

# The Impact of the Ukraine war on the Arctic

The Arctic is considered one part of the world particularly affected by climate change, with rising temperatures transforming access to the region and its resources. This makes it an emerging geopolitical hotspot for great power competition and warrants a closer analysis of contemporary dynamics. Resource mining is becoming possible and new shipping routes are opening in the Northwest and Northeast Passages, providing alternatives to existing southern routes. In addition, fishing grounds are expanding northward. These emerging opportunities create new desires and challenges in the Far North.

On August 2, 2007, Russia sent two submarines to the geographic North Pole and anchored the Russian flag on the seabed. This symbolic act demonstrated Russia's territorial claims and drew attention to the region.2 Already in 2001, Russia had become the first state to apply to the United Nations for an extension of its own Exclusive Economic Zone (EEZ), which assures a state of sovereignty over all resources located within. The reason given by Russia was that its continental shelf extends undersea into the Arctic Ocean.3 The application was not accepted, because there is no consensus on the geographic delimitation of undersea features in the Arctic. Canada and Denmark made similar requests to extend their sovereign rights. However, these overlap with Russian claims, which create a conflict regarding the division of the Arctic Ocean.

As climate change progresses, the Arctic is gaining geopolitical significance. Potential economic opportunities arise from the exploitation of energy resources such as oil and gas, and the new exploration of lucrative fishing grounds. In addition, the use of polar shipping routes, which would provide a shorter connection between Eurasia and North America, is attractive to many actors. These new opportunities create overlapping interests and security challenges. In addition to the aforementioned factors, Russia's invasion of Ukraine

in February 2022 significantly changes the situation. Even if the war has not spread to the Arctic, it will undoubtedly impact the geopolitical situation and cooperation between the Arctic States.

#### **Governance Structures**

In 1996 the Arctic Council was established as the main intergovernmental regional platform. It consists of the eight Arctic States and six indigenous peoples' organizations. The Arctic Council is designed to promote cooperation, coordination, and interaction among the Arctic States and to engage Arctic indigenous communities. The Council addresses issues of sustainable development and environmental protection in the Arctic. Military security is deliberately excluded to allow open communication between the Western Arctic States and Russia.

## Remilitarization

The new accessibility of northern borders areas has led to increased rivalry and mistrust among the Arctic States in recent years, following a long period of peaceful cooperation. This has also been triggered by new influential actors, primarily China, placing a greater focus on the Arctic. Since the Cold War, the Arctic had minimal geopolitical significance. Previously it was an important supply corridor for NATO, especially during a potential confrontation between the two blocks. Moreover, the two superpowers, the U.S. and the Soviet Union, were only a few kilometres apart in the Arctic.

Due to climate change, the sea ice in the Arctic is retreating further every year. This means that more and more operations can be carried out further north. As a result, rivalry within the polar circle is increasing. In addition to the new geographical accessibility, resources such as oil and natural gas are becoming more accessible. The Arctic States are interested in accessing these resources and opportunities to

bring them under their control. This rivalry for resources, shipping lanes, and geopolitical power has led to increased military armament.

Russia pursues respective militarization to achieve its own economic goals, but also to be able to defend its territory in case of a crisis. The focus here is on an increased presence in the North Atlantic, which Canada and the U.S. would have to cross to be able to support NATO allies in the case of conflict. The "new" northern border created by climate change will thus be protected by an increased military presence.

To this end, more than 50 military bases from the Soviet era have been reactivated and renovated.6 In addition, investments have been made in new radars and satellites to improve the Russian early warning system, and in fighter jets and missile defence systems to strengthen defensive and deterrent capabilities. These upgrades are particularly implemented in the Western Arctic under command of the headquarters of the Russian Northern Fleet on the Kola Peninsula. The latter is equipped with nuclear submarines, aviation capabilities, coastal forces, ground forces, and surface ships with missile and anti-submarine capabilities.7 In addition, Russia is developing military capabilities tailored to the Arctic, such as special drones, armed transport vehicles, and all-terrain vehicles. The operational capability of the Northern Fleet is regularly verified in training exercises.8

Russian activities in the Arctic are noted and responded to by the U.S. and other NATO members. The strategies of Arctic States in North America and Europe are increasingly addressing the issue of security. In the strategy papers of the individual Arctic States, military security concerns are playing an increasingly crucial role, in addition to climate change, economic development, and collaboration. In recent years, NATO itself has turned its attention to the Far North, and the challenges and changes there.



The U.S. has long neglected the Arctic in its strategy documents. However, in the fall of 2022, the U.S. published its "National Strategy for the Arctic Region". The program consists of four pillars: "Security", "Climate Change and Environmental Protection", "Sustainable Economic Development", and "International Cooperation and Governance". The fact that "Security" is mentioned first shows the growing importance of protecting the region against foreign threats. Various documents emphasize the need for an increased military presence in the Arctic, but the focus had been on other conflict hotspots.

The diverging foci of the U.S. and Russia become clear when assessing available capabilities. The U.S. currently commands two icebreakers, whereas Russia employs over 50.10 However, the U.S. plans further to upgrade its fleet with the Polar Security Cutter program. Since the Trump administration, the U.S. has again placed greater focus on the Arctic and a special ambassador for the Arctic region was installed. In addition, the U.S. is increasingly participating in military exercises with NATO allies in the region. Similar to Russia, the U.S. has begun reactivating bases in the region, as well as providing funding to modernize and expand existing bases in Greenland and Iceland. Furthermore, it was announced in 2022 that the North American Aerospace Defense Command (NORAD) would be brought up to date. In particular, early warning systems are to be modernized and expanded. Canada itself has announced that it will invest \$30 billion in Arctic affairs over the next two years, of which \$3.8 billion are earmarked specifically for NORAD.

NATO's focus remained on other regions as well, due to the fact that non-Arctic members have different priorities. Nevertheless, the involvement of both multilateral actors and individual states is increasing. An example is the "Cold Response" exercise that takes place every two years in Norway since 2006. The most recent "Cold Response" in March 2022 was a massive exercise in southeastern, central, and Arctic Norway involving 30.000 troops, 20 aircraft, and 50 naval vessels, including capital ships such as aircraft carriers. Also worth mentioning

is the Arctic Challenge 2023, which took place in Rovaniemi, Finland, for two weeks at the end of May. In this air exercise, the Nordic countries of Norway, Finland, and Sweden invited NATO countries to train together. The exercise involves intense scenarios both for crews on the ground and in the air. The aim of the exercise is to learn from each other, and share experiences and approaches. Initially, this exercise took place only among the Nordic countries, but since 2013 other NATO members have also been invited, which shows the increased activity in the Far North.<sup>11</sup>

As a non-Arctic actor, China has become more active in the region. However, China's military presence has not yet increased. China's growing influence continues to focus on economic and political aspects. First doubts are being voiced by the U.S. that Chinese dual-use assets could be used for civilian as well as military aspects.

In the coming years, China plans to further expand ground and satellite-based communications in the Arctic. These could be used for safer shipping, but also for military purposes. At the latest since 2018, with the publication of an Arctic White Book in which China calls itself a "Near-Arctic State", China has been laying claim to the Arctic. Even though China's northern border is still about 1500 km to the South of the Arctic Circle. China's White Book on the Arctic mainly specifies environmental responsibility, sustainability, cooperation, and scientific research. Beyond that, however, unmistakable demands on resources can be identified. Notably, China claims that the Arctic has lost its regional status due to climate change and has relevance for the entire world.

Over the past decade, China and Russia have advanced various research and development projects in the Arctic.

These activities include close cooperation between research institutions and the militaries of both countries. One focus is on research into underwater acoustics, a key technology for detecting naval activity. The two countries have also integrated their satellite-based navigation systems, suggesting an exchange of intelligence data.

Despite Russia's invasion of Ukraine, China and Russia have continued their joint military manoeuvres. These exercises include tactical manoeuvres, strengthening communications, artillery bombardment, and ship-based helicopter flights. Although China's interests in the Arctic do not always align with Russia's, Russia's growing dependence on China reinforces their shared geostrategic ambitions. These include balancing U.S. influence over other Arctic littoral states and expanding military and economic control over polar sea routes.<sup>12</sup>

#### Developments due to the War in Ukraine

The Russian war of aggression against Ukraine has altered the status quo in the Arctic. This has particular relevance for the cooperation between the Arctic States, which is essential considering the advancing climate change. Due to the war, regional cooperation with Russia was put on hold. On March 3, 2022, all members of the Arctic Council, except Russia, decided to suspend the Council's work in response to the Russian invasion.13 Other initiatives and projects, which were implemented together with Russia, followed suit. The seven Arctic States decided to continue their activities for environmental protection and sustainable development without Russia. The treaties negotiated in recent years under the auspices of the Arctic Council, such as the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, remain in force. However, the tense situation will make multilateral cooperation much more difficult in the coming years.

Another consequence of the Russian war against Ukraine is the expansion of NATO. Both Finland and Sweden applied for membership in the alliance shortly after Russia's invasion. Finland already joined NATO on April 4, 2023. Sweden's accession is probably only a matter of time. This would make every other member of the Arctic Council a NATO member and isolate Russia even more. Finland's accession in particular has a major impact on Russia's sense of security. The accession doubles the NATO-Russia border, with major parts in Arctic areas. While this has implications for defence



responsibilities on both sides, NATO gains more opportunities and options for positioning its resources in the Far North. The integration of the two Arctic nations improves NATO's ability to access and prepare for conflicts in the region. 14 The two nations bring capable forces that have experience in the Arctic and the weather conditions that prevail there. Finland also has one of the strongest artilleries in Europe and is a leading manufacturer of icebreakers.

Finland's membership was strongly criticized by the Russian side, and even beyond that, tensions between the states in the region grow. Russia, for example, accused Norway of violating the treaties on the access to the Spitsbergen archipelago and threatened it with unspecified consequences. Moreover, in June 2022, Russia tightened border controls with its Arctic neighbours Finland and Norway.15 Another consequence of the Russian war in Ukraine is the sanctions regime against Russia. A large number of these sanctions are relevant to the Arctic region and Russia's economic interests there. Both the U.S. and European countries have banned oil and gas imports from Russia. Much of Russia's oil and gas is produced in the Arctic. Russian companies now must look for new markets, as business plans were primarily focused on the European market.16 This conversion will be associated with high costs, and it remains to be seen whether Russia will even find buyers in large quantities and at the price that the European countries were willing to pay.

In addition to the Western bans on imports of Russian resources, the sanctions have also affected Russia's northern energy projects. For example, many of Russia's projects have been implemented with financial and technical support from abroad, including from Western countries. European companies, such as the French energy company TotalEnergies, are rejecting further collaboration with Russian enterprises and are withdrawing from projects. Companies from outside of Europe follow suit or sell their shares of Russian companies. These developments cast doubt on Russia's ability to realize its ambitions in Arctic energy development.

Another repercussion of the Russian war are upgraded Sino-Russian relations. Being cut-off from the West and its markets and investments, Russia has to rely on other partners. Even before the war, Russia and China increased joint defence cooperation because of their shared antipathy toward the United States and NATO. They have conducted joint naval manoeuvres since 2012.17 China has profited from the deteriorating relations. Due to the West's economic sanctions against Russia, which have already been expanded since 2014 due to the annexation of Crimea, Russia has become increasingly dependent on Chinese investment and cooperation. Despite the deepening relations between Russia and China, the latter tends to keep a low profile in the current conflict. China's largest trading partners are still the U.S. and the European Union, and there is no interest in worsening these relations.

Just before Russia attacked Ukraine, Putin and Xi stated that joint projects for sustainable development in the Arctic should be deepened and that the friendship between the states was "unlimited." This did not change after Russia invaded Ukraine, even though it violated the principles of Chinese foreign policy. Fearing Western sanctions, China does not support Russia with more military equipment than before the invasion, but criticizes Western sanctions and weapon shipments, as well as NATO expansion. 18

#### Outlook

The political situation in the Arctic has been permanently changed by the Russian war of aggression against Ukraine and is highly unlikely to return to the pre-war status quo in the future. Russia's isolation in the region has far-reaching implications. The ongoing climate change is more evident in the Arctic than in other regions of the world and requires close cooperation. Russia's isolation removes the actor with the largest territory in the region, which means that climate protection and sustainability programs can no longer be implemented there. In particular, Russian territories provide an important place to monitor climate change and permafrost

thaw. As a result, Western scientists no longer have access to important data and research that has implications far beyond the region.<sup>19</sup>

The economic sanctions have resulted in Russia opening to other actors. It can be expected that cooperation with China in the Arctic will intensify. Russia's isolated situation offers new lucrative opportunities, especially for China, and to gain influence in the Arctic through investments. An increased engagement of China, which calls itself a "near Arctic State", could further complicate the relations in the region, since especially the U.S. wants to limit Chinese influence around the globe.

The security situation in the region in particular is in transition. The already completed accession of Finland to NATO and the forthcoming accession of Sweden will shape Russia's sense of security and Moscow will be forced to strengthen its extended border with NATO. In addition, the accession of the two countries could lead to increased NATO exercises in the Arctic and thus more exercises near the border with Russia, which would reinforce the spiral of rearmament on both sides.

Western sanctions will further affect the Russian economy and threat perceptions, which will result in Russia having to set new priorities in the reorganization of its armed forces. A redeployment of NATO forces to its eastern borders will lead Russia to prioritize its western borders. However, a weakened Russia can also be expected to further develop its nuclear deterrent. Most of its ballistic missile submarines are stationed on the Kola Peninsula, and thus in the Arctic and in proximity to the NATO border.

By prioritizing its Western and Arctic borders, Russian forces will be concentrated even more than before in the European Arctic, driven by the new threat scenario created by NATO enlargement. The so-called Kirov-Railway between St. Petersburg and Murmansk is a key supply route for the Arctic. It runs near the Finnish border and is crucial for military logistics in the north. Therefore, one Russian focus will



be on protecting and safeguarding this route against potential interdiction.

In addition, Russia's sensitivity to increased activity by NATO units in the region will grow. Therefore, it will be important on the part of NATO to conduct meaningful escalation management and not to underestimate Russian response capabilities, especially around the Kola Peninsula. There is currently no indication that Russia intends to reduce its forces in the Arctic, as the Kremlin also plans to continue economic projects that provide the background for an expanded military presence. In Russia's current naval strategy, the activities of the U.S. and NATO in the region are seen as a threat, which means that the Russian Northern Fleet will intensify and expand its activities.21

On the other hand, it can also be expected that stabilization settles in with a certain threat level. With its attack on Ukraine, Russia is attempting, among other things, to prevent Ukraine's integration into the Western block. Finland, as a member of the European Union, was one of NATO's closest allies even before it joined NATO, and an attack by Russia would be less of a hindrance to Euro-Atlantic integration than in Ukraine. Moreover, as long as the war in Ukraine is waged, Russia's focus remains on that conflict, and it would thus be strategically very unwise to open another front. Russia's military capabilities are already reduced by the war and Western sanctions.

The war also has a clear impact on Russian forces stationed on the Kola Peninsula. In the course of the invasion, Russia has deployed a large part of its northern forces to Ukraine and the Black Sea region.<sup>22</sup> The land forces on the Kola Peninsula have significantly been reduced to only a fifth of their original numbers before the invasion, with 80 percent of them being deployed to Ukraine. Presently, the land forces on the Kola Peninsula consist of the 200th Brigade in Pechenga, the 61st Naval Infantry Brigade in Sputnik, and the 80th Arctic Motor Rifle Brigade in Alakurtti.<sup>23</sup>

The 200th Separate Motor Rifle Brigade suffered the most significant losses during the Ukrainian invasion. These soldiers were deployed to Kharkiv in the initial stage of the Russian invasion, and by last fall, they had lost two battalion tactical groups, totalling 1,500 soldiers. Approximately half of the troops from the Murmansk region were lost during the conflict. In addition, the Northern fleet lost around 100 tanks and armoured vehicles in Ukraine.

These developments show that Russia's current focus is on Ukraine, forcing it to neglect other regions. The large losses in Ukraine, especially among the Northern Fleet forces, reduce Russia's options in the Arctic in the short term. The loss of these troops, specifically equipped and trained for missions in the Arctic climate and geography, will limit Russian capabilities to operate in such conditions. Under these circumstances, Russia should have no interest in expanding another conflict in the Arctic. Moreover, it is hardly foreseeable when Russia will regain full troop strength in the Arctic after the losses of the war and the sanctions limiting rearmament.

Russia should have an interest in ensuring that the Arctic remains a zone of peace to continue the major economic projects on which the country's economy depends. However, Putin has presented himself as unpredictable, which means that a variety of scenarios is possible. With the increased military presence in the Arctic, even small accidents can lead to escalation. In addition, it is also possible that a conflict between Russia and NATO in another region continues as a "spillover effect" in the Arctic. There, Russia still enjoys the unrestricted status of a great power. Moscow currently sees itself as militarily superior to all other states in the region, which is why, in the case of an escalation between Russia and Western states, an attempt could be made to settle the conflict or gain leverage in this region.

## Conclusion

Even though the Russian war of aggression against Ukraine has not directly spread to

the Arctic, the conflict has permanently changed the situation there. Previously close cooperation in the Arctic Council has been suspended, with far-reaching consequences for climate and environmental research in the Arctic.

Due to Russia's isolation, the Arctic faces major challenges. Important environmental protection programmes can no longer be implemented with and in Russia. The NATO countries are moving closer together and trying to implement the projects without it. In addition, Finland's accession and Sweden's imminent entry into NATO are further hardening the fronts. This has ramifications for Russia's sense of security and will drive a fast remilitarization. Isolation and sanctions against Russia will most likely lead to Russia relying more on Chinese investment, specifically to implement its complex projects in the Far North. This increases China's influence in the Arctic and could lead to additional tensions with Western countries. Renewed cooperation between Western countries and Russia is not foreseeable at this stage and competition in the Arctic between these two blocks will intensify.

Finland's accession to NATO significantly increases the Alliance's military expertise for Arctic conditions. Joint exercises have been conducted in the Arctic for years and the alliance's regional capabilities continue to increase. Russia also attaches great importance to the Far North and plans to continue upgrading the region with new infrastructure. However, its military capabilities are limited at this point due to the war in Ukraine. A large part of the troops stationed in the Arctic have been deployed there and took considerable losses. Added to this are Western sanctions, which further limit Russian ability to rebuild these capabilities. However, Russia will prioritize to rebuild its troops on the Kola Peninsula due to its significance. Increased military deployments and manoeuvres in the Arctic by both sides will thus deepen the potential for conflict.

Resource extraction in the region likewise remains difficult due to extreme climatic

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conditions. In addition, infrastructure projects have been halted or delayed due to reduced cooperation and Western investments. If resources become more accessible due to climate change in the next years, the tense situation between the Western and Russia could become ever more serious.

Overall, the war against Ukraine has led to a deterioration of the situation in the Arctic. Cooperation and coordination among Arctic States have been disrupted, and tensions have increased. Military presence and rivalry both grow and will lead to more friction. The impact of the war on the Arctic will shape the geopolitical situation there in the coming years and bring new challenges and risks.

#### **About the Author**

Jonas Winkel holds a bachelor's degree in geography from Goethe University Frankfurt am Main and a master's degree in international development studies from the University of Vienna. His main focus is on security, defence and international cooperation. During and after his studies he gained first professional experiences at the ECFR, the AIES, the EU Parliament and the GIZ.

#### **Endnotes**

- 1) Humrich, Christoph, (2011): Ressourcenkonflikte, Recht und Regieren in der Arktis. Aus Politik und Zeitgeschichte. https:// www.bpb.de/shop/zeitschriften/apuz/33503/ressourcenkonflikte-recht-und-regieren-in-der-arktis/
- 2) Braune, Gerd, (2016): Die Arktis, Porträt einer Weltregion. Bundeszentrale für politische Bildung.
- 3) O'Rourke, Ronald, (2017): Changes in the Arctic: Background and Issues for Congress. CRS Report.
- 4) Uebachs, Isabel, (2018). Geopolitische Folgewirkungen des Klimawandels in der Arktis Ökonomische Chancen und ökologische Herausforderungen als komplexes internationales Konfliktpotential. (IPW Selected Student Paper, 63). Aachen: Rheinisch-Westfälische Technische Hochschule Aachen, Philosophische Fakultät, Institut für Politische Wissenschaft. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-58621-1.
- 5) The members of the Arctic Council are Russia, the U.S., Canada, Norway, Denmark, Sweden, Finland and Iceland.
  6) Conley, Heather and Matthew Melino, (2020): "The Ice Curtain: Russia's Arctic Military Presence", CSIS, https://www.csis.org/

features/ice-curtain-russias-arctic-military-presence.

- 7) Kopra, Sanna and Collin Wall, (2022): Ein Neues Klima: Die Auswirkungen des russischen Krieges auf die schmelzende Arktis. Policy Brief. Friedrich Naumann Stiftung. https://www.freiheit.org/de/deutschland/die-auswirkungen-des-russischen-krieges-auf-die-schmelzende-arktis.
- 8) "Arctic Military Activity Tracker", CSIS. Accessed June 19, 2023. https://arcticmilitarytracker.csis.org/.

- 9) The White House (2022): National Strategy for the Arctic Region. Washington D.C. https://www.whitehouse.gov/wp-content/uploads/2022/10/National-Strategy-for-the-Arctic-Region.pdf. 10) Woody, Christopher, (2020): As US tries to close 'icebreaker gap' with Russia, its only working icebreaker is making a rare trip north. Business insider. https://www.businessinsider.com/us-worried-about-icebreaker-gap-with-russia-in-arctic-2020-11.
- 11) Joliet, David, (2023): Arctic Challenge Exercise 2023 Im Norden wird gemeinsam trainiert. Die Bundeswher. Arctic Challenge Exercise 2023 Im Norden wird trainiert (bundeswehr.de).
- 12) Merkle, David, (2023): The Self-Proclaimed Near-Arctic State. International Report 1/2023. Konrad Adenauer Stiftung. International Reports 1/2023 (kas.de).
- 13) Hilde, Paal, (2022): Auf Eis gelegt: Sicherheitspolitik und internationale Beziehungen in der Arktis nach der Zeitenwende. BAKS-Papiere. 08/22. https://www.baks.bund.de/sites/baks010/files/arbeitspapier\_sicherheitspolitik\_2022\_8.pdf.
- 14) Claesson, Michael and Zebulon Carlander, (2022): How Sweden and Finland Can Bolster NATO. War on the Rocks. https://warontherocks.com/2022/07/how-sweden-and-finlandcan-bolster-nato/.
- 15) Staalesen, Atle, (2022): Russia security official says borders with Nordic countries must be strengthened. Arctic Today. htt-ps://www.arctictoday.com/russia-security-official-says-borders-with-nordic-countries-must-be-strengthened/.
- 16) Staalesen, Atle, (2022a): How the EU's latest sanctions could halt Russia's Arctic oil plans. Arctic Today. https://www.arctictoday.com/how-the-eus-latest-sanctions-could-halt-russias-arctic-oil-plans/.
- 17) Blivas, Alec, (2021): Sino-Russian Military Exercises Signal a Growing Alliance. U.S. Naval Institute. https://www.usni.org/magazines/proceedings/2021/june/sino-russian-military-exercises-signal-growing-alliance.
- 18) Martina, Michael, (2022): China not giving material support for Russia's war in Ukraine. Reuters. https://www.reuters.com/world/china-not-giving-material-support-russias-war-ukraine-us-official-2022-07-01/.
- 19) Paul, Michael, (2023): Arktische Kollateralschäden des russischen Angriffskrieges. Stiftung Wissenschaft und Politik. https://www.swp-berlin.org/publikation/arktische-kollateralschaedendes-russischen-angriffskrieges.
- 20) Staalesen, Atle, (2022b): Isolated Russia says it will invite "non-Arctic" states to develop its North. The Independent Barents Observer. https://thebarentsobserver.com/en/arctic/2022/04/isolated-russia-says-it-will-invite-non-arctic-states-develop-its-north.
- 21) Humpert, Malte, (2022): Russia's militarization of the Arctic shows no sign of slowing down. The Arctic Institute.
  22) Wall, Colin and Njord Wegge, (2023): The Russian Arctic Threat. CSIS Briefs. Center for Strategic and International Studies.
  230125\_Wall\_RussianArcticThreat\_0.pdf (csis-website-prod. s3.amazonaws.com).
- 23) Kuczyński, Grzegorz, (2023): Russia moves troops from Far North to Ukraine. Warsaw Institute. Russia Moves Troops From Far North To Ukraine | Warsaw Institute.



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Dr. Langweg 3, 2410 Hainburg/Donau Tel. +43 (1) 3583080 E-Mail: office@aies.at Website: www.aies.at

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