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Risk Governance and Transatlantic Cooperation in Space

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How can transatlantic partners cooperate on risk governance in space?

What types of risk exist in space?

Today, outer space is used for many applications that have become very important to modern societies: communication, Earth observation, and navigation. Most space technologies are inherently dual-use, i.e., they can be used for a civilian as well as a military purpose. Space has become part of the critical infrastructure of modern societies. In particular the United States and Europe have a stake in ensuring the use of space for these applications. This makes it advisable to consider the risks that exist for the sustainable use of space, such as the increasing amount of orbital debris and the prospect of an arms race in space. These risks can only be tackled in a meaningful way through international cooperation. Increased transatlantic cooperation matters particularly because the United States and Europe are significant actors in space, with the United States being the primary space power. While there are certain differences in preferences of how to tackle those risks, there are important similarities that create opportunities for stronger transatlantic cooperation in risk governance in outer space.

Risks for the Sustainable Use of Space

Outer space is used for a variety of applications, the most common being communication, Earth observation, and navigation. All of these applications and technologies are dual-use in character, meaning that they can be used for a civilian as well as a military purpose. Earth observation satellites provide important data that help us to better understand conditions on Earth. This data can be used for modern climate and environmental research, as well as for military reconnaissance. Satellites are an important part of the global communication network as well. Particularly for countries with a less developed ground-based communication infrastructure, they provide an attractive, less expensive alternative. Communication satellites are indispensable for military communication because they allow fast and secure data transfer. One of the most well-known space applications is the Global Positioning System (GPS) that was developed by the U.S. military as a navigational aid and is still under military management. It is used to perform several important military tasks such as the navigation for troops and vehicles, mission planning, and the guidance of precision munitions. In the meantime, the GPS signal is used for a vast number of civilian applications as well. It has contributed to a significant improvement in the effectiveness and safety of modern transport, whether on land, water, or in the air. More and more people make use of satellite navigation in order to travel from point A to B.

There are roughly 1,000 active satellites in orbit, but they are not the only objects in space. There is a growing amount of space debris consisting of, among other things, upper stages of rockets and pieces of satellites that have broken apart. Currently, there are more than 17,000 pieces of debris in orbit, each with a diameter of at least ten centimeters and more than 300,000 objects with a diameter of at least one centimeter.[1] These objects can stay in orbit for many years before they reach a point where they burn up in the atmosphere and because of their tremendous speed—7 km/second and more—they pose a risk to active satellites. A collision with a small object of only one centimeter in diameter produces the energy of an exploding hand grenade.[2] The International Space Station (ISS) had to conduct several maneuvers in order to avoid significant risks of collisions with larger pieces of debris.

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In addition, there is a security dimension as well. The use of space for military purposes that started with the launching of reconnaissance satellites in the 1960s created the incentive to develop technologies to attack satellites in order to deny their military benefits to an opponent. During the Cold War, both the United States and the Soviet Union began work on such anti-satellite (ASAT) weapons.[3] However, despite testing some ASAT technologies, both superpowers refrained from full scale development and deployment of such space weapons. The reason for this restraint was likely the strategic value of early warning satellites that the United States and the Soviet Union did not want to put at risk because attacks on those satellites could have triggered a dangerous escalation dynamic.[4]

The issue of an arms race in space received a new wave of attention after 2001 when the Bush administration proclaimed a need for the United States to be able to exercise "space control." This was expressed in the official U.S. Space Policy of 2006: "[…] the United States will […] deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests; […]."[5] In parallel, funds for research and development of respective technologies such as lasers or microsatellites increased. It is important to note that several technologies that are developed under the heading of missile defense can be modified so as to have a certain ASAT capability also.[6] Other space-faring countries, in particular Russia and China, worry about the United States having advanced space weapon capabilities and have threatened to develop space weapons also. Such threats should not be neglected. From the Soviet era, Russia is still in possession of considerable know-how of ASAT technology. China demonstrated in 2007 its capability of developing ASATs when it destroyed its own weather satellite with a modified ballistic missile.[7]

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An arms race in space would add another risk to space systems. Satellites would not only be in danger of colliding with orbital debris but could become targets of purposeful attacks. Particularly for those states that are less dependent upon space, satellites could become attractive targets in times of crisis. In addition, there is a direct link between an arms race in space and the proliferation of orbital debris. If the ASAT technology used is based on the principle of destroying the satellite, for example, in the case of the so-called "hit-to-kill" technology or by using explosions, testing such technologies can increase the amount of debris significantly. The Chinese ASAT test of 2007, for instance, produced roughly 2,000 new pieces of debris each larger than five centimeters, which meant an increase of 8 percent in the overall debris population.[8]

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Transatlantic Risk Preferences and Space Debris

Both the United States and EU member states recognize orbital debris as a growing risk to their space systems. In the 1970s, the first technical studies on orbital debris were conducted by the National Aeronautic and Space Administration (NASA) of the United States. Due to the seminal work of NASA scientist Donald J. Kessler on the subject, the term "Kessler-Syndrome" was coined for a scenario in which an increase of objects in space leads to a collision cascade that would severely obstruct the use of space.[9] In 1979, NASA established its Orbital Debris Program that contributed significantly not only to further research on the phenomenon of orbital debris, but also to the diffusion of this knowledge and thereby placing debris and the problems it poses for the use of space on the international space policy agenda. In 1987, NASA and the European Space Agency (ESA) began to hold bilateral meetings to discuss the issue. On the basis of those meetings, which were soon thereafter conducted together with the space agencies of additional states, the Inter-Agency Space Debris Coordination Committee (IADC) was established in 1993.[10]

The main approach in Europe and in the United States to the management of the risk of orbital debris is the establishment of preventive measures that aim at the mitigation of newly created debris. In the 1990s, NASA developed its "Orbital Debris Mitigation Standard Practices," which established four central goals and measures for debris mitigation.[11] Examples of such measures are improved designs of upper stages that create less debris when releasing a satellite into orbit or the avoidance of explosions in orbit by releasing the remaining fuel. Another example is the disposal of satellites after the end of their active use by letting them burn up in the atmosphere or by placing them in less crowded orbits. Of course, all these measures increase the costs of launching and operating a satellite. Nevertheless, Europe's space agencies followed the U.S. example and developed similar guidelines that were formalized in the "European Code of Conduct for Space Debris Mitigation," which was signed in 2006 by the space agencies of Germany, France, Great Britain, and Italy, as well as by ESA.[12]

Such technical guidelines were promoted at the international level as well. On the basis of the work done by the national space agencies and, in particular, the IADC, a set of preventive measures similar to the ones mentioned above was adopted by the United Nations Committee on the Peaceful Use of Outer Space (UNCOPUOS) in its Debris Mitigation Guidelines in 2007.[13] It is fair to say that the establishment of those guidelines played a role in the slowdown of the growth of debris that could be observed until the Chinese ASAT test. However, compliance with the Debris Mitigation Guidelines of UNCOPUOS is voluntary and there is no international agreement on rules that go beyond these technical standards. It can be expected that a growing number of actors in space will put the existing rules under stress. Such growth should be expected as a result of both the emergence of new space-faring countries and the increasing privatization of spaceflight. The first successful docking maneuver to the ISS by a commercial space vehicle, which was conducted by SpaceX in May 2012, is considered by many observers to be a harbinger of the future of space flight, and its eventual expansion beyond just the United States.

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Transatlantic Risk Preferences and Space Security

While the Outer Space Treaty (OST) of 1967 clearly bans the deployment of weapons of mass destruction—for example, nuclear warheads—in space, it does not contain explicit restrictions on conventional weapons. This led to several calls for the establishment of new arms control agreements for outer space. In 1985, in the Geneva-based Conference on Disarmament (CD), the so-called Ad Hoc Committee on the Prevention of an Arms Race in Outer Space (PAROS) was established. However, PAROS failed to reach an agreement on a mandate for substantial negotiations and since 1995, the CD has not even agreed on a mandate for PAROS.[14] Nevertheless, this did not preclude states from making proposals for arms control in space. In recent years, China and Russia in particular have been active in this regard. Since 2001, they have brought forward several working papers and issued a draft for a so-called Treaty on Prevention of the Placement of Weapons in

Outer Space and of the Threat to Use Force against Outer Space Objects in February 2008.[15] According to this proposal, the parties to the treaty would not be allowed to deploy any sort of weapon in outer space and/or to resort to the threat or use of force against outer space objects. Clearly, this proposal is flawed because it outlaws the use or threat of force against space objects but not the development and deployment of ground-based ASAT systems (as it was tested by China in 2007). It is, therefore, not surprising that the United States rejected the Chinese-Russian proposal.

The transatlantic partners have not yet managed to come to an agreement on a common approach to space security. One major reason for this is the different preferences and perceptions that exist with regard to the assessment and management of the risk of an arms race in space. On the European side of the Atlantic, an arms race in space is perceived as a risk for the peaceful use of outer space in the future. Already in the early 1980s, even before the establishment of PAROS, western European states were concerned about the threat of an arms race in space. In contrast, the official position of the United States has been that there is no risk of an arms race in space.[16] This does not mean that the United States is not worried about certain developments in space. The United States has the most military satellites in orbit and depends upon them for its way of conducting warfare. Satellite services are indispensable for reconnaissance, navigation, and military communication—as the wars in Iraq and Afghanistan have shown.[17] The United States is well aware that an increasing army dynamic in space might put its own space assets at risk. The National Security Space Strategy of January 2011 refers to space as increasingly "contested."[18] In particular, the growing capabilities of China are of concern to the United States. The fact that China is capable of developing ASAT technology was proven in 2007 and it can be assumed that it seeks to use it as a means to attack the United States at a point where it seems to be vulnerable.[19]

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Risk preferences of Americans and Europeans differ with regard to risk management as well. Several European states were quite active in the CD and made various proposals to establish arms control in and for space. France, for example, with the support of other western European states proposed an ASAT ban in 1983 and 1984.[20] Like several similar proposals for treaty-based arms control, they were rejected by the United States, a position that has since not changed much. The 2006 National Space Policy of the Bush administration states:

"The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests; […]."[21]

Obviously, one reason for the reluctance of the United States toward arms control measures for space is the tremendous technological edge that it enjoys with regard to space technology. As a consequence, it fears that it has the most to lose from restrictions upon such technologies. In addition, it fears that it would not be possible to verify compliance with an agreement.[22] Instead of arms control, the United States pursues a strategy of deterring attacks on its space systems. Reference to such a strategy of deterrence can be found in the space policy of the Bush administration as well as the Obama administration. However, deterring attacks on one's satellites is more difficult the more you depend on them—in relation to the potential attacker. As a consequence, the United States seeks to increase the resilience of its space infrastructure. This can be achieved by several measures. One can make its satellites more robust by means of passive protection, improved cooperation with international partners and/or the commercial sector in order to rely on their capabilities, improved capacities to replace defunct satellites, or improved non-space alternatives.[23]

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In sum, Europeans and Americans favor different strategies to manage the risk that space weapons could entail. While the Europeans prefer to prevent an arms race in space by means of arms control, the United States has focused on a combination of deterrence and the reduction of its vulnerability. In recent years, however, there has been an approximation of positions toward the establishment of rules for responsible behavior in space. In December 2008, the EU issued a draft of a Code of Conduct for outer space activities. This can be seen as a reaction to the U.S. refusal to seriously consider treaty-based arms control. As the name already indicates, this recent EU proposal does not come in the form of a legally binding international treaty, but rather as a non-binding set of norms. Furthermore, *While the Europeans prefer to prevent an arms race in space by means of arms control, the United States has focused on a combination of deterrence and the reduction of its vulnerability.*

instead of banning certain technologies, such as ASATs, the Code of Conduct would establish rules for behavior in space. One of the central provisions of the draft Code of Conduct commits states to "refrain from any intentional action which will or might bring about, directly or indirectly, the damage or destruction of outer space objects […]."[24] The EU draft was discussed with other space-faring nations and revised at certain points in the process. The EU plans to negotiate a Code of Conduct in 2013.[25]

The United States under the Obama administration also shifted positions on space security policy. While its National Space Policy of June 2010 and the National Security Space Strategy of January 2011 point out that deterrence and the improvement of resilience of U.S. space systems play important roles in U.S. space policy, both documents refer at several points to the establishment of norms of responsible behavior in space.[26] This gradual change of position is, in addition to the general openness of the Obama administration to international cooperation, also the result of the incremental learning that an increasing number of actors in space without new rules might significantly enhance the risks for all satellites in orbit—a development of which the United States would be the country most negatively affected.

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Conclusions and Policy Recommendations

On the basis of the preferences identified above, what can be said about the chances for transatlantic cooperation with regard to the risks for the sustainable use of space? First and foremost, the common interest in the mitigation of orbital debris and the recent approximation of positions toward the establishment of rules for responsible behavior in space create room for more transatlantic cooperation. It is in the interest of both the United States and Europe to make use of this leeway. As a first step they should consider the start of negotiations on a code of conduct for outer space in 2013 as a priority of international space policy. To this end, they should be prepared to invest diplomatic resources in order to gain the support of other space-faring countries in this endeavor. However, even if such an effort was successful and major space-faring countries agreed on such a code, this would not be a panacea to deal with the risks for space.

The common interest in the mitigation of orbital debris and the recent approximation of positions toward the establishment of rules for responsible behavior in space create room for more transatlantic cooperation.

While a code of conduct, as proposed by the EU, would establish the rule that states should refrain from the intentional destruction of any object in orbit, such a rule would not hinder states to further develop technologies that can be used as space weapons. It is doubtful whether a voluntary code of conduct will be enough to keep states from using these technologies in a time of intense crisis. Thus, it is important to take action in order to contain the arms dynamic in space and build trust among states. In this regard, Canada made an interesting proposal in 2009. According to the working paper Canada issued in the CD, states could pledge not to test or use a weapon against any satellite, not to place weapons in outer space, and not to test or use any satellite as a weapon against any other object.[27] Specifically, a moratorium on the further testing of space weapons could

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help to curb the arms race in space. The United States has the national technical means to monitor compliance of such a moratorium and would be free to revoke its pledge and react with appropriate measures in case it considers other states to be in violation of their pledges.

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In regard to the mitigation of orbital debris, there is room for increased international and transatlantic cooperation as well. Setting up the IADC and UNCOPUOS debris mitigation guidelines was an important step and surely helped to slow down the growth of debris up until the Chinese ASAT test in 2007. However, these measures will likely be insufficient to keep the risk for satellites at a tolerable level in the long term—particularly if the trend toward the privatization of space continues. Consequently, the EU and the United States together could take the initiative in UNCOPUOS to make the voluntary space debris mitigations obligatory for all space-faring states. This would contain the obligation for states to establish equally high standards for the licensing of private space activities in order to avoid a future race to the bottom with regard to licensing requirements. An alternative to such a strict, top-down licensing process would be to consider economic measures to offer incentives for all space actors, state and non-state, to prevent the creation of debris. An interesting proposal is the collection of fees for space-launches. The fees would vary with the degree to which the operator applies measures that mitigate the creation of debris. Low fees would be the reward for those actors who apply debris mitigation standards and invest in respective technologies. In addition, the fees could be collected into a fund and be used to finance research and development of new technologies that can actively remove larger pieces of debris from orbit.[28] We do not yet have working technologies to "clean-up" space, but research on technologies for active debris removal is already underway. The German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt, DLR), for example, is financing research on a service satellite that could capture uncontrollable satellites and dispose of them in a controlled way.

Consider economic measures to offer incentives for all space actors, state and non-state, to prevent the creation of debris.

There is another field that offers opportunities for increased transatlantic cooperation that would help to cope with the risks in space: Space Situational Awareness (SSA). In short, SSA means knowing what is going on in space; it means observing space with the help of radars and high-performance telescopes. The data on the objects in space and their orbits gathered by these techniques is essential to assess the probabilities of potential collisions with other space objects. On the basis of the results, maneuvers can be planned in order to avoid collisions and the creation of debris that would result from the collision. In addition, if states managed to agree on rules of responsible behavior in space, SSA capabilities could be used to monitor whether states stick to the agreed rules. The United States is clearly the leading power with regard to SSA capabilities. The Space Surveillance Network (SSN), a global network of optical and radar sensors run by the U.S. military, provides the data for a catalogue of space objects.[29] With the exception of classified data on military satellites, the United States shares this data with state and non-state partners in cooperation. The ESA and other European satellite operators use this data for collision warnings as well. In 2008, the ESA started a SSA Preparatory Program in order to improve its own SSA capabilities and to reduce its dependence on the U.S. data. In order to achieve this aim, the ESA program seeks to build upon and connect existing European capacities like the French GRAVES or the German TIRA radar and to supplement them with additional capabilities.[30] If this program succeeds and European SSA capabilities significantly improve in the future, it could pave the way for increased transatlantic cooperation in the form of a more intensive and less one-way data exchange.

1 Cesar Jaramillo, ed., *Space Security Index 2012*, September 2012, <http://www.spacesecurity.org/SpaceSecurityReport2012.pdf> (16 November 2012): 28f.

2 Heiner Klinkrad, ed., *Space Debris. Models and Risk Analysis* (Chichester: Springer, 2006).

3 Paul B. Stares, *The Militarization of Space. U.S. Policy, 1945-1984* (Ithaca, NY: Cornell University Press, 1985).

4 Michael Sheehan, *The International Politics of Space* (London/New York: Routledge, 2007): 102f.

5 U.S. National Space Policy, 31 August 2006, <www.fas.org/irp/offdocs/nspd/space.pdf> (16 July 2012).

6 David Webb, "Space Weapons. Dream, Nightmare or Reality?," in *Securing Outer Space, ed. Natalie Bormann and Michael Sheehan* (London/New York: Routledge 2009): 24-41.

7 Götz Neuneck, "China's ASAT Test. A Warning Shot or the Beginning of an Arms Race in Space?," in *Yearbook on Space Policy 2006/2007. New Impetus for Europe*, ed. Charlotte Mathieu/Nicolas Peter/Kai-Uwe Schrogl (Vienna: Springer 2008): 211-224.

8 Götz Neuneck, "China's ASAT Test. A Warning Shot or the Beginning of an Arms Race in Space?," in *Yearbook on Space Policy 2006/2007. New Impetus for Europe*, ed. Charlotte Mathieu/Nicolas Peter/Kai-Uwe Schrogl (Vienna: Springer 2008): 211-224.

9 Donald J. Kessler and Burton G. Cour-Palais, "Collision Frequency of Artificial Satellites. The Creation of a Debris Belt," *Journal of Geophysical Research* 83:6 (June 1978), p. 2637-2646.

10 Committee for the Assessment of NASA's Orbital Debris Programs, *Limiting Future Collision Risk to Spacecraft. An Assessment of NASA's Meteoroid and Orbital Debris Programs* (Washington, DC: 2011): 7ff.

11 U.S. Government, *Orbital Debris Mitigation Standard Practices*, 1997, <http://www.orbitaldebris.jsc.nasa.gov/library/USG_OD_Standard_Practices.pdf> (5 September 2012).

12 European Code of Conduct for Space Debris Mitigation, 28 June 2004, <http://www.cnsa.gov.cn/n615708/n676979/n676983/n893604/appendix/200852915 1013.pdf> (17 September 2012).

13 United Nations, *Report of the Committee on the Peaceful Uses of Outer Space* (A/62/20), United Nations, 2007, <http://www.oosa.unvienna.org/pdf/gadocs/A_62_20E.pdf> (27 November 2012), Annex.

14 On the debate about space security within the system of the United Nations, see Detlev Wolter, *Common Security in Outer Space and International Law* (Geneva: United Nations Institute for Disarmament Research, 2006).

15 Conference on Disarmament, *Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat to Use Force against Outer Space Objects* (CD/1839), 29 February 2008, <http://www.geneva.mid.ru/space/CD_1839_280208_eng.pdf> (27 November 2012).

16 Detlev Wolter, *Common Security in Outer Space and International Law* (Geneva: United Nations Institute for Disarmament Research, 2006): 64f, 77f.

17 Michael Sheehan, *The International Politics of Space* (London/New York: Routledge 2007): 94ff.

18 U.S. Department of Defense and U.S. Office of the Director of National Intelligence, National Security Space Strategy. Unclassified Summary, January 2011, <http://www.defense.gov/home/features/2011/0111_nsss/docs/NationalSecuritySpace StrategyUnclassifiedSummary_Jan2011.pdf> (2 October 2012).

19 Ashley J. Tellis, "China's Military Space Strategy," *Survival* 49:3 (Fall 2007), p. 41-72; Michael Sheehan, *The International Politics of Space* (London/New York: Routledge 2007): 164f.

20 Detlev Wolter, *Common Security in Outer Space and International Law* (Geneva: United Nations Institute for Disarmament Research, 2006): 62f.

21 U.S. National Space Policy, 31 August 2006, <www.fas.org/irp/offdocs/nspd/space.pdf> (16 July 2012), p. 2.

22 For a critical discussion of these propositions see Max M. Mutschler, "Keeping Space Safe. Towards a Long-Term Strategy to Arms Control in Space," *Peace Research Institute Frankfurt* (PRIF) Report No. 98, December 2010.

23 U.S. Department of Defense and U.S. Office of the Director of National Intelligence, National Security Space Strategy. Unclassified Summary, January 2011, <http://www.defense.gov/home/features/2011/0111_nsss/docs/NationalSecuritySpace StrategyUnclassifiedSummary_Jan2011.pdf> (2 October 2012), p. 11; U.S. Department of Defense, *Fact Sheet: Resilience of Space Capabilities*, <http://www.defense.gov/home/features/2011/0111_nsss/docs/DoD Fact Sheet - Resilience.pdf> (4 October 2012).

24 Council of the European Union, ed., *Draft Code of Conduct for Outer Space Activities*, 3 December 2008, <http://www.eu2008.fr/webdav/site/PFUE/shared/import/1209_CAGRE_resultats/Code %20of%20Conduct%20for%20outer%20space%20activities_EN.pdf> (27 November 2012), p. 8.

25 For a detailed discussion of the EU as an actor in the field of space security see Max M. Mutschler and Christophe Venet, "The EU as Emerging Actor in Space Security?," *Space Policy* 27:2 (May 2012), p. 118-124.

26 The White House, National Space Policy of the United States of America, 28. June 2010, <http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf> (23 August 2012); U.S. Department of Defense and U.S. Office of the Director of National Intelligence, National Security Space Strategy. Unclassified Summary, January 2011, <http://www.defense.gov/home/ features/2011/0111_nsss/docs/NationalSecuritySpaceStrategyUnclassifiedSummary_Jan2011.pdf> (2 October 2012).

27 Conference on Disarmament, *On the Merits of Certain Draft Transparency and Confidence-Building Measures and Treaty Proposals for Space Security* (CD/1865), 5 June 2009, <http://www.unog.ch/80256EDD006B8954/ %28httpAssets%29/C40D0B92E5F37A9CC12575FC003BCE37/$file/CD_1865_E.pdf> (27 November 2012).

28Andrew M. Bradley and Lawrence M. Wein, "Space Debris. Assessing Risk and Responsibility," *Advances in Space Research* 43:9 (May 2009), p. 1372-1390 (1381f).

29 Committee for the Assessment of NASA's Orbital Debris Programs, *Limiting Future Collision Risk to Spacecraft. An Assessment of NASA's Meteoroid and Orbital Debris Programs* (Washington, DC: 2011): 9.

30 For more information on the SSA activities of ESA see <http://www.esa.int/esaMI/SSA/index.html> (20 September 2012).

Economic and financial market risks; the consequences of climate change, terrorism, and organized crime; supply security of energy and raw materials; the increase of cybercrime; and the vulnerability of critical infrastructure—governments, businesses, and societies face numerous systemic risks. Purely national approaches to cope with these transnational challenges are doomed to fail. In fact, there is a need for international cooperation. The United States and the EU are key players in this context—without the two economic and political heavyweights, systemic risks cannot be handled adequately. Despite the high degree of integration of their economies, sound political relations, and similar vulnerabilities to systemic risks, cooperation between the two partners is often difficult.

ADDITONAL ANALYSIS IS AVAILABLE ONLINE:

White, Grey, and Black (Euro) Swans: Dealing with Transatlantic Financial Risk in 2012, by Matthias Matthijs (2012)

Climate 2.0 – Can Geoengineering Make the World a Safer Place?, by Sabrina Schulz (2012)

Jessica Riester and Kirsten Verclas, *Nuclear Energy in the U.S. and Germany: Weighing the Risks*, AICGS Issue Brief 52 (2012).

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