THE MAGAZINE

FOR PARTNERS AND CLIENTS

AUSTRIAN INSTITUTE OF TECHNOLOGY

JUNE 2024

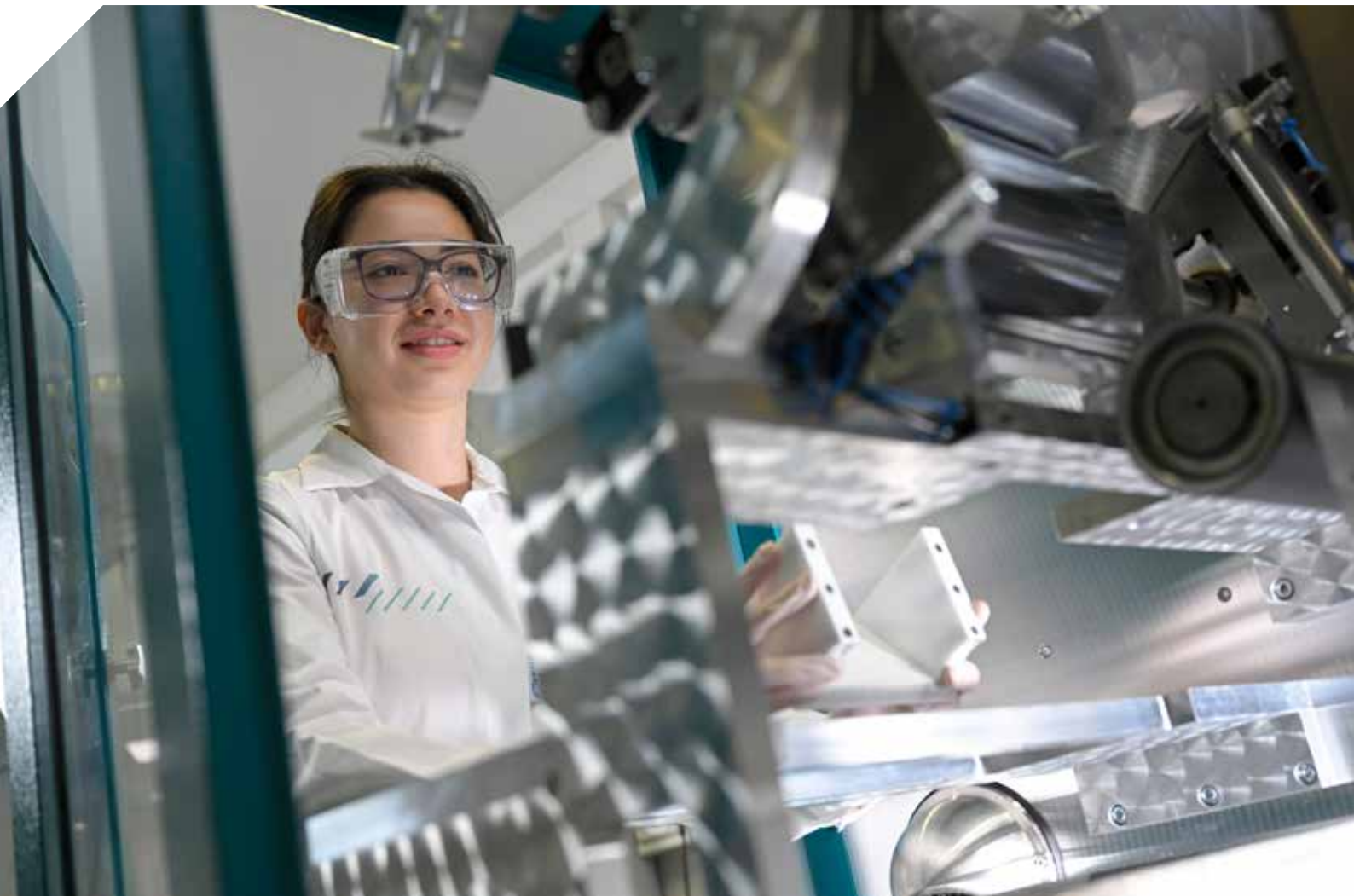
Technology Talks Austria
„Triple Transition“: Solutions for economy, industry and society

Digitization and decarbonisation
Successes in important projects in AIT‘s strategic focus areas

Lange Nacht der Forschung 2024
AIT presented the latest technologies to a wide audience.

AIT continues to expand excellence in applied research.
Ideas from basic research are brought to industrial implementation.

First-class research infrastructure is an essential basis for the success of the AIT.



Andreas Kugi (AIT Scientific Director), Peter Schwab (Chairman of the Supervisory Board), Brigitte Bach (Spokesperson of the AIT Management Board) and Alexander Svejkovsky (AIT Financial Director; f.l.t.r.)).

AIT EXPANDS EXCELLENCE IN APPLIED RESEARCH

Chairman of the Supervisory Board Peter Schwab and the three Managing Directors Brigitte Bach, Andreas Kugi and Alexander Svejkovsky presented to the public how the AIT Austrian Institute of Technology is consistently pursuing its successful path and positioning itself for the future.

„The AIT Austrian Institute of Technology is more relevant than ever - not only for business and industry, but also for society and Austria as a business location," stated Peter Schwab, Chairman of the AIT Supervisory Board, at this year's annual press conference. This is particularly evident in the fact that the current research priorities are closely aligned with the major challenges we are currently facing and will face in the foreseeable future.
„Industry needs high-quality support in technology development - especially in the areas of decarbonization and digitalization - whereby AIT research must be about 5 years ahead of industry: The know-how must already be available when it is needed by industry," says Schwab.

Foto: AIT

„RTI IS HIGHLY RELEVANT FOR THE BUSINESS LOCATION"

Brigitte Bach, spokesperson for the AIT's management, illustrated this strong position with an impressive figure: „The AIT is a key player in Austria and Europe: since the start of HORIZON EUROPE, the AIT has raised a total of 57 million euros from the EU pot by participating in 95 projects - making the AIT one of the top three in Austria." Research, technology and innovation (RTI) are highly relevant for Austria and Europe as a business location - jobs, prosperity and technological sovereignty are based on them. „Against the backdrop of the triple transition - the major transformation that is being driven by digitalization and decarbonization and which we also want to shape in a way that is fair to people - it is important that we deal with these major challenges in the field of RTI in such a way that we develop competitive advantages."

FACTS & FIGURES 2023

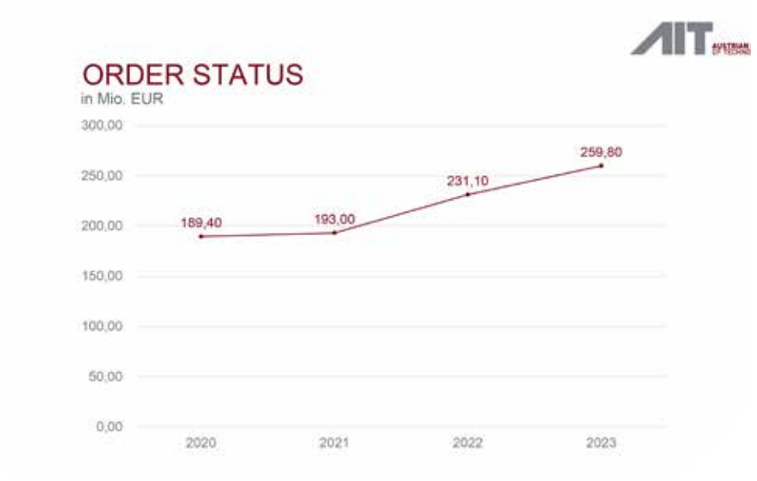
199,7 Mio. €	operating revenue
3,396 Mio. €	net profit (after movement in reserves))
1.527	emloyees
166	PhD students
625	publications (ref.)
43	granted patents

„EXCELLENCE IN APPLIED RESEARCH"

The AIT focuses on two strategic areas: sustainable, resilient infrastructure and the digital transformation of industry and society. „We see ourselves as a bridge between basic research and industrial implementation," emphasized Scientific Director Andreas Kugi. This means that the AIT is predestined to take on a role as a technology hub, a network hub in Austria for European technology development. „We have an unrestricted claim to excellence in applied research: our mission is to bring ideas from basic research into industrial implementation, and we want to be excellent along the way."
One way of achieving this is to establish lighthouse projects based on areas of strength. And: „Artificial intelligence is omnipresent and will also disruptively change research." For this reason, the AIT has set up its own task force to deal with the transformation towards an AI-driven company.

„WELL POSITIONED FOR THE NEXT STEP"

The figures for the past financial year 2023 also show that AIT is well on track. As Financial Director Alexander Svejkovsky emphasized, incoming orders grew by around five percent to over EUR 100 million and the order backlog even increased by twelve percent to just under EUR 260 million (see chart). At the same time, however, expenses have also risen, driven by inflation. As there is no inflation adjustment for the basic funding from the Research Funding Act in the current period, a revenue reserve of EUR 1.5 million has been allocated, which can be used to launch specific projects, for example in the field of artificial intelligence.
As examples of further infrastructure investments, he cited the Solid State Battery Lab, the expansion of radiopharmaceutical production at the subsidiary Seibersdorf Labor and the new development of the site of the AIT subsidiary LKR Leichtmetallkompetenzzentrum Ranshofen. „We are preparing for growth in the next performance agreement period," says Svejkovsky.



TECHNOLOGY TALKS AUSTRIA: SOLUTIONS FOR BUSINESS AND SOCIETY

The Technology Talks, which were held for many years as part of the Alpbach Forum, are now celebrating their new appearance for the first time in Vienna.

What does the „triple transition" - the ecological, digital and human-centered transformation that is currently taking place simultaneously - mean for science, business, industry, society and RTI policy? Answers will be sought at Vienna's Museumsquartier on September 12 and 13, 2024.

The Technology Talks, which have been organized by the AIT Austrian Institute of Technology together with partners as part of the European Forum Alpbach since 1983, will take place this year under the new name „Technology Talks Austria" on September 12 and 13 in Vienna's Museumsquartier (following the FFG Forum on September 11). In subsequent years, a rotation to other central locations in Austria is planned. „The Technology Talks offer a discussion platform with all relevant partners from the domestic and European RTI landscape in a global context," explains Brigitte Bach, Spokesperson of the AIT Management Board and Chair of the event's Board of Trustees.

UTILIZE OPPORTUNITIES

The main theme of the Technology Talks Austria 2024 is the essential significance of key technologies and the important role of research, technology and innovation (RTI) for the „triple transition" - the simultaneous „green" and digital transformation, which should be people-oriented. RTI secures jobs and prosperity, strengthens the competitiveness of Austrian industry and Austria as a business location. RTI is also the basis for Europe's technological sovereignty of Europe and increases resilience.

The ongoing transformation processes pose major challenges for business and industry, science and society, but also offer great opportunities that must be exploited in the best possible way. To this end, the transformation processes must be strategically shaped. „We urgently need solutions - and for this we need more research, technology and innovation," emphasizes Andreas Kugi, Scientific Director of the AIT and Chairman of the Program Advisory Board.

RENOWNED SPEAKERS

The topic will be discussed in an innovative mix of concise keynote speeches by internationally renowned speakers, diverse plenary debates and in-depth workshops. A multi-stakeholder perspective will be adopted in all formats: The three groups involved are science/research, business/industry and politics/public authorities.
Solutions are sought for industry and society. The technology talks discuss which areas need to be given greater attention in order to actively shape the future and make progress on pressing challenges.

- The two-day program will begin with a keynote speech on the topic of „The importance of technology for the economy and society".
- The first cornerstone of the „triple transition", the ecological transformation, raises many questions - such as how existing technologies can best be used, which technological building blocks and framework conditions are still missing and where there is a need for action in RTI policy.
- A panel on digital transformation will focus in particular on artificial intelligence and its high transformation potential for industry, society and location development.

The Technology Talks Austria 2024 programme provides a compact and comprehensive one-and-a-half-day overview at the „Triple Transition" and offers a platform to discuss on the consequences for RTI policy – at international, European and national level.

- The third aspect of the threefold transformation, the human-centered transition, examines the role of people in a technologized world.

Based on this, conclusions for RTI policy are discussed:

- At an international level, highlights will be cast on developments in Canada, Australia and Korea, for example.
- A central panel will look at Europe's response to the challenges.
- And finally, the focus will be on current and future RTI policy in Austria.

Renowned experts have been invited as speakers and panelists - a continuously updated overview can be found at **www.technology-talks-austria.at**

TICKETS

for the Technology Talks Austria are available for 180 euros (students: 90 euros) at **www.technology-talks-austria.at**

In-depth workshops

The workshops, which deepen and complement the plenary program, will be hosted by renowned partners from the RTI community. Workshops have already been confirmed by:

- IV (Industriellenvereinigung)
- FFG (Forschungsförderungsges.)
- ACR/WKÖ
- Joanneum Research
- Forschung Austria
- Klima- und Energiefonds
- ÖBB Infra
- ESBS
- Austria Tech/A3PS/Virtual Vehicle/Frequentis

More Workshops are beeng planned (as of May 28, 2024).

Would you also like to become a partner of the Technology Talks?
We have put together attractive packages for partners.
Send an e-mail to technologytalks@ait.ac.at

Illustrationen: AIT/message

FOCUS ON PERFORMANCE

DIGITIZATION

Autonomous forklift truck

On May 7, 2024, the AIT Large-Scale Robotics Lab presented the result of intensive research work at the newly built AIT outdoor test site for work machines in Seibersdorf. It was an autonomous forklift truck that was developed as part of the major European project „AWARD" (All Weather Autonomous Real logistics operations and Demonstrations). The project runs from January 2021 to mid-2024 and aims to demonstrate how automated transport vehicles can sustainably improve the transportation of goods in Europe in all weathers. To this end, the project partners are investigating a wide range of use cases and scenarios.
In Austria, the AIT is focusing specifically on the automation of loading and unloading processes using forklift trucks in outdoor operations in order to significantly increase efficiency in the logistics sector with a perfectly coordinated system. „The first and most important requirement was to develop a system that adapts flexibly to the current situation and operates with the required level of safety and functionality in all weather conditions," emphasizes Patrik Zips, expert in the field of automation at AIT. With its many years of expertise in the field of state-of-the-art sensor technologies and intelligent software solutions, AIT aims to play a key role in optimizing logistics processes in Europe. The AIT project was specifically concerned with human-centered automation of loading and unloading processes in an unstructured environment.

https://award-h2020.eu

Secure quantum communication in practice

AIT has been entrusted with the management of one of the outstanding projects from the last European QuantERA call; Mariana Ferreira-Ramos is the project manager. In the „QISS-ME" research project, AIT is working with scientists from Germany and Israel on secure communication solutions for data centers and on the integration of quantum key distribution. The aim is to achieve cost-effective, tap-proof data encryption using silicon photonics integration technology to create compact and secure communication links. This innovative approach not only increases the security of data centers, but also facilitates seamless integration into existing infrastructures, paving the way for broad acceptance in various application areas. And these are very wide-ranging.
„Quantum physics has given us deep insights into the workings of nature, quantum technology will now capitalize on these findings by unlocking unprecedented capabilities with practical implications. From the potential of quantum computing to solve complex problems exponentially faster than classical supercomputers, to the unbreakable security protocols of quantum cryptography and sensing, these advances will transform fields such as medicine, defense and finance," says Mariana Ferreira-Ramos.

https://sciencebusiness.net/news/quantum-quest-europes-journey-towards-technological-innovation

Patient data management of tomorrow

AIT has developed a new solution for harmonizing medical data from different sources with so-called „Health Data Space Nodes". The aim is to significantly improve patient care using AI models. The solution enables decentralized patient data from various healthcare facilities such as GP practices, diagnostic centers and hospitals to be brought together. Previously, this data was not only distributed across various systems, but often could not be integrated due to legal and technical hurdles. „Our technology takes into account important aspects of data protection through advanced de-identification processes that protect patient information while making it usable for research purposes. In addition, the nodes enable the cleansing, visualization and annotation of the data, which significantly increases its quality and informative value," explains AIT researcher Martin Baumgartner. All of this creates the basis for using patient data to develop effective AI-supported diagnostic tools, for example for the treatment of heart failure. In the „D4Health Tirol Heart Failure Registry" project, together with the Tirol clinics, data from more than 5,000 patients has already been successfully integrated and analyzed. The AIT is now planning to extend the new solution to other medical areas.

https://www.frontiersin.org/articles/10.3389/fmed.2024.1301660/full

Fotos: AIT (3)

DECARBONIZATION

Research for resilient agriculture

Climate change poses considerable challenges for agriculture, such as higher temperatures in summer and longer periods of drought. At the AIT site in Tulln, more resilient and environmentally friendly plant varieties are therefore being researched in climate chambers. Numerous sensors and state-of-the-art technologies are used to precisely simulate a wide range of environmental conditions. „Our facilities make it possible to finally analyze the effects of climate change on agricultural production in detail under real conditions," explains AIT researcher Angela Sessitsch.
From the vast amount of data collected, algorithms and artificial intelligence can be used to identify patterns and correlations that remain hidden to the human eye. These in turn make it possible to precisely understand and predict specific reactions of plants to changing climate conditions. This will ultimately allow the most resilient plant strains to be selected and customized solutions to be developed for agriculture. The aim of the researchers is to contribute to crop security thanks to effective cultivation methods and to specifically breed resilient plant varieties. In particular, microbiome-based solutions that offer an environmentally friendly alternative to conventional pesticides and fertilizers are being developed in the AIT's climate chambers.

Paper industry on the way to climate neutrality

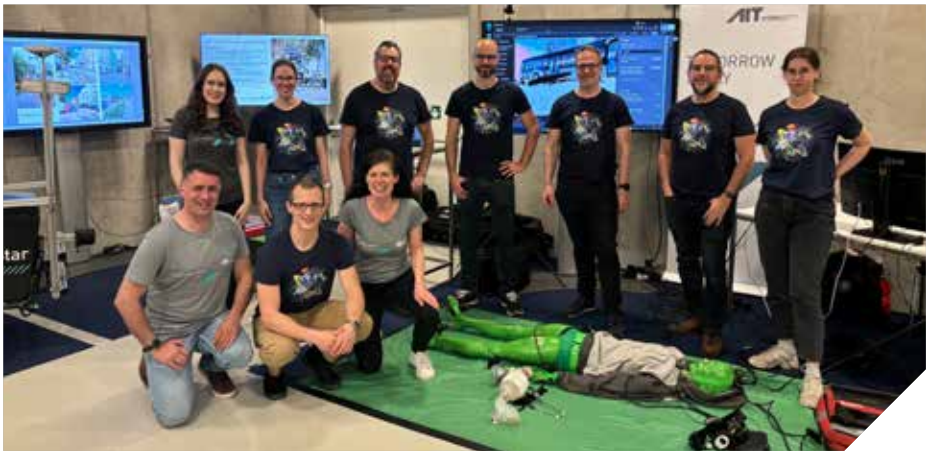
The Austrian paper industry has set itself the goal of becoming the first industrial sector in the country to become climate-neutral well before 2050. Several years of research cooperation with the AIT are helping it to achieve this goal. In the industry project „DekarPIO - Decarbonization of the pulp and paper industry using mathematical optimization", AIT is supporting the Austrian pulp and paper industry in the implementation of its projects. The potential for savings is particularly high in this industry.
This is because the annual energy requirement is around 16.5 TWh.
AIT is currently working with project partners from the paper industry and representatives of the industry association to develop a calculation tool and a guide to decarbonization. The calculation tool will enable companies to better evaluate the framework conditions and the use of technology for decarbonization qualitatively and quantitatively depending on the location and to compare different scenarios with each other. The central question of the research project is how CO2-free energy supply concepts can be implemented in the future. Climate-neutral alternatives include alternative fuels such as renewable gas and residual materials, (high-temperature) heat pumps or the use of deep geothermal energy.
User-centered design was also important in the development of the calculation tool.

Rail4Future starts large-scale trial

The COMET project Rail4Future, which has been running since 2021, has set itself the goal of to enable a more reliable and cost-efficient evaluation of rail infrastructure and thus shape the digital rail system of the future.
An important point here is the topic of predictive maintenance. ÖBB wants to double the performance of the rail system by 2040. By 2030, the number of train kilometers traveled is expected to increase from 160 to 200 million. This will also put an enormous strain on the infrastructure, especially bridges. ÖBB-Infrastruktur AG has more than 8,700 bridges in its network, 1,447 of which are steel bridges. These often have a service life of over 100 years. To make this possible, reliable designs, detailed condition forecasts and predictive maintenance are required.
As part of Rail4Future, an extensive test was therefore carried out under the leadership of ÖBB and AIT on the dismantled supporting structure of the Pinkabach bridge at the ÖBB bridge works in St. Pölten. The partners involved were HBK, TÜV AUSTRIA, FCP/VCE/Strucinspect, Schimetta and Graz University of Technology. In this test, the bridge structure was excited using the AIT's Mobile Seismic Simulator (MoSeS) and stressed until failure. This allowed the fracture mechanisms to be precisely observed and valuable insights to be gained for optimized maintenance management.

Fotos: AIT, GettyImages, Rail4Future

Fotos: AIT (2), BMK/Gaetan Perwein



The AIT team (pictured with the MED1stMR high-tech training system for first responders) at the Lange Nacht der Forschung 2024.

SUCCESSFUL LANGE NACHT DER FORSCHUNG

The AIT Austrian Institute of Technology was represented at this year's Lange Nacht der Forschung with exciting stations at a total of four locations. In Vienna, Graz, Braunau and Tulln, visitors of all ages were offered fascinating insights into the world of applied research.
The topics ranged from health and sustainability to cutting-edge technologies and artificial intelligence. The high level of participation by children, who enthusiastically took part in small experiments, was particularly pleasing.

AIT Managing Director Brigitte Bach together with FFG Managing Director Karin Tausz, Climate Protection Minister Leonore Gewessler and BMK Section Head Henriette Spyra at the Lange Nacht der Forschung.

AIT IS FIRMLY ANCHORED IN THE EUROPEAN NETWORK EARTO

Excellent science is international - this applies both to cooperation on research topics and the recruitment of highly qualified researchers. „For the AIT Austrian Institute of Technology, integration into international and especially European networks is therefore key," emphasizes Brigitte Bach, spokesperson for the AIT Management Board.

The EARTO (European Association of Research and Technology Organizations) is an important organization in this regard: This association of research and technology organizations connects more than 350 RTOs in 23 countries; EARTO members represent 150,000 researchers who operate a wide range of research and technology infrastructures.

The AIT plays a special role in this: Brigitte Bach was appointed to the Executive Board and Treasurer at the organization's annual conference in Warsaw in mid-May - she is therefore part of the EARTO Steering Committee, which also includes representatives from other leading RTOs in Europe (such as the Spanish Tecnalia and the French CEA).

PROMOTING GIRLS IN THE MINT FIELD

As part of the Vienna Daughters' Day, the AIT Austrian Institute of Technology once again gave interested girls between the ages of 11 and 16 an insight into the fascinating world of cutting-edge research this year. Together with scientists and Climate Protection Minister Leonore Gewessler, the focus was on getting girls excited about technological and scientific challenges and actively involving them in these areas.

Explicitly and repeatedly addressing girls is important, as they are often reluctant to choose a career in technology when it comes to choosing an apprenticeship or profession. „The R&D sector is still not permeable enough for girls and

women. In order to meet the challenges of the future, we need to harness the creativity and innovative power of all talents," says AIT Managing Director Brigitte Bach.

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