

## The current state, problems and future of Germany's air and missile defence

Justyna Gotkowska

From German point of view, air and missile defence systems are of little relevance for the protection of Germany's territory. However, they are seen as important for conducting 'out of area' operations, providing military assistance to allies, and for Germany's political and military-technical position within NATO. The Bundeswehr has been modernising its air and missile defence systems for several years. The modernisation of very short-range and short-range systems is slightly behind schedule. Plans to modernise the medium-range air and missile defence have been encountering problems since the United States decided to refrain from buying the jointly developed MEADS system. Therefore Germany is currently considering using the results of the MEADS program in the development of its own medium-range air and missile defence system, possibly in co-operation with France and Italy. Such a system would ensure protection against short-range ballistic missiles (up to 1000 km) and might become part of NATO's ballistic missile defence, replacing the Patriot batteries which Germany is currently operating. Furthermore, Germany could expand its involvement in NATO's ballistic missile defence in the future by buying or developing system to intercept medium- and intermediate-range ballistic missiles (up to 3000 km and 5500 km). The final decision on this matter has not yet been taken, and will be left for the successive governments of Germany to resolve. It will depend on a number of political, military and financial factors.

### Risks, threats and air & missile defence from Germany's perspective

Germany perceives a direct territorial threat involving conventional military means as an unlikely event today and in the foreseeable future. Germany does not rule out however crises or conflicts on NATO's borders, which could require Germany to provide assistance to other NATO member states under Article 5 of the North Atlantic Treaty. Nonetheless, Germany is primarily focused on non-military risks and threats to its security posed by failing and failed states, the collapses of authoritarian regimes, international terrorism, the activities of criminal networks, natural and climate disasters, epidemics, surges

in migration, or shortages in supplies of natural resources and raw materials. According to official documents, crises and conflicts caused by such phenomena may affect Germany's security in its broader sense. They may thus create reasons for the government to deploy the Bundeswehr on NATO, EU or UN operations.

Taking into consideration Germany's perception of threats, air and missile defence systems are considered to be **of little relevance for the defence of Germany's territory**. Germany sees no risk of a conventional attack, or of an attack using short-range ballistic missiles (up to 1000 km – Russia is not regarded as a potential enemy), or even medium-range ballistic missiles (up to 3000 km – according to Luftwaffe of-

officials, no potential enemy possesses such capabilities, although some might acquire them in the future)<sup>1</sup>. This reasoning is also reflected in the document of the Federal Ministry of Defence from 2010 concerning proposed savings on armament and military equipment. The document concludes that the surface-to-air defence systems are of little importance for Germany with regard to the defence of German territory alone<sup>2</sup>.

Germany believes however that **air and missile defence capabilities are important for conducting 'out of area' operations**. Air and missile defence systems may be used for the protection of facilities and of German or allied mobile forces. They should counter a wide range of symmetric and asymmetric threats: from multi-role combat aircraft, helicopters, UAVs, to cruise missiles, rocket, artillery and mortar shells or even short-range ballistic missiles (up to 1000 km)<sup>3</sup>.

Moreover, **Germany perceives air and missile defence capabilities as important in the NATO context**. Firstly, Germany is aware of the risks posed by instability in the Middle East (such as the war in Syria) to the southern peripheries of NATO. Germany is thus considering providing military assistance to southern NATO members, as demonstrated by German involvement in Operation Active Fence in Turkey (two Patriot batteries). However, there has been no German discussion of the possibility of crises in Northern or Central and Eastern Europe involving the use of military force. Secondly, air and missile defence capabilities are being considered in the context of Germany's political and military-technical position and influence within NATO. The Bundeswehr and the Federal Min-

istry of Defence believe that missile defence is gaining particular significance in the wake of NATO's 2010 decision to develop a ballistic missile defence capability.<sup>4</sup> It is being developed on the basis of the US European Phased Adaptive Approach (EPAA, which includes the land-based SM-3 interceptor sites in Poland and Romania), and will be expanded by incorporating the missile defence systems of NATO's European members. Therefore, according to the Bundeswehr and the MoD, Germany's contribution to NATINAMDS, NATO's future Integrated Air and Missile Defence System, should correspond to German position as one of the Alliance's largest member states. From a military-technical point of view, Germany is aware that if it made no national contribution to the system, German companies would largely be excluded from air and missile defence development projects in Europe, and in the future Germany might become dependent on its allies in both the military and industrial dimensions.

### **Air and missile defence capabilities are being considered in the context of Germany's political and military-technical position and influence within NATO.**

The Bundeswehr is also developing air and missile defence systems **in the context of the *Breite vor Tiefe* capabilities development concept**. Since future risks and threats are unpredictable, the German Armed Forces should maintain and develop a wide range of capabilities, even on a small scale, so that they can be gradually expanded if needed.<sup>5</sup>

<sup>1</sup> See statements by General Dieter Naskrent, Deputy Inspector of the Luftwaffe, Zukünftige Bedeutung der deutschen bodengebundenen Luftverteidigung, 26 November 2012, <http://www.idlw.de/index.php/aktuelles-idlw/390-zukuenftige-bedeutung-der-deutschen-bodengebundenen-luftverteidigung>

<sup>2</sup> Federal Ministry of Defence, Priorisierung Materialinvestitionen, Handlungsempfehlungen, 25 June 2010.

<sup>3</sup> Helge Weymann, Die Neuausrichtung der bodengebundenen Luftverteidigung, 6 December 2012, [www.luftwaffe.de](http://www.luftwaffe.de)

<sup>4</sup> The German Air Force is responsible for the entire air and missile defence in the current structure of the Bundeswehr, having taken over the Army's tasks related to very short-range and short-range air defence in the aftermath of the 2011 reform.

<sup>5</sup> Justyna Gotkowska, Bundeswehr 3.0. The political, military and social dimensions of the reform of the German armed forces, *Policy Briefs 28*, May 2012, [http://www.osw.waw.pl/sites/default/files/PW\\_28\\_EN.pdf](http://www.osw.waw.pl/sites/default/files/PW_28_EN.pdf)

## German plans regarding air and missile defence

For several years, the Bundeswehr has been upgrading its very short-range, short-range and medium-range surface-to-air defence systems. This is related to the fact that some systems have been decommissioned, and others will be put out of service within a few years. In accordance with the original plans, a comprehensive modernisation of the entire air defence architecture should have been completed by around 2020.

**(1) Very short-range (VSHORAD) and short-range (SHORAD) air defence.** As the systems currently in use are being gradually decommissioned (Roland in 2005, Gepard in 2010 and Ozelot/Stinger around 2018), a decision was

**A decision was taken in 2007 to develop a completely new architecture for very short-range and short-range air defence.**

taken in 2007 to develop a completely new architecture for very short-range and short-range air defence, the so-called System Flugabwehr (SysFla). The SysFla concept originated mainly from analyses of the current and future 'air' threats faced by German military units participating in foreign missions. The experience of the mission in Afghanistan was the main source of guidance in this regard. The original plan was for SysFla to be developed in three phases, and the system was intended to ultimately provide protection for stationary facilities, theatre of operations, and mobile forces against a wide range of symmetric and asymmetric threats.<sup>6</sup> Since 2008, German arms companies have been in charge of the development of SysFla; it is being developed by a joint venture of Rheinmetall Defence and MBDA Deutschland in co-opera-

tion with Diehl BGT Defence and Kraus-Maffei Wegmann.

The objective of the first phase of the SysFla project was to create a stationary system that could counter asymmetric threats (RAM, i.e. low-calibre rockets, artillery and mortar shells) and symmetric threats (aircraft, helicopters, UAVs or even cruise missiles), and could primarily be used for the defence of military bases during foreign operations. The first phase of the project has been partially completed. In its current version, the stationary MANTIS system serves mainly to counter RAM shells within a range of 500 metres to 3 kilometres. The Bundeswehr received two such systems in the autumn of 2012 (and plans to acquire two more). However, it has not decided to use them in Afghanistan for the protection of the Kunduz base because of the downsizing of the German contingent. In accordance with the SysFla concept, the MANTIS system will also be equipped with LFK NG launcher/missile to counter aircraft, helicopters, UAVs and even cruise missiles within a range of up to 10 km and at altitudes of up to 5 km.<sup>7</sup> The LFK NG launcher/missile and its integration into the MANTIS system are still in development. In the second and third phases of the SysFla project, the whole system is expected to attain better target detection capability, become mobile and be adapted to protecting mobile forces. A mobile platform will be developed which will be integrated with a C-RAM cannon, and probably an LFK NG launcher<sup>8</sup>.

**(2) Medium-range air defence (MRAD).** Currently the Bundeswehr is equipped with Patriot surface-to-air missile batteries that were ordered before the end of the Cold War and have been in service since 1989. The medium-range Patriot system serves to protect theatre of op-

<sup>6</sup> Rheinmetall Defence, SysFla / LFK NG – the air defence system of the future, 8 June 2010, [http://www.rheinmetall-defence.com/de/rheinmetall\\_defence/public-relations/news/detail\\_1426.php](http://www.rheinmetall-defence.com/de/rheinmetall_defence/public-relations/news/detail_1426.php)

<sup>7</sup> Rheinmetall Defence, System Flugabwehr (SysFla) – Schutz im Einsatz, February 2010, [http://www.rheinmetall-defence.com/de/rheinmetall\\_defence/public-relations/current\\_topic/archive/details\\_1580.php](http://www.rheinmetall-defence.com/de/rheinmetall_defence/public-relations/current_topic/archive/details_1580.php)

<sup>8</sup> Is Germany Losing Its Air-Defence Capability?, 21.12.2009, [www.defpro.com](http://www.defpro.com); Luftwaffe, Das Nächstbereich-Schutzsystem Mantis, [www.luftwaffe.de](http://www.luftwaffe.de); Ulrich Rapreger, MANTIS übergeben und einsatzbereit, Europäische Sicherheit & Technik, January 2013, p. 44-45.

erations, troops, military bases and population centres. Over the last twenty years, some of the German Patriot batteries have been gradually decommissioned, while others have been upgraded. Since early 2013, the Luftwaffe has been operating twelve Patriot batteries (with additional two batteries for training) with PAC-3 upgrade. The batteries have dual capabilities for air defence to counter aircraft, helicopters and UAVs within a range of 68 km (PAC-2 missiles), and for missile defence to intercept short-range ballistic missiles (up to 1000 km) within a range of around 15–45 km<sup>9</sup> (PAC-3 CRI missiles) at altitudes of up to 20 km. However, as the economic viability of Germany's Patriot batteries and their upgrade potential are diminishing, they were planned to be decommissioned between 2020 and 2025.<sup>10</sup> In view of the need to replace the Patriot system, Germany, together with the USA and Italy, launched a project in 2005 to develop the MEADS medium-range air and missile defence system (Medium Extended Air Defence System). The MEADS system was expected to offer better target detection and interception capability, wider range, more interoperability and better transport and mobility capability (see Appendix). German Patriot batteries were expected to be gradually replaced by eight MEADS batteries from 2018. Additionally, German companies have been developing IRIS-T SL air defence system to be integrated with MEADS system for service in the Bundeswehr. IRIS-T SL was intended to counter less demanding targets such as aircraft, helicopters, UAVs and air-to-surface missiles within a range of 25 km, the objective being to reduce the cost of operating the MEADS system with the expensive PAC-3 missiles.

<sup>9</sup> Bundeswehr, PATRIOT aktuell, [www.luftwaffe.de](http://www.luftwaffe.de); Jerry Sommer, Streitpunkt. Raketenabwehr in Europa, February 2012, [http://www.paulschaefer.info/fileadmin/lcmsschaefer/download/1202\\_raketenabwehr.pdf](http://www.paulschaefer.info/fileadmin/lcmsschaefer/download/1202_raketenabwehr.pdf), p. 10.

<sup>10</sup> Antwort der Bundesregierung auf die Kleine Anfrage der FDP, Konzept der Bundesregierung zur Flugabwehr und Luftverteidigung, Drucksache 16/13752, 07.07.2009, <http://dip21.bundestag.de/dip21/btd/16/137/1613752.pdf>

However, in February 2011, President Barack Obama announced that the US would withdraw from the MEADS program and not buy the future system, officially for financial reasons.<sup>11</sup> That decision prompted Germany to announce that it would not buy the MEADS system either. Without the USA, which had been expected to buy the largest number of batteries, their purchase became too expensive for the European partners. However, the USA has agreed (probably under pressure from Germany and Italy)

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to participate in the research and development phase of MEADS program until its planned completion in 2014. This would imply the creation of a system prototype whose effectiveness would be proved in two intercept flight tests. Although the US Congress and Senate initially refused to grant financing for the final year of the MEADS research and development phase, ultimately the program will receive funding and will be completed. The decisive factors in this move have been the support of the Obama administration and the threats by Germany and Italy that they would demand compensation for the interruption of the joint program.<sup>12</sup>

<sup>11</sup> Apart from the reasons related to spending cuts, the decision was probably also influenced by pressure from the US arms industry, which is reluctant to transfer technologies to European companies, and the US Army, which prefers to retain full control over newly developed technologies.

<sup>12</sup> Reuters, Stop-gap spending measure funds MEADS missile defense, 25 March 2013, <http://www.reuters.com/article/2013/03/25/us-lockheed-missiles-idUSBRE92O02F20130325>

## Problems and development prospects

The spending cuts and the problems with the MEADS program have forced Germany to revise its original plans for developing its air defence architecture. In 2011, the German Air Force formulated a new air defence concept (*Luftverteidigungsverbund 2020*) and presented it to the Federal Ministry of Defence.<sup>13</sup> The concept has probably not been approved yet, and is not available through open sources; however, some conclusions about it can be drawn from statements by Bundeswehr and MoD's officials and press reports.

**(1) Very short-range and short-range air defence.** The Bundeswehr will upgrade and buy successive elements of the SysFla project depending on its financial situation. It is expected to go ahead with the planned purchase of two more MANTIS systems, and to integrate it with LFK NG launcher/missile, although the acquisition of mobile elements of the system may be postponed. There is a strong economic and industrial case (which is at least as important as the military considerations) for purchasing all the projected SysFla elements. The extensive involvement of German companies in its development allows to maintain and develop technologies and production capacity in Germany, which in the future may open export opportunities. However, the sense of acquiring successive SysFla elements may be challenged by politicians, especially the opposition. SysFla is being developed on the basis of scenarios involving high-intensity conflicts such as the mission in Afghanistan, yet in the short and medium term, the Bundeswehr is unlikely to take part in foreign operations of this kind. The German Armed Forces have been consistently developing their expeditionary capabilities, and previous and current defence ministers have argued for greater Bundeswehr involvement

in foreign missions. However, the recent decisions by the German government concerning (minimal or no) military involvement in the conflicts in Libya and Mali, and the critical attitude of the majority of the political elite and public opinion towards the rationality and effectiveness of NATO/EU military involvement, are evidence of an opposite tendency. For this reason, the Bundeswehr is expected to use its expeditionary capabilities in future crisis management operations to only a limited extent. The case for acquiring all the SysFla elements could be strengthened by arguing that they might also be used domestically, e.g. for protecting important public events in Germany – this is an argument that German defence companies in particular could find useful to raise.

### **The Bundeswehr will upgrade and buy successive elements of the SysFla project depending on its financial situation.**

**(2) Medium-range air defence.** After the United States decided in February 2011 not to buy the MEADS system, Germany modified its plans concerning the modernisation of its medium-range air and missile defence system. Germany currently does not plan to buy the MEADS system, but to use the results of the program along with German technological potential to build a national system that will also include some 'European' elements.<sup>14</sup> The Germans assume that they will be able to modernise their medium-range air defence using some key elements of the MEADS prototype, such as the BMC4I Tactical Operation Center, the Multifunction Fire Control Radar (MFCR) and the Launcher, with the latter two providing 360-degree defence. Information provid-

<sup>13</sup> Helge Weymann, Die Neuausrichtung der bodengebundenen Luftverteidigung, Luftwaffe, 6 December 2012, [www.luftwaffe.de](http://www.luftwaffe.de)

<sup>14</sup> Interview with Lieutenant-General Karl Müllner, Inspector of the Luftwaffe, *Newsletter Verteidigung*, 11 September 2012, <http://www.newsletter-verteidigung.de/archiv/beitraege/188-interview-mit-general-leutnant-karl-muellner-inspekteur-der-luftwaffe>

ed by an employee of the Federal Office for Arms Technology and Procurement in October 2012<sup>15</sup> suggests that the first step could be to integrate the MFCR, the BMC4I centre and the IRIS-T SL air defence system with the German Patriot batteries (although these plans have not yet been approved). The second stage could consist in the creation of a system with better parameters with the integration of a 'European' missile. Since Franco-German co-operation has been mentioned in this context, such a missile would probably be developed on the basis of the French-Italian Aster-30. German companies do not possess any technologies to build missiles capable of intercepting short-range ballistic missiles; with regard to air defence, the most advanced German surface-to-air system is the IRIS-T SL currently under development. Therefore Germany has to co-operate with foreign partners. MBDA Deutschland, the Ger-

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man company participating in the MEADS program, has been lobbying for the integration of the MEADS elements with the Franco-Italian SAMP/T system.<sup>16</sup> According to representatives of the Bundeswehr and MBDA Deutschland, such a system could become the basis for a European medium-range air and missile defence system in the future. There have been no reports of German-French talks on the subject, though. Moreover, Franco-German relations in this sphere have not been particularly good for some time. The reasons for this include

the deepening of Franco-British military and technical co-operation, as well as the differences between Germany and France on military crisis management (Libya, Mali, Syria) and arms industry issues (most recently, the failed EADS-BAE merger). However, it is possible that talks on possible co-operation between Germany and France on a medium-range missile defence system will begin after the Bundestag elections this autumn.

### Germany and NATO's ballistic missile defence

German Patriot batteries (and their possible successors) will become part of NATO's ballistic missile defence, since it was decided that the ALTBMD program<sup>17</sup> (in which Germany has been participating since 2005) will be integrated into the NATO system along with the US EPAA elements in Europe. However, the Patriot batteries (and their possible successors) will serve solely for missile (and air) defence of population centres, military and strategic facilities against short-range ballistic missiles (up to 1000 km). The few publications by German think-tanks on the subject, and the conclusions that can be drawn on the basis of documents and statements by MoD's and Bundeswehr officials<sup>18</sup>, suggest that **Germany does not rule out expanding its contribution to NATO's ballistic missile defence in the future.** The decision will depend however on a number of political, military and economic factors, and will not be taken before early 2014. It is certain, however, that the Bundeswehr's priority will be to build the future air and missile defence architecture in such a way that new systems, radars and interceptors can be incorporated into it and coordinated under a single command centre.

<sup>15</sup> Regine Friedberger, Überlegungen zur deutschen Luftverteidigungsarchitektur, *Europäische Sicherheit & Technik*, October 2012, p. 70-72.

<sup>16</sup> Thomas Homberg, Einstieg in den Luftverteidigungsbund 2020 notwendig und möglich, *Politik & Sicherheit*, November 2012, [http://www.politik-sicherheit.de/Archiv\\_ab\\_07/Politik\\_Sicherheit\\_Nr19.pdf](http://www.politik-sicherheit.de/Archiv_ab_07/Politik_Sicherheit_Nr19.pdf)

<sup>17</sup> The aim of the ALTBMD (Active Layered Theatre Ballistic Missile Defence) program was to protect NATO deployed forces against short- and medium-range ballistic missile threats (up to 3000 km range).

<sup>18</sup> Oliver Thränert, Das Raketenabwehrprojekt der Nato, *SWP-Studie*, September 2011, [http://www.swp-berlin.org/fileadmin/contents/products/studien/2011\\_S25\\_trt\\_ks.pdf](http://www.swp-berlin.org/fileadmin/contents/products/studien/2011_S25_trt_ks.pdf); see footnote 3, 14 and 15.

Germany has been considering the following options to potentially expand its contribution to NATO's ballistic missile defence: the purchase of the land-based THAAD system, modernisation of the F124 Sachsen class frigates, or even the development of a European system to intercept ballistic missiles at higher altitudes. The US-made **THAAD system** is designed to provide protection against short- and medium-range ballistic missiles (up to 1000 and to 3000 km, respectively) within a range of up to 200 km and at altitudes of up to 150 km, i.e. in the upper strata of the atmosphere (the so-called *upper tier*). It can therefore provide missile protection for larger areas than the Patriot or MEADS systems, which intercept missiles in the lower strata of the atmosphere (the so-called *lower tier*).<sup>19</sup> For financial reasons, the **modernisation of the F124 Sachsen class frigates** (Germany has three such vessels)<sup>20</sup> has so far seemed to be the preferred option – such modernisation would consist in upgrading either the SMART-L radars alone, or the entire missile defence system including the SM-3 missiles which, depending on the type, would be able to intercept short- and medium-range missiles (up to 1000 km and up to 3000 km respectively, for the SM-3 Block IB) or medium- and intermediate-range missiles (up to 3000 and 5500 km, for the SM-3 Block IIA). The US Aegis BMD-capable ships equipped with SM-3 interceptors (Block IA for the moment) are already deployed in the Mediterranean as part of the EPAA's first phase. Land-based SM-3 interceptors are to be deployed in Romania (by 2015; SM-3 Block IB) and in Poland (by 2018;

SM-3 Block IIA). According to an employee of the Federal Office for Arms Technology and Procurement, the option of **creating a European system** (in Franco-German cooperation) to intercept ballistic missiles in the upper strata of the atmosphere is also being considered.

**The final decision on further German involvement in NATO's ballistic missile defence will depend on political, military and financial factors.**

The final decision on further German involvement in NATO's ballistic missile defence has not yet been taken. It will probably be left for the next government to resolve, and the outcome will depend on political, military and financial factors. For now, the German government seems to have adopted a 'wait and see' approach, and to be watching the implementation of the US EPAA program as well as the plans of the other allies. The decision to step up German involvement will depend on whether Germany feels threatened by attacks using medium- and intermediate-range ballistic missiles. The plans of other European NATO members as well as changes in the attitude of Russia, will also be important. Finally, Berlin's decision will also be influenced by financial considerations. The cost of buying or developing the systems in question are very high, and will be acceptable to Germany only if they are shared in a co-operative arrangement by several European countries.

<sup>19</sup> Tomasz Kwasek, System przeciwrakietowy THAAD, *Dziennik Zbrojny*, 25 January 2013, <http://dziennikzbrojny.pl/artykuly/art,5,22,3262,wojska-ladowe,bron-rakietowa,system-przeciwrakietowy-thaad>

<sup>20</sup> The main task of the F124 Sachsen class frigates is to provide air defence while escorting warships and commercial vessels, and to provide local protection for coastal areas; currently they are equipped with SM-2 missiles.

## APPENDIX

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### MEADS Program

The United States, Germany and Italy started developing the MEADS medium-range air and missile defence system (Medium Extended Air Defense System) in 2005, financing 58%, 25% and 17% of the project costs, respectively. MEADS International is a joint venture established by the US Lockheed Martin, Germany's LFK GmbH/MBDA Deutschland and Italy's Alenia Marconi Systems/MBDA Italia. The MEADS system was intended to counter aircraft, helicopters, UAVs and cruise missiles, as well as short-range (up to 1000 km) ballistic missiles carrying conventional and unconventional warheads as part of the defence of the national territory and the protection of deployed forces (no information is available on the system's exact range). The system was supposed to offer better capability to detect targets and offer 360-degree defence capability, a feature that the Patriot system does not offer. It was also intended to offer greater interoperability and compatibility with other systems, meaning both systems held by other allies and other systems within Germany's national air defence architecture. The MEADS system was also supposed to be more mobile, i.e. to offer better capability to move in the field and be easier to airlift (using A400M or C-160 Transall transport aircraft or CH-53 helicopter as an externally-mounted load).

### Components of the MEADS system:

- Multifunction Fire Control Radar (MFCR) operating in the X-band and equipped with an active electronically scanned array antenna (AESA);
- Surveillance Radar;
- Battle Management, Command, Control, Communications, Computers and Intelligence (BMC4I) Tactical Operation Center;
- Launcher and reloader with 360-degree coverage (for eight PAC-3 MSE missiles);
- PAC-3 MSE missile manufactured by the US-based Lockheed Martin; it counters aircraft, helicopters, UAV's, cruise missiles and short-range ballistic missiles;
- IRIS-T SL, a medium-range air defence system developed by Germany's Diehl BGT Defence. It was supposed to supplement the German version of the MEADS system to reduce the cost of operating the MEADS batteries with the expensive PAC-3 MSE missiles. IRIS-T SL was supposed to counter less demanding targets – aircraft, helicopters, UAVs and air-to-surface missiles within a range of 25 km<sup>21</sup>.

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<sup>21</sup> Diehl Defence, IRIS-T Guided Missile Family, IRIS-T SL, <http://www.diehl.com/en/diehl-defence/products/guided-missiles/iris-t-guided-missile-family/iris-t-sl.html>

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EDITORS: Olaf Osica, Anna Kwiatkowska-Drożdż

Katarzyna Kazimierska, Anna Łabuszewska

TRANSLATION: OSW

CO-OPERATION: Jim Todd

DTP: Wojciech Mańkowski

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Centre for Eastern Studies

Koszykowa 6a, 00-564 Warszawa

phone: +48 | 22 | 525 80 00

e-mail: [info@osw.waw.pl](mailto:info@osw.waw.pl)

Visit our website: [www.osw.waw.pl](http://www.osw.waw.pl)