onto a high-performance, high-availability cloud platform meeting the latest security standards and enabling greater efficiency and scalability.

Building on the success of the EPN cloud event, which included participants from member states, extension states, WIPO, the EUIPO and selected user associations, several workshops took place in 2022. The EPO also kicked off an information security working group to exchange knowledge on measures to manage services in the cloud securely. Our aim at the EPO remains building an even more responsive EPN that focuses on topical subjects of interest to the national offices, users, and society at large.

## 4.2 EQE and EPAC

Thanks to the new digital European qualifying examination (EQE), candidates have been able to sit the exams from anywhere in the world with access to electronic documentation since 2021. In 2022 they benefited from the improvements suggested by the candidates of the previous year. These included, among others, the ability to annotate papers on screen, an integrated chat to support candidates in case technical assistance was needed, and an extended scheduling of the paper exams. We also implemented a new candidate management system, which streamlined and simplified the administrative tasks.

New MICADO with upgraded search capabilities

Figure 7 – EQE 2022



**EQE 2022**

5 exams split over 11 flows

40 online invigilators + force team (10 members)

Secured examination environment

Audio and image invigilation

Bidirectional communication channel

Source: EPO

The first-ever European patent administration certification (EPAC) examination took place on 12 December 2022. Colleagues from the EPO joined more than 500 candidates from 33 countries to sit the online examination, highlighting the global demand for such a certification and the convenience of digital testing.

The EPAC enables formalities officers, paralegals and patent administrators to demonstrate that they have acquired the knowledge and skills necessary to deal with the procedures associated with the filing, prosecution, grant and maintenance of European and international patent applications before the EPO, as well as with post-grant administrative procedures.

In preparation for the exam, the candidates drew on several support measures, including a mock exam, e-learning modules and recorded seminars on the EPO's website. From 2023, those who intend to sit the annual examination can join a seminar series and download a series of e-books as they work towards a high-quality certification.

*New patent administration examination delivered digitally*

## 4.3   IP5

The annual IP5 meetings in 2022 took place in virtual format and were chaired by the EPO. Among the highlights were the IP5 NET/AI roadmap and a global alerting system, covering patent prosecution changes in all five offices.

The IP5 representatives acknowledged the progress made in the implementation of the IP5 NET/AI roadmap. This roadmap covers projects concerning AI-assisted classification, the development of new classification schemes for new and emerging technologies as well as AI-related technologies, and the collection and publication of existing materials on the examination practices of the IP5 offices on AI-related inventions.

In 2022 the work on developing a global IP5 alert system that sends emails to subscribers when a change occurs in the file wrapper data of an IP5 patent family member has been concluded. The EPO is leading this initiative, which has been long awaited and desired by the industry.

*Joining efforts with IP5 offices in definition and delivery of AI-related projects*

## 4.4   CPC

In 2022 Monaco, Belgium, Italy, Peru and Luxembourg joined the CPC family, which is now made up of 37 offices worldwide, including 21 EPO member states and one validation state. The number of countries exchanging CPC data with the

EPO increased to 22, with Poland joining in May 2022. We also started machine-to-machine CPC data transfers. The CPC coverage of EPO documentation continued to increase as shown by the circa 67.9 million documents classified by the end of 2022.

The EPO is continuing to promote the use of CPC worldwide and in particular in our member states. The external classification portal was made available via the Single Access Portal and aims to offer a hub for co-operation on classification, providing a range of services to national offices, while some parts are also publicly available.

Work is in progress on the revamped CPC website (www.cpcinfo.org). New designs were shared with stakeholders, and we aim to implement them in 2023.

As of early 2022, we started making CPC allocations available on the day of publication of published EP documents. This request had been a long-standing wish from our users and is in line with the EPO's aim to provide as much complete and correct data as possible in a timely manner. The CPC symbols assigned to European patent applications by the EPO have been included in the PDF documents of European patent applications (EP A publications) and European patents (EP B publications).

Last but not least, a series of bilateral technical meetings on harmonisation took place between USPTO experts (called search and classification examiners) and their counterpart quality nominees. The aim was to reach a consensus on classification practice, including the scope of the classification groups, CPC definitions and the use of both C-Sets and orthogonal symbols. By end of 2022, 258 subclasses were partially or totally harmonised, which represents 40% of CPC. These activities resulted in opportunities to improve the scheme and definitions.

Steady progress in harmonisation of classification practice with USPTO

## 5.    Contributing to long-term sustainability

Our digitalisation journey directly contributes to the long-term sustainability of the EPO not only by future-proofing our technology and tools, but also by enabling efficiency improvements. Two topics, however, are worth highlighting: our efforts to implement governance best practices and putting financial sustainability and enhanced financial processes at the heart of our corporate culture.

The ICT sustainability of the EPO is covered in detail in the Environmental Report 2022.

### 5.1    Improving transparency and governance

Building upon the Information Security Policy framework approved in 2021, in 2022 we focused on embedding information security management best practices in our daily work. In preparation for the ISO 27001 certification process, the project team performed a comprehensive compliance assessment of the EPO with respect to the 114 security controls foreseen in Annex A of the ISO 27001 standard. The assessment involved collecting all required support documentation as well as formulating proposals for the implementation of pending items or

planning for bridging gaps according to the compliance level or maturity assessed.

Following an external audit, the EPO received ISO/IEC 27001:2013 certification in October 2022, which confirms our ability to use a globally recognised method to manage information security. Almost 150 staff belonging to different business units EPO-wide were actively involved and hold central and local responsibilities to maintain the certification.

## 5.2    Supporting enhanced financial processes

With an ambition to improve the financial steering capacity of the EPO, the reporting and integrated financial planning processes have been redesigned and implemented in SAP Analytics Cloud (SAC), a solution that has been successfully launched in 2022. This state-of-the-art controlling and accounting software tool provides the foundation for an end-to-end digital budget process.

The tool has been made available to all budget planning stakeholders, including programme managers, making it possible to replace manual spreadsheet-based submissions with digitalised workflows. It has been successfully used for the annual budget cycle 2023 by including input from business units as well as supporting workforce planning and salary calculation. The existing cost centre reporting and SP2023 financial dashboard were also migrated.

In the area of procurement, we continued working on improving our tools, such as digitalisation of contract creation based on standard templates pre-validated by the legal department, and storage of contracts. Moreover, we introduced the possibility of signing the procurement contracts digitally, which increases the efficiency of the contract validation and signature process.

# 6.    Transforming our IT

The Strategic Plan 2023 refers to artificial intelligence as one of the key enablers to boost the EPO's ability to exploit its data and internal knowledge with the goal of improving the efficiency and quality of its products. Having a long history of data science in our organisation, we had a good understanding of opportunities for gains through AI.

The projects under the artificial intelligence and blockchain programme not only delivered concrete results, but also proved that AI offers the potential to take digital transformation to the next level, helping us to become more innovative, flexible and adaptive as an organisation. Our team of data scientists is constantly exploring ways to make our processes more efficient by developing and training new AI models.

One of the most significant developments in the past years has been the digitalisation of the PGP. Productivity gains have already been made in the areas of pre-classification, classification and search, where new tools are embedded with artificial intelligence.

In the year ahead and beyond, the EPO will therefore begin implementing new tools and initiatives that result in a truly digital examination process and a fully digital end-to-end PGP. These new tools and digital processes will yield higher

quality and more timely products and services for our users. For example, an upgraded AI-based digital file allocation tool will match the contents of a file directly with examiner competences, ensuring that the right file goes to the right examiner at the right time. But we will also ensure that digital transformation benefits our users more directly in their interactions with the EPO.

## 6.1    Leveraging artificial intelligence and blockchain

In 2022 we delivered refined models for pre-classification and automatic classification, reclassification, CPC full-symbol services and AI-based search. We also improved the digital file allocation model which is being piloted with our examiner colleagues.

EPO Translate was made available to all EPO staff and offers the service to translate 56 languages, of which French, German, Dutch, Italian, Chinese and Japanese are available for confidential translations. The new portal gives access to all machine translation engines of the EPO machine translation system, for example the tailored Google engine which lies behind the Espacenet patent translation service. While some of these engines are specifically trained for processing patent text, EPO Translate also offers an engine for general language text translation.

Comprehensive in-house translation service, also suitable for confidential content

Figure 8 – Feedback mechanism in EPO Translate
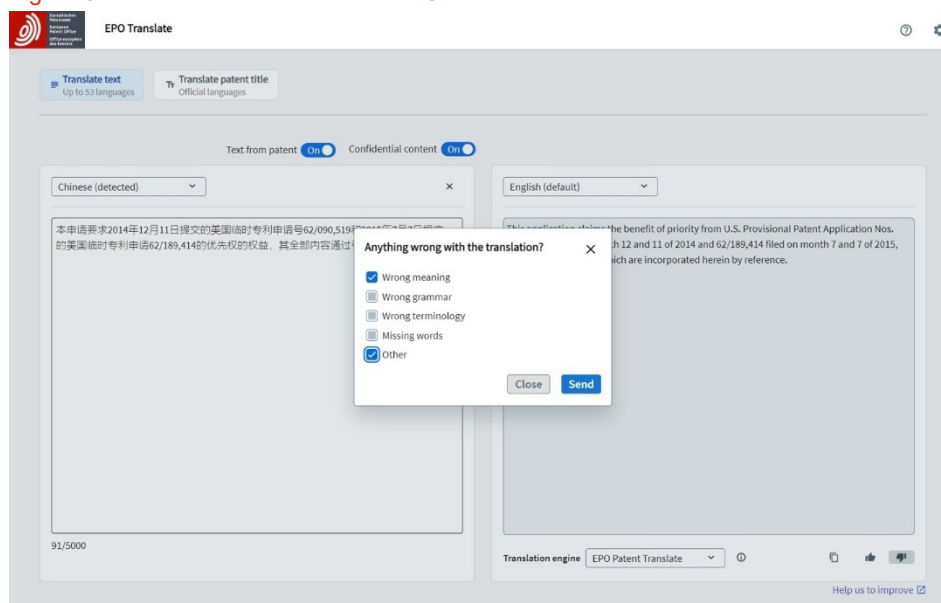


Source: EPO

By implementing artificial intelligence solutions, the stack of in-house services in areas such as classification and translation increases. When new services were running in parallel with the legacy ones, they proved to offer better quality and performance. Moreover, by having full ownership of the tools, we can adapt and improve them as and when required. In addition, the replacement of external systems and outsourced services will deliver tangible savings. For example, the in-house machine translation service replaced the outsourced title translations of new applications into the other two official languages, thereby saving approx. €250 000 annually.

We are also able to identify additional value generated by AI-driven services. An automated first-page-clipping microservice, which produces an image (representative drawing) from the first page of a patent document, implemented in 2021, saves €1 per figure compared to the human-based contract. Towards the second half of 2022 this new service had processed more than €1.9 million worth of additional figures.

Finally, we delivered a priority-document blockchain prototype that includes a distributed system of computers and participants. While blockchain remains an emerging technology at the EPO, its potential future benefits range from more secure and consistent data sharing between IP offices, users and other IP organisations to efficiency gains via lower operational costs, reduced processing time and lower paper consumption. Owning a working solution that allows the exchange of encrypted documents with external entities constitutes a major knowledge gain on blockchain technology. Now we are waiting for partners willing to explore future applications with us.

Prototype blockchain solution that allows exchange of encrypted documents with external entities