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Cooperative Airspace Security in the Euro-Atlantic Region

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Executive Summary

This paper offers an overview of existing arrangements and provides a discussion of policy challenges involved in constructing a regional Euro-Atlantic capability to jointly monitor and counter common airspace threats through the networking of military and civil air traffic control systems.ⁱ It argues that a strengthened political, financial, and technical commitment to build a cooperative airspace security system is a “win-win” area for NATO-Russian engagement that would promote regional military transparency, deepen cooperation against airborne terrorism, and enhance regional crisis stability. Deeper and broader regional airspace security arrangements would also foster the culture of cooperation, transparency, and confidence built between all Euro-Atlantic states—large and small—through practical civil-military cooperation.

In a May 2010 op-ed, U.S. Vice President Joseph Biden wrote of the “vital” need to “adapt” Euro-Atlantic security institutions “to the challenges—and opportunities—of a new era.”¹ He noted the importance of “reciprocal transparency” of military forces, called for improved cooperative means to deal with “external challenges,” argued for more “effective conflict-prevention, conflict-management, and crisis-resolution” mechanisms to enhance stability, and reaffirmed the importance of territorial integrity and the indivisibility of regional security. “We seek an open and increasingly united Europe in which all countries, including Russia, play their full roles,” Biden stated.²

A careful examination of “bottom-up” cooperative opportunities in airspace security in line with this vision is in order at a time when policy makers in Washington, Brussels, and Moscow seek to design and agree on a common capability to defend the Euro-Atlantic against missile threats.³ Toward this end, an expansion of ongoing cooperative airspace security projects is a cost-effective and technically feasible undertaking that could promote both agreement and action on the rules of engagement, as well as on the sharing of information, technology, and costs in regional missile defense that involves Russia. In an effort to make Euro-Atlantic security “indivisible,” it might also be useful to learn from past experience with using this type of functional engagement for the purposes of reassurance.

This paper begins by introducing a practical case of airspace problems over the Baltic. It continues with an overview of existing North Atlantic Treaty Organization (NATO) approaches to the networking of military and civil air traffic control systems. It further describes the William J. Clinton administration’s efforts to build cooperation in Central and Eastern Europe through the Regional Airspace Initiative. The paper then offers an analysis of present airspace tensions in conflict-prone and non-NATO state areas in the region. Finally, it reviews the ongoing NATO-Russian Cooperative Airspace Initiative and recommends that this project be expanded geographically and to the sharing of military aircraft data as well as extended to U.S.-Russia counterterrorism cooperation across the Bering Strait.

ⁱ For the purposes of this paper, the Euro-Atlantic region spans from Vancouver to Vladivostok.

Introduction: Turbulent Skies over the Baltic

On September 15, 2005, seven Russian Air Force aircraft were conducting a patrol flight from St. Petersburg to Kaliningrad. One of the fighter jets, a Sukhoi Su-27 manned by Maj. Valeriy Troyanov, unexpectedly strayed from its flight path over the Baltic Sea and entered Lithuanian airspace.⁴ Detected by Baltic Air Surveillance Network (Baltnet) radars, the descending fighter's track flickered on air traffic control monitors in a regional air surveillance coordination center for twenty minutes before the Su-27 crashed near a small village northwest of Vilnius.⁵ In response to the aircraft's violation of the new North Atlantic Treaty Organization (NATO) member's airspace, a NATO joint operations center belatedly ordered a NATO Air Police contingent comprised of four German Air Force F-4 Phantom fighters to scramble from the former Soviet military air base at Zokniai.⁶

Safely ejected from the pilot's seat, Troyanov soon found himself locked under arrest in a Vilnius hotel—and at the center of a political row that had been long in the brewing. The Russian aviator's shortcut through the Baltic skies was just a small part of a much larger story about airspace politics between Russia and NATO. Regional tensions escalated after former Warsaw Treaty Organization states joined the Atlantic Alliance and began their integration into the Integrated (Extended) Air Defense System (NATINADS). Moscow had repeatedly expressed concern about the surveillance of its military installations by NATO aircraft, including the Airborne Warning and Control System (AWACS), in close proximity to its borders.⁷ In turn, airspace violations by a Russian Beriev A-50 airborne early warning aircraft with Sukhoi escorts—reportedly on a mission to test Estonia's newly installed radars—prompted an exchange of diplomatic notes between Tallinn and Moscow in 2004.⁸

Moscow and Brussels no longer envision resolving their conflicts by force. However, the altercations over regional airspace highlight the continuing risks of Cold War legacy practices and mark the fault lines in the bilateral relationships between Russia and NATO's newer members. They also raise questions about the extension of NATO's Article V security guarantee against Russia and further strain the security relationships between Moscow, Brussels, and Washington.ⁱⁱ

In a response to the 2005 airspace incursion, Lithuanian papers challenged the credibility of NATO Air Police, a part of NATINADS extended to the Baltic states in the spirit of collective defense, calling it a “public relations gimmick.”⁹ “The NATO umbrella over Estonia, Latvia, and Lithuania seems to be full of holes. We do not even know what kind of event would have to happen before the NATO eagles would hurry to help us,” Estonian papers echoed. Latvian papers warned further, “[i]t would be quite dangerous for NATO forces to shoot down a Russian plane over Lithuanian territory, and the international consequences could not be foreseen.”¹⁰

If the incident and the reaction to it are emblematic of a larger problem, they also highlight the existence of a solution and the urgent need to implement it. After a politically charged, yet thorough, two-month investigation confirmed that the incursion of the Russian fighter was an accident, Moscow promptly repaid Vilnius for the damages incurred.¹¹ In an

ⁱⁱ See text of The North Atlantic Treaty at: http://www.nato.int/cps/en/natolive/official_texts_17120.htm.

October 2005 statement, Russia's Ministry of Foreign Affairs also called for "special trust- and cooperation-building measures" on the borders along the Baltic, the "development of which the Russian side had repeatedly suggested." "A special significance would be an increase in the pace of implementation of the NATO-Russia [C]ouncil [NRC] project on a common air traffic monitoring and control system, which could also be a means to counter potential 'airborne' terrorist threats," the statement noted.¹²

Six years later, NATO and Russia are getting ready to operationalize this special joint air traffic monitoring and control system. This project, with potential to assure both Central and Eastern European (CEE) states and Russia, is the NRC Cooperative Airspace Initiative (CAI). Before turning to NRC CAI, however, a discussion of regional airspace cooperation precedents is in order.

Building Blocks of Regional Airspace Security

In today's Euro-Atlantic region, states have a range of detection, tracking, and communication capabilities that enable them to safeguard their sovereign airspace, to monitor and control both civil and military air traffic within that airspace, and to observe the common airspace they share with their neighbors. Flight plan information provided by an aircraft that intends to take off, land, or transit through a state's airspace and that aircraft's transponder signals are supplemented with the data derived through national detection and tracking sensors—ground-based civil air traffic control (ATC) radar systems that may or may not be integrated with their multi-platform military sensor counterparts of various range and tracking angles.ⁱⁱⁱ

The data collected from these national sensors can be exchanged, if data formats are compatible, for similar data provided to the state on a reciprocal basis by its neighbors through data links. This information can, in turn, be used to generate a common air picture (CAP)—a shared display of all activity within the common airspace. A CAP supplements the basic capability of civil and military air traffic controllers in neighboring states to communicate by voice and track airspace activity using national sensors. More specifically, a CAP offers additional detection time and the potential for improved coordination in response to threatening common airspace developments.¹³

The Baltnet system, which detected the intrusion of the Su-27 into Lithuania's airspace, is an example of tightknit cooperation that allows three neighboring states to detect and track the activity in their common airspace. Baltnet consists of several radar sensors in Latvia, Lithuania, and Estonia, a regional airspace surveillance coordination center (RASCC) in Estonia, a national air surveillance center in each state, and a regional data and

ⁱⁱⁱ See discussion and graphics in Thomas Thomas and Russell Benel, "Improving Coalition Interoperability Through Networking Military/Civil Air Traffic Control Systems," presentation at the 9th International Command and Control Research and Technology Symposia (ICCRTS) in Copenhagen, Denmark, September 14-16, 2004, http://www.dodccrp.org/events/9th_ICCRTS/CD/papers/072.pdf. It should be noted that Global Positioning System (GPS) satellite data is also becoming an increasingly widespread complement to ground radar data for aircraft tracking purposes.

communications network.¹⁴ The system was designed and procured as a joint effort—the Baltic states share the equipment, equally contribute staff, and, crucially, have identical access and distributional privileges to the data derived from the network’s sensors.

Washington initiated regional airspace security cooperation in CEE long before the Baltic states became NATO members, as the section below will discuss in greater detail.¹⁵ Though Baltnet’s data formats were designed to be compatible with data formats of its Western counterparts and could have been used to facilitate a CAP exchange with the Alliance, the RASCC was not integrated into NATINADS until after the three states had acceded to NATO.¹⁶ And, even after the integration of Baltnet into NATINADS, the Baltic states have continued to perceive the vulnerability of their airspace.^{iv}

For the purposes of this paper, it is useful to imagine the current Euro-Atlantic airspace security architecture as a “patchwork” that consists of state groupings—like the Baltic three. The ATC systems and data-sharing capabilities within this “patchwork” are loosely integrated through both civil and military—chiefly NATO—channels.^v Another organization, the European Organization for the Safety of Air Navigation (EUROCONTROL), works with both members and non-members of the European Union on operational and technical solutions for civil-military air traffic coordination and air traffic management (ATM).

At present, the politics and mechanics of this integration exclude Russia (and the Commonwealth of Independent States) from this regional airspace security architecture. This exclusion is another unfortunate legacy practice that prevails despite the institutionalized ability of NATO and Russia to resolve disputes through diplomatic channels. It is also potentially the architecture’s greatest systemic weakness—the inability to share sensor data makes the neighboring states opaque to one another and inhibits cooperation in situations where innocent lives and mutual security might be threatened.

^{iv} It should be noted that unless there is a prior agreement with the country providing NATO Air Police coverage, the Baltic states cannot direct the Air Police contingent to engage a potentially threatening aircraft. See Charles Butler, “NATO Air Policing: Past, Present, and Future Roles,” thesis submitted to the Faculty of the Air Command and Staff College Air University, April 11, 2006.

^v For a detailed description, see Thomas and Benel, *op. cit.* This report examines the potential for network integration of civil and military air traffic control within a coalition framework. The authors posit that a comprehensive air picture cooperation would include the following capabilities: positive identification, system-to-system data communication to fully supplement voice communication between air traffic controllers, shared use of interrogators within a region. The study also notes the challenges to comprehensive integration due to the variation in capabilities and data standards employed among states as well as funding and proprietary concerns. Further, the study argues, “[t]raditional operations concepts and long-standing suspicions between former enemies limit the speed of transition toward improved information sharing. In some cases, even the services within a country find coordination difficult.” The study recommends the creation of a working group to explore the possibility of comprehensive integration.

The Need to Cooperate Against Common Airspace Threats

A common concern for Euro-Atlantic policy officials and military planners is the timely detection, tracking, communication, and coordination of a response to threats to and from the region's airspace. Airborne terrorism is a high-impact threat that knows no borders and comes in many forms. Terrorist attempts to exploit passenger aviation and related infrastructure through hijacking, explosive attacks, attacks with shoulder-launched weapons, as well as the potential "seizure of civil aircraft for use as 'manned missiles'" are permanent fixtures on the landscape of threats.¹⁷ In the future, the possibility of terrorist attacks with radar-evading Unmanned Aerial Vehicles (UAV) and cruise missiles with explosive or unconventional payloads is also set to bedevil security bureaucracies.

The "manned missile" scenario is a threat that has attracted significant policymaker attention since the September 11, 2001 terrorist attacks on New York and Washington.¹⁸ Strengthened airport security measures have made it difficult to plan and execute an attack with a hijacked aircraft, known as "renegade" in NATO parlance. Yet, these measures are unlikely to eliminate it completely.¹⁹ The preparedness level of national authorities—both civil and military—and their ability to cooperate are frequently tested by the incidents of the loss of voice communication (COMLOSS) between air traffic controllers and aircraft.²⁰

In one infamous case in 2002, an unscheduled Tupolev Tu-154 aircraft from Central Asia entered the airspace of the Czech Republic, which was heavily guarded at that time due to a NATO summit in Prague.²¹ This aircraft intended to land at a restricted airport. But, the Tu-154 was unable to communicate with Czech air traffic monitors that had attempted to reroute it to another airfield.²² Thankfully, a special U.S. Air Force F-16 Air Patrol that worked jointly with Czech air defense and NATO for the duration of the summit was able to escort the aircraft to an alternate airfield for landing. It later turned out that the aircraft was ferrying the Minister of Defense of Kazakhstan.^{vi}

This sequence of events highlights the complexity that would be involved in tracking and scrambling assets to chase a potential "renegade" or a UAV across the "patchwork" Euro-Atlantic skies, while simultaneously coordinating a response between political and military authorities on the ground.^{vii} In turn, the absence of tested and trusted arrangements and data sharing channels that would enable the timely detection and the adequate tracking of a potential "renegade" between Russia and its NATO neighbors makes all parties—populations on the ground as well as aircraft passengers transiting through airspace—vulnerable.

^{vi} Comparable ad hoc arrangements involving NATO states require intricate rules of engagement and transfer of authority procedures as well as ample joint training. In this case, Czech legislation assigned engagement authority to the Czech Air Force and air defense. Thus, for the 2002 summit, NATO worked out procedures by which NATINADS would detect the threat and transfer the authority to the Czechs. Both sides also had to work out the rules of engagement that would involve U.S. Air Force aircraft that participated in the special Air Patrol. See James Smith, "Operation Summit CAP," *Air & Space Power Journal*, Fall 2004, <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj04/fal04/smith.html>.

^{vii} It should be noted that "renegade" is a civilian threat in accordance with NATO policy.

As briefly noted above, Russia and NATO view ballistic missile defense cooperation as the pinnacle of their cooperative security engagement in the region. Yet, projects that build capacity to respond to more immediate threats such as airborne terrorism or regional instability can also promote the demilitarization of regional relationships. Mutual challenges require the negotiation of detailed crisis management arrangements and prudent information sharing agreements—political, military, and technical—especially between Russia, its insecure neighbors, and NATO states.

Washington’s “Patchwork” Airspace Security Efforts in Central & Eastern Europe

After the Warsaw Treaty Organization’s dissolution, CEE states actively initiated the restructuring of their airspaces to reaffirm their newfound sovereignty and to accommodate a greater number of civil airspace users. They also began to modernize their civil ATC infrastructures in order accept Western radar inputs and comply with European and International Civil Aviation Organization (ICAO) safety standards, policies, and procedures.^{viii} CEE states that sought NATO membership also planned to procure new national air defense; command, control, communication, and computer (C4) systems; as well as their military ATC infrastructures—or upgrade existing systems.

In these disjointed national efforts, Washington recognized the opportunity to “promote more open [airspace] access,” reaffirm the airspace sovereignty of these new nations, and strengthen regional stability.²³ The CEE countries sharing borders were in a unique position to leverage one another’s civil and military airspace monitoring assets, thus enabling reciprocal transparency through the exchange of air situation data.²⁴ The proximity of flight information regions (FIR) allowed these countries to monitor the common airspace deep into one another’s borders.^{ix} Further, neighbors with wobbly transitional economies could also pool financial resources and jointly manage projects, thereby strengthening their strategic ties.

In a 1993 Presidential Review Directive (PRD)-36, the Clinton administration proposed a Regional Airspace Initiative (RAI) program that would “establish a region-wide civil-military airspace management and air sovereignty system” and “incrementally enhance operational and conflict prevention capabilities” within the CEE states.^x RAI intended to foster the “civilian control of [air traffic management] ATM with military partnership,

^{viii} Commercial air travel in Europe boomed beginning during the 1990s, prompting efforts to restructure European airspace. For a comprehensive discussion of regional approaches, see Clinton Oster and John Strong, *Managing the Skies: Public Policy, Organization and Financing of Air Traffic Management* (Ashgate: December 2007).

^{ix} A FIR, according to an ICAO definition, is “an airspace of defined dimensions within which flight information service and alerting service are provided.” A FIR is a geographical entity that may or may not extend further than national boundaries.

^x The text of PRD-36 remains classified, though the author has requested it for mandatory declassification review in October 2009. PRD quotes are from Neil Planzer, “Regional Airspace Initiatives in Europe,” *The DISAM Journal*, Summer 2001, http://www.disam.dsca.mil/pubs/v.23_4/planzer.pdf; and Chris Robinson, U.S. Department of Defense Policy Board on Federal Aviation, presentation titled “International Civil-Military Airspace Initiatives and Programs,” September 20, 2007.

interoperability with U.S.-NATO, regional cooperation increasing regional stability, [improvement of airspace security, and a more] efficient use of civil and military infrastructure resources.”²⁵

The PRD kicked off five sets of country studies starting in June 1994.^{xi}

- The first of these analyzed the creation of Air Sovereignty Operations Centers (ASOC) that could provide the CEE countries with a cost-effective capability to generate a CAP—“display all actions within their [civil and military] airspace [individually and within a region] in a single display format compatible with Western standards.”²⁶
- The second set of analyses, radar interoperability and life cycle upgrade studies (RADIUS), put forth the “requirements of modernizing a nation’s older surveillance radars to ASOC standards.”²⁷
- Third, assessments of navigation aids upgrades (NAVAIDS)—a “systematic incremental set of agreed-upon modifications required to modernize a nation’s military navigational systems and landing aids to meet ICAO and NATO standards” were carried out.²⁸
- Fourth, the country studies explored the creation of National Military Command Centers (NMCC) that would “fuse the display of air, ground and sea assets of both military and civilian organizations in real time to provide a[n emergency] response package.”²⁹
- Finally, broader C4 integration studies that intended to “develop systematic incremental recommendations for a country to modernize and regionalize its command and control functions and processes” were completed.³⁰

President Bill Clinton personally introduced the RAI at a January 1994 summit of the Visegrád Four—Czech Republic, Hungary, Poland, and Slovakia—in Prague, the Czech Republic.³¹ A year later, the Four formally accepted Washington’s \$25 million (over two years) offer, agreeing to interlink their air defense and civilian ATC systems.³² And, since 1994, the U.S. Department of Defense (DoD) Policy Board on Federal Aviation (PBFA) has assisted with the implementation of the RAI studies in the following 15 countries (parts of the region):³³

June 1994-June 1995: Czech Republic, Hungary, Poland, and Slovakia (Central);
 February 1995-September 1995: Slovenia, Romania, Albania (Southern);
 January 1996-September 1996: Estonia, Latvia, Lithuania (Northern), also in Austria;
 January 1997-September 1997: Macedonia and Bulgaria (Eastern);
 After 2000: Moldova and Georgia.³⁴

According to a U.S. Department of Defense briefing, RAI resulted in a total of 17 regional airspace studies as well as 10 ASOCs, 13 NAVAIDS, 15 C4 studies, and 2 NMCCs.³⁵ All of the

^{xi} These studies were overseen by the Office of the Assistant Secretary of Defense for International Security Affairs (OSD/ISA) and carried out by the Massachusetts-based Electronic System Center at Hanscom Air Force Base and the MITRE Corporation.

states that chose to develop ASOCs have since joined NATO.^{xii} Thus, these centers were gradually integrated into NATO's new Air Command And Control System (ACCS)—the backbone of NATINADS in the decades to come.³⁶

Russia has warily eyed U.S. efforts to promote regional airspace security cooperation in the CEE. In RAI's early days, Washington kept the projects politically separate from NATO initiatives in Partnership for Peace (PfP) states. In retrospect, this decoupling may be interpreted as an effort to assuage Russian concerns about NATO expansion—Moscow was against the development of ASOCs. Russian officials argued at the time, as one analyst summarized, that ASOCs “formed a defensive belt against [Russia] that could also be used for missile guidance or tracking purposes.”³⁷ It's unclear whether Washington ever extended the RAI offer to Moscow.

In their travels across Europe, U.S. officials also had to soothe NATO allies about these airspace projects. RAI offered bilateral commercial opportunities to Washington separately from NATO, yet still in the PfP “spirit.” The projects were “not intended to advocate a regional alliance” among any of the neighboring state groupings nor were they “intended to distract [potential NATO aspirants'] attention [away] from NATO membership,” U.S. officials stressed.³⁸ Instead, Washington argued that “by jointly developing a modernization strategy for regional ATM, the [CEE countries involved in the RAI demonstrated] their resolve to achieve stability through clearly defined cooperative relationships with their neighbors.”³⁹ The demonstration of this resolve offers instructive lessons for the Euro-Atlantic challenges of today.

Extending Airspace Security through NATO: Tensions over Georgia & Neighbors

During the 1990s, NATO-aspirant PfP states received ample Western technical and financial assistance. This assistance included refits of Soviet-made military aircraft with NATO-compatible transponders, refurbishment of bases and airfields, upgrades and procurement of air defense, C4, and radar systems.⁴⁰ While not explicitly linked at the beginning, RAI had served as a precursor for regional sensor projects like Baltnet that were subsequently integrated into NATINADS.⁴¹ Further, the RAI studies gave birth to projects with several common “elements”—they served as a “direct link to [U.S. Combatant Commander] COCOM and [U.S. DoD Office of the Secretary of Defense]OSD airspace objectives,” “assist[ed] PfP nations in meeting Individual Partner Action Program [IPAP] objectives leading to NATO membership, [and supported] new NATO members in their efforts to achieve higher standards of NATO integration.”⁴²

^{xii} These projects were usually implemented as follows. In setting up the Czech Republic's ASOC, the U.S. supplied (through the Foreign Military Sales program) a Lockheed Martin commercial off-the-shelf (COTS) interoperability starter kit, while Prague provided the facilities, communication system, and a digitizer information source (radar and flight plan); it also partnered with domestic commercial companies for development and integration of software and hardware require for ASOC implementation. See Bela Szekely, “COTS in our Air Control System,” paper presented at RTO SCI Symposium on “Strategies to Mitigate Obsolescence in Defense Systems Using Commercial Components,” Budapest, Hungary, October 23-25, 2000.

In 2001, NATO complemented these patchwork airspace security efforts by unveiling the Air Situation Data Exchange (ASDE) program to PfP states.⁴³ The need for this program was dictated by the possibility that “NATO peacetime and crisis response operations could result in an operational requirement to use [PfP state] airspace.”⁴⁴ In practice, ASDE would involve a NATO control and reporting center connected through a data link with a declassification filter to a comparable control center already in place in the respective Pfp state.

At present, ASDE agreements have been signed and data exchange has been activated between the following four NATO and non-NATO FIR neighbor groups: Germany and Austria, Turkey and Georgia, Hungary and Ukraine, and the Baltic three and Finland.⁴⁵ NATO has also engaged with Albania (before its accession to NATO) and Macedonia.⁴⁶

States have cited a variety of reasons for participating in ASDE. Ukraine, which began discussions with NATO about ASDE in 2006, saw its participation in the program as an opportunity to, inter alia, “improve national procedures for civil-military coordination[,] provide support to NATO in case of aviation emergencies or terrorist acts,” as well as eventually use it to “introduce a NATO-compatible air [search and rescue] system.”⁴⁷ (Thus, the function of Ukraine’s ASDE could also be compared to a RAI NMCC, discussed above.)

As the May 2010 NATO agreement with the Ukraine articulated, the ASDE:

- Facilitated a “controlled exchange of air picture data by filtering the NATO air picture in such a manner that it [was] releasable” to non-NATO states that were NATO FIR neighbors.
- Allowed the “air pictures of a defined airspace along the common border [to be] exchanged, confirming and, where necessary, supplementing the respective air pictures” of the NATO and non-NATO state.
- “[A]im[ed] to reduce the airspace conflicts in two ways: by minimizing potential cross-border incidents and optimizing responses to “renegade” situations with civil airplanes.”⁴⁸

Not surprisingly, the ASDE has proven to be controversial in NATO-Russia relations. As in the case of the RAI ASOCs, Moscow has repeatedly questioned NATO’s intentions in extending airspace security cooperation to CEE states. Through the 1990s, Russia had offered these states, as participants of the Cooperative Security Treaty Organization (CSTO), common air defense projects.⁴⁹ In response, some of them rejected Moscow’s advances, looking toward a potential accession to NATO. Thus, in an awkward way, Western initiatives that intended to promote transparency and build confidence between neighbors had the absolutely opposite effect on key regional relationships. By exploiting and perpetuating the artificial division of regional security into NATO and CSTO, small states also effectively set the tone of the relationship between Moscow and Brussels.

Georgia’s participation in ASDE has proven to be an exceptionally prickly issue. Tbilisi’s ASDE agreement was finalized several weeks after the conclusion of the August 2008 Caucasus conflict, which ruptured NATO-Russian political and military relations.⁵⁰ Since then, Georgian officials have vocally sought to emphasize that the agreement implied a

NATO security guarantee through claims of integration—if not direct and political, then indirect and technical—into NATINADS.

An August 2007 Georgian Ministry of Defense publication posited that Russian aircraft incursions into Georgian airspace had “prompted discussions at NATO [headquarters] HQ in Brussels to speed up [ASDE participation] procedures so that Georgia becomes incorporated into [NATINADS] as soon as possible.”⁵¹ Further, a Georgian official was quoted as saying, “[t]he integration of Georgia’s radar into the NATO system will give NATO controllers real-time information about any incursions into Georgian airspace. [...] Everything will be displayed at NATO HQ, at the central command point.”⁵²

Brussels pushed back on Tbilisi’s claims. Upon the 2008 conclusion of the trilateral ASDE arrangement between Georgia, Turkey, and NATO’s Supreme Headquarters Allied Powers Europe (SHAPE), the Alliance’s officials downplayed Georgian claims by stressing that ASDE “does not integrate a Partner Nation’s Air Surveillance Capability into ... NATINADS.” Further, they noted that the exchange was “limited to a clearly defined airspace extending on both sides of the common border between the Partner nation and NATO nations.”⁵³

As the Baltic case has already highlighted, enhanced national airspace detection and tracking capabilities, NATO membership, and even integration into NATINADS appear to be of a limited assurance value, unless they are integrated into a broader political framework. Tbilisi sought to play on regional divisions still further. After the data exchange with NATO began, Georgian officials worriedly argued to their U.S. counterparts that their radar coverage was inadequate for observing national airspace, hinting at a military threat from Moscow.⁵⁴

To be sure, Georgia’s neighborhood is neither stable, nor secure. That said, the ambiguities surrounding the status of South Ossetia and Abkhazia, and their relationship with Georgia, require a political solution between Tbilisi and Moscow, and not a military one involving NATO.^{xiii} However, in situations where the conflict resolution process is at a stalemate, cooperative airspace security projects may play another critical role—assistance in the de-escalation of regional tensions.

The events that took place in the run-up to the Caucasus conflict highlight the usefulness of a shared airspace picture in promoting crisis stability. For a year before that fateful summer, Russia and Georgia engaged in provocative behavior in the airspace above the disputed territories. Moscow argued that Georgia’s UAVs incessantly flew over Abkhazia and South Ossetia.⁵⁵ Tbilisi, in turn, posited that Russian interceptors had repeatedly intruded on its sovereign airspace.⁵⁶ These incidents culminated in the downing of a Georgian UAV from Abkhazia’s sky. Tbilisi insisted that a Russian aircraft shot down its drone. Moscow, in turn, stood firm in pinning the incident on Abkhazia’s own air defense and noted that the presence of the UAV in the airspace above the territory contradicted Georgia’s international obligations.⁵⁷ Because of the absence of a CAP, both sides were free

^{xiii} These efforts would be best accomplished through political mechanisms available to a strengthened Organization for Security and Cooperation in Europe.

to question the sources and the interpretation of the radar track data that was used to support the other's allegations.

In today's conflict-prone regions, disputed borders shouldn't necessarily imply airspace opacity. To the contrary, cooperative airspace projects allowing all parties equal access to a common source of information about the activities in their airspace would promote transparency and confidence-building. In retrospect, a CAP of the air situation over Georgia, Abkhazia, and South Ossetia that was shared between Russia, Georgia, and third parties could have also served as an enforcement mechanism for treaty obligations. While resolving the conflict involving Abkhazia and South Ossetia requires political will, a creative implementation of additional airspace security arrangements involving Russia and either NATO or U.S. technology could buttress regional stability by decreasing information asymmetries to all regional actors.

Fitting Russia into the Cooperative Airspace Security Architecture

NATO and Russia have had a common position on airspace security on paper since 1997. In the NATO-Russia Founding Act, the parties declared their interest to cooperate on "enhanced regional air traffic safety, increased air traffic capacity and reciprocal exchanges, as appropriate, to promote confidence through increased measures of transparency and exchanges of information in relation to air defense and related aspects of airspace management-control."⁵⁸ The statement even noted that Brussels and Moscow would "include exploring possible cooperation on appropriate air defense related matters."⁵⁹

However, a mutual push for practical cooperation was only made after May 2002. At a NATO summit in Rome, then-Prime Minister of Denmark Anders Fogh Rasmussen expressed the consensus opinion when he stated that converging NATO-Russian concerns about the threat of terrorism pointed toward a "new beginning" in the long-suffering relationship.⁶⁰ In the Rome Declaration, the parties agreed to pursue "a multi-faceted approach, including joint assessments of the terrorist threat to the Euro-Atlantic area, focused on specific threats, for example, to Russian and NATO forces, [and] to civilian aircraft."⁶¹ A month later, the NATO-Russia Council (NRC) formally launched a working group tasked to "discuss ways of improving cooperation in the sphere of airspace management [in order to] enhance capabilities in fighting terrorist threats to civil aviation."⁶²

The NRC working group developed an operational concept for a Cooperative Airspace Initiative (CAI)—an effort to "implement a joint [NATO-Russia] capability for [air traffic management] interoperability to enable [the] reciprocal exchange of air traffic data."⁶³ By the summer of 2003, the NRC had allocated funding for a CAI feasibility study.⁶⁴ In the meantime, the project's political importance was reiterated in the 2004 NATO-Russia Action Plan on Terrorism.^{xiv} CAI's importance as a tool for promoting regional security was

^{xiv} The parties pledged to "continue to implement relevant elements of the NRC Cooperative Airspace Initiative, in particular a capability to facilitate effective civil-military cooperation with a view to enhancing the ability of NRC member states to combat threats to civil aviation." See text of NATO-Russia Action Plan on

reaffirmed after the crash of the Russian Su-27 in Lithuania in 2005. A press release issued by the Russian mission to NATO focused on the importance of the “underlying goals” of the Initiative—“enhancing transparency [and] predictability” of the regional airspace.⁶⁵ The project even endured the chill in NATO-Russian relations following the 2008 Caucasus conflict.

Now almost 10 years old, the CAI is a crisis management arrangement that seeks to facilitate a continuous exchange of ground sensor data tracked 150 kilometers along each side of the border in three pairs of FIRs between Russia and NATO.⁶⁶ The initiative’s objectives include the “detection [of] and notification” about a potential “renegade” and the “continuity of real-time air track information for the purpose of coordination [of action between CAI participants and] obtaining alerting notification on aircraft outside the [national airspace] limits.”⁶⁷

At present, the transmission of sensor data is filtered and restricted to the tracking of civil aviation.⁶⁸ However, from its inception, CAI was intended for the exchange of data on both “civil and military air traffic.”⁶⁹ A 2010 article quoted a NATO agency spokesman as saying that a two-step transition to the exchange of military air traffic data was envisioned within the next five years.⁷⁰

In practical terms, the project has involved the creation of a total of eight communication nodes (four in Russia, two in Poland, and one in Norway and Turkey, respectively) with several computer terminals each. Out of these nodes, six local communication units (LCU) facilitate the exchange of data from national ATC centers to one NATO coordination center (CC) and one Russian CC. Upon the detection of a potential “renegade,” a national ATC center informs its LCU which, in turn, informs the respective CC. The CC, in turn, informs its counterpart CCs.⁷¹ These nodes are connected through digital data links and voice coordination circuits.⁷² The three Russian LCU are connected to one another through digital data links—and the same goes for the three NATO LCUs. However, a NATO LCU is not set up to receive digital data from its Russian FIR counterpart, and vice versa.^{xv} Instead, the digital data (and voice) exchange occurs only through the two CC set up in Warsaw and Moscow, respectively.

As Russian officials have stated, the CAI will be essential for “encouraging the joint use of civil ATC and military equipment, facilitating the sharing of airspace information internally and with neighbor[s], encouraging civil ATC integration into Western Europe, [and] facilitating the future exchange of civil and military air situation data.”⁷³ After several high-profile tests, the NRC is expected to declare initial operational capability of the system in 2011.⁷⁴ NRC has also stated that CAI “is open for participation by other nations.”⁷⁵

Terrorism, December 9, 2004, http://www.nato.int/cps/en/SID-E35A6C2F-E65CD507/natolive/official_texts_21003.htm.

^{xv} In the northernmost FIR, the Russian LCU in Murmansk is configured for a voice communication capability with its NATO counterpart in Bodø, Norway. In the southernmost FIR, the Russian LCU in Rostov is similarly set up to communicate via voice with its NATO counterpart in Ankara, Turkey. In the westernmost FIR, the Russian LCU in Kaliningrad is also capable to communicate via voice with its NATO counterpart in Warsaw, Poland.

Expanding Cooperative Airspace Security to the Euro-Atlantic

Five years ago, during a visit to NORAD headquarters, a Russian Air Force commander proposed to study the sharing of a U.S.-Russian CAP across the Bering Strait.⁷⁶ His counterparts from the U.S. and NATO soon traveled to a Russian ATC facility in the Far Eastern town of Magadan to examine its possible linkage with Elmendorf Air Force base, close to Anchorage, Alaska. At the time, both militaries rightly noted that a U.S.-Russian CAI across the Strait could serve as a “tool” to “get past the Cold War axioms.”⁷⁷ The creation of such an arrangement was linked to the progress of the NRC CAI.

In an effort to strengthen counterterrorism cooperation through the U.S.-Russian Presidential Working Group, Moscow and Washington have prioritized joint work on airborne threats.⁷⁸ In August 2010, U.S. and Russian aircraft participated in an unprecedented exercise that saw the civil and military authorities of both states track and shadow a “renegade” aircraft across the Pacific Ocean.⁷⁹ The next logical step for this cooperation is a strengthened U.S.-Russian commitment to a Bering Strait CAI.

Some analysts have pointed out that NRC CAI capabilities could eventually leverage those of the NATO ASOCs. A recent *Jane’s* report by a veteran reporter pointed out that “the CAI project could eventually plug into” CEE ASOCs in order to “fully exchange air situation data.”⁸⁰ This selective networking could also “form the basis for investigating an expansion of air monitoring capabilities to the domain of cruise missile warning and defense.”⁸¹ Thus, CAI could form the foundation of a NATO-Russian cruise missile defense concept that could also employ Russian S-family interceptors.⁸² All of these concepts, embedded in a political NATO-Russia reassurance package, may merit further study.

An examination of the prospects for expanding cooperative airspace security across the whole Euro-Atlantic region would not be complete without a discussion of how to scale potential barriers to implementation. Toward this end, all of the projects discussed above have a positive track record in terms of costs and timelines. When the implementation of these initiatives required speedy and inexpensive hardware and software solutions—even to enable “plug and play”—participants simply used commercial-off-the-shelf (COTS) technology and partnered with CEE developers.^{xvi}

In the case of the NRC CAI, the organization EUROCONTROL served as a COTS developer. The involvement of EUROCONTROL was no accident. During the past twenty years, the nonprofit agency created and deployed technical solutions to enable collaborative decision making between civilian and military air traffic managers—in individual states and across state borders.⁸³

One of these tools, CIMACT, was chosen for NRC CAI project because of its widespread use and proven cost effectiveness.⁸⁴ This hardware and software package processes and integrates data from civil and military ATC sources and offers users a comprehensive CAP.⁸⁵ Both NATO and Russia were able to apply CIMACT technology without extensive

^{xvi} See Robinson, op. cit. and Thomas and Benel, op. cit. for a detailed discussion of technical issues involved in the process of networking civil-military air traffic control systems. Crucially, the latter study notes, “most of the required capabilities are readily available in currently available COTS products.”

proprietary and export control challenges.⁸⁶ Though NATO was responsible for development, deployment, and maintenance costs, CAI participants on the NATO side were entitled to the CIMENT software for free as EUROCONTROL members.⁸⁷ Russia, in turn, paid for the development and deployment of CIMENT-based systems in the LCUs and the CC on its territory.

As of April 2010, approximately 10 million Euros total had been invested into the CAI by Russia and eleven NATO states. These NATO states included Canada, France, Greece, Hungary, Italy, Luxembourg, Norway, Poland, Turkey, UK, and the U.S.⁸⁸ An expansion of the NRC CAI to additional states through CIMENT would be both technically feasible and cost effective today.

Summary: Toward a Deeper and More Confident Airspace Engagement

This paper offered an overview of existing airspace arrangements and discussed the policy challenges involved in constructing a regional Euro-Atlantic capability to monitor and counter common airspace threats through the networking of military and civil air traffic control systems.

At present, air traffic control systems and data-sharing capabilities within continental Europe are loosely integrated through both civil and military—chiefly NATO—channels. The politics and mechanics of this integration presently exclude Russia (and the Commonwealth of Independent States) from the regional airspace security architecture. This exclusion is an unfortunate Cold War legacy practice. It is also potentially the architecture's greatest weakness—the inability to share sensor data makes the neighboring states opaque to one another and inhibits cooperation in situations where innocent lives and mutual security might be threatened.

To date, Russia and NATO have viewed ballistic missile defense cooperation as the pinnacle of their cooperative security engagement in the region. Yet, projects that build capacity to respond to more immediate threats such as airborne terrorism or regional instability are better suited for promoting the demilitarization of regional relationships. Mutual challenges require the negotiation of detailed crisis management arrangements and prudent information sharing agreements—political, military, and technical—especially between Russia, its insecure CEE neighbors, and NATO states. In an effort to make Euro-Atlantic security “indivisible,” past U.S. policy successes set useful precedents.

During the 1990s, Washington pursued a Regional Airspace Initiative (RAI) program that “establish[ed] a region-wide civil-military airspace management and air sovereignty system” and “incrementally enhance[d] operational and conflict prevention capabilities” within the Central and Eastern European states. At a later date, the implementation of these non-NATO RAI projects promoted the integration of some of these states into NATO air defense. At every step of the way, Russia was concerned about NATO's intentions.

Partnership for Peace states also received ample Western technical and financial assistance through the channels of the Atlantic Alliance. The Air Situation Data Exchange (ASDE)

projects have since provided transparency and predictability in the airspaces shared by NATO and non-NATO member states. These initiatives could today be used to promote a common air picture over conflict-prone areas with disputed borders, particularly those that have seen an increased use of unmanned technologies.

Since 2002, NATO and Russia have worked on an arrangement that would facilitate a continuous exchange of ground sensor data tracked 150 kilometer along each side of the mutual border. Premised on the need to jointly combat airborne terrorism, the development of the Cooperative Airspace Initiative (CAI) has important implications for regional security. The CAI, expanded to include military aircraft and broadened to additional states, could provide be used to provide continuous civil-military transparency and institutionalize assurance to Russia and its nervous neighbors. An additional CAI across the Bering Strait could buttress the commitment to the NRC CAI as well as cement U.S.-Russian security cooperation.

In a fully developed Euro-Atlantic airspace security architecture of the future, all states would be engaged—as equally as politically possible and technically feasible—in a routine capability to jointly monitor and counter all threats to their common airspace. Conceptually, the gradual networking of military and civil air traffic control systems offers a “bottom-up” approach to building cooperative airspace security in the region that complements ongoing U.S., NATO, and Russian efforts to design a ballistic missile defense architecture. Unlike missile defense cooperation, however, the process of sharing data derived from ATC sensors would allow all sides to deal with common airborne threats that are already in existence and require no consensus-building.

In sum, a strengthened political, financial, and technical commitment to build a cooperative airspace security system would be a “win-win” for NATO-Russian engagement. The efforts to promote regional military transparency, deepen cooperation against airborne terrorism, and enhance regional crisis stability would be in line with U.S., Russian, and European national security interests. Deeper and broader regional airspace assurances would nurture the culture of cooperation, transparency, and confidence built between all Euro-Atlantic states and territories—large and small—through practical civilian-military cooperation.

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Abbreviations

ACCS—Air Command And Control System
ASDE—Air Situation Data Exchange
ASOC—Air Sovereignty Operations Center
ATC—Air traffic control
ATM—Air traffic management
C4—Command, control, communication, and computer
CAI—Cooperative Airspace Initiative
CAOC—Coalition Air Operations Center
CAP—Common air picture
CC—Coordination center
CEE—Central and Eastern Europe
CIMACT—Civil/Military ATM/Coordination Tool
CIS—Commonwealth of Independent States
COCOM—Combatant Commander
COMLOSS—Loss of communication
COTS—Commercial off the shelf technology
CRC—NATO Control and Reporting Center
CSTO—Cooperative Security Treaty Organization of the CIS
DOD—Department of Defense
EUROCONTROL—European Organisation for the Safety of Air Navigation
FIR—Flight information region
ICAO—International Civil Aviation Organization
IPAP—NATO Individual Partner Action Program
LCU—Local communication unit
NATO—North Atlantic Treaty Organization
NATINADS—NATO Integrated (Extended) Air Defense System
NAVAIDS—Navigation aids upgrade studies
NMCC—National Military Command Center
NORAD—North American Aerospace Defense Command
NRC—NATO-Russia Council
OSD—Office of the Secretary of Defense
PBFA—DoD Policy Board on Federal Aviation
PfP—Partnership for Peace
PRD—Presidential review directive
RADIUS—Radar interoperability and life cycle upgrade studies
RAI—Regional Airspace Initiative
RASCC—Regional airspace surveillance coordination center
SHAPE—Supreme Headquarters Allied Powers Europe
UAV—Unmanned aerial vehicle

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- ¹ Joseph R. Biden, Jr., "Advancing Europe's Security," *International Herald Tribune*, May 5, 2010, <http://www.nytimes.com/2010/05/06/opinion/06iht-edbiden.html>.
- ² Biden, op. cit.
- ³ See discussion in Lewis A. Dunn, "Reshaping Strategic Relationships: Expanding the Arms Control Toolbox," *Arms Control Today*, May 2009, http://www.armscontrol.org/act/2009_5/Dunn.
- ⁴ Aiste Skarzinskaite and Anatoly Medetsky, "Tensions Simmer Over Su-27 Plane Crash," *St. Petersburg Times*, September 27, 2005, http://www.sptimes.ru/index.php?action_id=2&story_id=15654.
- ⁵ Ian Demidov and Andrey Ivanov, "Ukraina Zamenila Litve NATO," (Ukraine replaced NATO to Lithuania) *Kommersant*, September 27, 2005, <http://www.kommersant.ru/doc.aspx?DocsID=613190&ThemesID=1159>.
- ⁶ This base is also known as Šiauliai. Aleksandras Matonis, "Airspace Control: Lithuania Will Remain 'Blind' for Approximately 10 More Years," Delfi, July 27, 2006, in Open Source Center Document EUP20060730011002.
- ⁷ See, for example, "U Rossiiskoi Granitsy Zamecheny Dva Samoleta-razvedchika NATO," (Two NATO reconnaissance aircraft noticed close to Russian border) Lenta.run, February 25, 2004, <http://lenta.ru/russia/2004/02/25/plane/> [Printed.htm](#) and "NATO Interesuiustya Rossiey," (NATO interested in Russia), *Segodnia.ru*, May 12, 2008, <http://www.segodnia.ru/index.php?pgid=2&partid=1&newsid=5875>.
- ⁸ Matonis, op. cit.
- ⁹ For a discussion of the Baltic reaction, see "Russian Jet Jangles Baltic Nerves," BBC News, September 20, 2005, <http://news.bbc.co.uk/2/hi/europe/4264010.stm>.
- ¹⁰ "Russian Jet Jangles Baltic Nerves," op. cit.
- ¹¹ Ministry of Foreign Affairs of the Republic of Lithuania, "Lithuanian Foreign Policy in 2005: Chronology of Events," http://www.urm.lt/popup2.php?item_id=10534.
- ¹² Ministry of Foreign Affairs of the Russian Federation, "Kommentariy Departamenta Informatsii i Pechati MID Rossii Otnositelno Zaversheniya Rassledovaniya v Svyazi s Avariey Samoleta Su-27," (Commentary by the information and print department of the Russian MFA regarding the completion of the investigation on the accident of the Su-27 aircraft) October 7, 2005, http://www.mid.ru/brp_4.nsf/0/D5741697284E7F32C325709700205263.
- ¹³ Ibid.
- ¹⁴ Thomas Thomas and Russell Benel, "Improving Coalition Interoperability Through Networking Military/Civil Air Traffic Control Systems," presentation at the 9th International Command and Control Research and Technology Symposia (ICCRTS) in Copenhagen, Denmark, September 14-16, 2004, http://www.dodccrp.org/events/9th_ICCRTS/CD/papers/072.pdf. See description of Baltnet at http://www.mil.ee/index_eng.php?s=baltnet.
- ¹⁵ "Baltnet—Baltic Air Surveillance and Control System," *The Ramstein Sword*, December 2009, http://www.airn.nato.int/BRTE_V/media/pdf_rel_pub/BALNET_December_2009.pdf.
- ¹⁶ Ibid.
- ¹⁷ See Stanislaw Zajas, "Countering Air Terrorism," *Connections*, Fall 2009, <http://www.pfpconsortium.org/publication-volumes/1604>.
- ¹⁸ Christopher Bennett, "Combating Terrorism," *NATO Review*, Spring 2003, <http://www.nato.int/docu/review/2003/issue1/english/art2.html>. This threat also is a matter of concern for new NATO states. See Zajas, op. cit.
- ¹⁹ Analysts note that even increased airport security measures are unlikely to dissuade terrorists from attempting to execute their deadly missions. See Andrew Kydd and Barbara Walter, "By Focusing on Planes, Terrorists Take a Calculated Risk," *Los Angeles Times*, January 24, 2010, <http://articles.latimes.com/2010/jan/24/opinion/la-oe-walter24-2010jan24>.
- ²⁰ For a discussion of COMLOSS, see SkyLibrary: http://www.skybrary.aero/index.php/Prolonged_loss_of_communication.
- ²¹ James Smith, "Operation Summit CAP," *Air & Space Power Journal*, Fall 2004, <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj04/fal04/smith.html>.
- ²² Ibid.
- ²³ Thomas and Benel, op. cit.
- ²⁴ Ibid.
- ²⁵ Robinson, op. cit.

²⁶ Planzer, op. cit.

²⁷ Leslie F. Kenne, "International Operations at the Electronic Systems Center," *The DISAM Journal*, Summer 2001, <http://www.disam.dsca.mil/pubs/Archives/Journal23-4.pdf>.

²⁸ Kenne, op. cit.

²⁹ Ibid.

³⁰ Ibid.

³¹ Planzer, op. cit.

³² "Eastern Europeans Move Closer to NATO," *Flight International*, January 25, 1995.

³³ Planzer, op. cit.

³⁴ Discussion of Georgia is offered in the section below.

³⁵ For technical details of project implementation, see Bela Szekely, "COTS in our Air Control System," paper presented at RTO SCI Symposium on "Strategies to Mitigate Obsolescence in Defense Systems Using Commercial Components," Budapest, Hungary, October 23-25, 2000; Nikolay Petrov, "National Military Command Center—From Idea to Implementation," *Information & Security*, 6/2001; Pavel Necas, Frantisek Olejnik, Lubos Gulas, "Simulation Federation in Coherence with C3I AF ATC System on CAX Platform," paper presented at the conference on C3I and M&S Interoperability, Antalya, Turkey, October 9-10, 2003; Petar Radenkov Stoyanov, Mihail Kostadinov Mihov, Georgi Kiprovs Georgiev, "Space Research Institute Contribution to Development of the Air Sovereignty Operation Center of Bulgaria," paper presented at the Electronics 2004 conference, Sozopol, Bulgaria, September 22-24, 2004.

³⁶ See description of NATO Air Command and Control System (ACCS):

http://www.nato.int/cps/en/natolive/topics_8203.htm.

³⁷ Brooks Tigner "NATO and Russia Near Air Traffic Information Exchange," *Jane's International Defence Review*, April 29, 2009.

³⁸ U.S. Assistant Secretary of Defense for Command, Control, Communication, and Intelligence (C3I) Emmet Paige quoted at 1995 Visegrád Four meeting in "Eastern Europeans Move Closer to NATO," op. cit.

³⁹ "Eastern Europeans Move Closer to NATO," op. cit.

⁴⁰ See Elizabeth Book, "NATO aspirants prepare for Prague," *National Defense Magazine*, August 2002.

⁴¹ Assistance was provided by the U.S., Norway, and Denmark. See "Baltnet—Baltic Air Surveillance and Control System," op. cit.

⁴² Robinson, op. cit.

⁴³ NATO Programming Center, *NPC Insight*, 2/2009, pg. 14,

http://www.npc.nato.int/pdf/dwnl/NPC%20Booklet_2009_02_english.pdf.

⁴⁴ See detailed discussion of ASDE filtering in Wim Hoekstra and Peter Rehäußer, "Outbound Downgrade Filter of ASDELINK-1 Forward Filter Version 1.5," NC3A, February 6, 2007,

<http://www.commoncriteriaportal.org/files/epfiles/0342b.pdf>.

⁴⁵ See "'Air Situation Data Exchange'- Important Coordination between NATO and Partner Nations," NATO Allied Command Operations, November 19, 2010, <http://www.aco.nato.int/page272201034.aspx>.

⁴⁶ Ministry of Defense of Georgia Public Affairs Department, "Georgia to Join ASDE System," *Today Defence*, August 2007, <http://www.mod.gov.ge/files/snwljzjbnkggeo.pdf>; NATO Programming Center, op. cit.

⁴⁷ "NATO-Ukraine Annual Target Plan for the Year 2007 in the Framework of NATO-Ukraine Action Plan," <http://www.nato.int/docu/basic/b070618atp-e.pdf>.

⁴⁸ "Ukraine and NATO Sign 'Air Situation Data Exchange' Agreement," NATO IMS news release, May 5, 2010, http://www.nato.int/cps/en/SID-0C8BD350-64350090/natolive/news_63170.htm.

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⁵¹ "Georgia to Join ASDE System," op. cit.

⁵² Ibid.

⁵³ "Georgia and NATO Start Air Situation Data Exchange Programme," op. cit.

⁵⁴ Georgia's command center was created in 2006, when Georgia's air defense radar was fused with 4 civilian ATC radars and the radar systems upgraded and supplied by, among others, Ukraine. Said Aminov, "Georgia's Air Defense with South Ossetia," *Moscow Defense Brief*, 3/17, 2009. Available:

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- ⁶⁶ Alan Fowler, presentation on CIMA CT and Lara, June 9, 2008, http://www.eurocontrol.fr/projects/edep/slides/CIMA CT_LARA.ppt.
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- ⁷⁰ Tigner, op. cit.
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- ⁷⁴ “NATO and Russian Step Up Their Efforts to Counter Air Terrorism,” NATO press release, April 29, 2010, http://www.nato.int/cps/en/SID-71FB7133-7CE5DCFA/natolive/news_62962.htm?selectedLocale=en.
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- ⁷⁸ See description of the bilateral working group on counterterrorism: <http://www.state.gov/p/eur/ci/rs/usrussiabilat/c37330.htm>.
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- ⁸¹ Dennis Gormley, *The Path to Deep Nuclear Reductions*, IFRI paper, Fall 2009, pg. 40, http://www.ifri.org/?page=contribution-detail&id=5575&id_provenance=97.

⁸² Ibid.

⁸³ See CIMENT description on EUROCONTROL website:

http://www.eurocontrol.int/cnd/public/standard_page/cnd_sis_CIMENT.html.

⁸⁴ France uses the tool for air defense (AD), Holland for NATO Security, while Norway, Poland, and Turkey are set to get it as part of the CAI project. Further, Portugal uses it for Military ATC and Moldova uses it for Military AD; Ukraine and Bulgaria have requested CIMENT. And, the software is currently on trial in Serbia and Slovenia. Alaska, Albania, Armenia, ARTAS, Austria, Azerbaijan, Cyprus, Egypt, Estonia, Italy, Jordan, Latvia, Lebanon, Lithuania, NATO, Norway, OMAN, Poland, Syria, Thailand, Turkey, and UK have apparently shown interest in the system. Alan Fowler, presentation on CIMENT at Civil Military ATM Coordination & Flexible Use of Airspace Seminar, July 7-8, 2009,

http://www.euromedtransport.org/uploads/media/9C_CIMENT_EuroMed.pdf

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