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**Turkey's Air and Missile Defense
Acquisition Journey Continues**

Nilsu Goren

*Graduate Fellow, Center for International
and Security Studies at Maryland (CISSM)*

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Introduction

After the United States confirmed that the Syrian regime used chemical weapons in the Damascus suburb of Ghouta on 21 August, the Patriot PAC-3 batteries deployed at the Turkish-Syrian border have been on alert status.¹ Turkey requested the deployment of NATO missile defenses after Syria shot down a Turkish RF-4E in June 2012 and a stray artillery shell killed 5 civilians in the border town of Akcakale later that year.

In order to increase its passive defenses against chemical, biological, radiological, and nuclear (CBRN) attacks across the border, the Turkish government has intensified military exercises and has deployed specialized CBRN teams to the border areas. In spite of these efforts, the Turkish government remains reliant on NATO deployed missile defense systems for protection from ballistic missile attack. Yet, on 26 September, the Turkish Undersecretariat for Defense Industries (SSM) executive committee, which is the national defense procurement agency, announced that the China Precision Machinery Import Export Corporation's (CPMIEC) HQ-9 (the export version is known as the FD-2000) won Turkey's five year old tender to purchase a long-range air and missile defense system.² Although Turkey has decided to start bilateral negotiations with China, the contract has not been finalized.

Despite the continued missile threat, Ankara's top priority is the conclusion of an agreement that allows for a co-production and co-licensing arrangement. The procurement strategy suggests that Turkey's top priority is technology transfer, rather than the rapid acquisition of an "off-the-shelf" system to immediately address Turkey's

¹ "More than 1400 killed in Syrian chemical weapons attack, US says," *The Washington Post*, August 30, 2013, at: http://www.washingtonpost.com/world/national-security/nearly-1500-killed-in-syrian-chemical-weapons-attack-us-says/2013/08/30/b2864662-1196-11e3-85b6-d27422650fd5_story.html?hpid=z1 and "Fuze kalkanina acil kodu," *Sabah*, August 24, 2013, in Turkish, at: <http://www.sabah.com.tr/Gundem/2013/08/24/fuze-kalkanina-acil-kodu>

² Lale Sariibrahimoglu, "Turkey selects Chinese HQ-9 SAM for T-Loramids," IHS Jane's Defense Weekly, September 26, 2013, at: <http://www.janes.com/article/27579/turkey-selects-chinese-hq-9-sam-for-t-loramids>

security needs. Thus, while Ankara had received bids from American, European, and Russian defense firms, the combination of the systems' lower price and China's willingness to coproduce the system in Turkey led to the decision to select the HQ-9.

Yet, for the third time since 1991, Ankara has had to make preparations to defend against a possible WMD attack. In the short term, Turkey should continue to rely on NATO's Patriot interceptors for security. However, in the long term, Ankara's selection of a Chinese missile defense system will likely preclude Ankara from taking advantage of NATO's missile defense architecture.

While Ankara claims that the system will use Aselsan's Herikks/Skywatcher command and control system, NATO officials have indicated that the system will not be interoperable with the sensors/radars deployed for the Alliance's missile defense system. Thus, while Turkish HQ-9 operators may be able to see NATO's complete air picture, they will, in all likelihood, not be able to benefit from the slew of other systems (early warning satellites, forward deployed X-band radars, and Aegis combat ships) that provide cueing information for NATO's missile defense system.

Recent Developments in Turkey's Quest for National Air and Missile Defense

Turkey is concerned about the weapons of mass destruction programs and missile launchers in the region and has therefore sought to procure air and missile defense systems, as well as other passive defenses for protection from nuclear, biological and chemical (NBC) threats.³ One of the key elements of the Turkish Armed Forces modernization project is the development of air defense systems with medium to long-range antimissile capabilities. Turkey first began negotiations with Israel for the Arrow missile defense system in 1997, but negotiations broke down after the financial crisis in 2001.

³ "Turkey: Defense White Paper 2000," at: <http://www.isn.ethz.ch/Digital-Library/Articles/Special-Feature/Detail/?lng=en&id=154907>

In January 2013, Turkey announced that it was seeking to co-develop a surface-to-air missile (SAM) program and had cancelled the 2009 off-the-shelf long-range air and missile defense system tender.⁴ The Turkish Long Range Air and Missile Defense System (T-LORAMIDS) tender bidders included Russia's Rosoboronexport (S-300 system), China's Precision Machinery Export Import Corp (CPMIEC), (HQ-9/FD-2000 system), the United States' Patriot PAC-3, and the Italian-French Eurosam (SAMP/T Aster 30.)⁵ In March 2013, Turkey finalized the acquisition model for the missile defense program and announced that it would acquire twelve missile-firing units in a co-development model.⁶

On a separate note, in March 2013, Defense Secretary Chuck Hagel announced that the U.S. effectively cancelled the fourth phase of the adaptive ballistic missile defense system.⁷ The Obama administration initially introduced the new missile defense architecture, known as Active Layered Theater Ballistic Missile Defense (ALTBMD), at the NATO Lisbon Summit in December 2010. The European Phased Adaptive Approach (EPAA) initially consisted of deployments in four main phases from 2011 to 2025, centered on the sea-based Standard Missile-3 (SM-3) interceptor – which would be upgraded in phases – and integrated with land and space-based sensors.

U.S. Aegis Ballistic Missile Defense (BMD) is the core of the EPAA and the SM-3 interceptors deployed on these surface ships are intended to counter short and intermediate-range ballistic missiles. The initial system consists of four Aegis Class cruisers, fifteen Arleigh Burke Class destroyers, land-based SM-3 interceptors that will

⁴ Lale Sariibrahimoglu and Nicholas de Larrinaga, "Turkey abandons USD4 billion t-Loramids SAM system buy," January 24, 2013, *IHS Jane's*, available at: <http://www.janes.com/products/janes/defence-security-report.aspx?id=1065975494>

⁵ Umit Enginsoy, "NATO warns Turkey against buying Chinese, Russian air defense systems," *Hurriyet Daily News*, July 25, 2011, at: <http://www.hurriyetdailynews.com/n.php?n=nato-warns-turkey-against-buying-chinese-russian-air-defense-systems-2011-07-25>

⁶ Lale Sariibrahimoglu, "Turkey to buy and co-develop T-Loramids SAM," *IHS Jane's Defense Weekly*, March 21, 2013, at: <http://www.janes.com/article/11554/turkey-to-buy-and-co-develop-t-loramids-sam>

⁷ "U.S. Cancels Part of Missile Defense that Russia Opposed," *The New York Times*, March 16, 2013, available at: http://www.nytimes.com/2013/03/17/world/europe/with-eye-on-north-korea-us-cancels-missile-defense-russia-opposed.html?_r=0

be deployed in Romania and Poland in 2015 and 2018 respectively, and an X-band radar system in Turkey that became operational in 2012.⁸ The U.S. has recently altered phase 4 of the EPAA. The United States therefore will not deploy the SM-3 block II-B, which was expected to be faster and have a more advanced kill vehicle than the version currently deployed.

While Turkey has embraced missile defense as a concept, it has had some problems with the EPAA. Turkey had initially demanded that it play a role in the NATO missile defense command, that it have some control over the ballistic missile defense system, and had asked for a guarantee stating that system would cover all of Turkish territory. As of now, it is unclear whether Turkey's demands have had an effect on the deployment of the EPAA. In 2013, Lt. Col Jay Janzen, a spokesman at Supreme Headquarters Allied Powers Europe, said "Decisions regarding the future of NATO's deployment of Patriots to augment the air defenses of southern Turkey have not yet been made."⁹

Turkey has therefore continued to push ahead with plans to develop a local missile defense system designed to augment NATO's missile defense system. In summer 2013, there were reports in the media that senior Turkish procurement officials believed Turkey was leaning toward choosing the Chinese long-range air and missile defense system, as it allowed technology transfer and was economically more feasible.¹⁰ Meanwhile, Turkey's largest defense company - ASELSAN - is reported to be developing a strategic radar system that will initially contain an illumination component and an indigenous "non-

⁸ "Aegis Ballistic Missile Defense," Missile Defense Agency at the U.S. Department of Defense, at: http://www.mda.mil/system/aegis_bmd.html

⁹ John Vandiver, "Eyes on Syrian border, US troops stand ready to defend Turkey's skies," *Stars and Stripes*, August 24, 2013, at: <http://www.stripes.com/news/eyes-on-syrian-border-us-troops-stand-ready-to-defend-turkey-s-skies-1.236704>

¹⁰ Burak Ege Bekdil, "Turkey may adopt Chinese Air Defense System," *Defense News*, Jun. 23, 2013, at: <http://www.defensenews.com/article/20130623/DEFREG04/306230007/Turkey-May-Adopt-Chinese-Air-Defense-System>

rotating identification friend-or-foe (IFF) system.”¹¹ The radar is expected to develop into a long-range surveillance and multifunctional radar after 2014 and be used on F-4 jet fighters and air and missile defense systems. The capability to reliably distinguish hostile from friendly aircraft is critical during conflict scenarios. Without the technology to identify and track military aircraft and missiles, no air and missile defense system could function without leading to “friendly-fire” issues.

According to the media reports and the SSM decision to start contract talks with China, the Turkish Defense Ministry has prioritized cost and technology transfer, while the Turkish Air Force has demanded that Turkey pursue the most advanced system the four suppliers can offer. The SSM decision to begin bilateral negotiations with the Chinese HQ-9 contradicts the Air Force’s request for the most advanced system. For instance, Turkey had been negotiating with the U.S. to buy the PAC-4 and PAC-5 systems instead of the outdated PAC-3s, and with the Russian Federation to get the S-400 system instead of the S-300.¹² According to the same source, Russia had indicated that it would decrease the number of batteries by half in order to decrease the costs of the more advanced S-400. Russia claims that instead of eight batteries, they could place a radar system in central Turkey to control four batteries and compensate for the decrease in coverage. Meanwhile, U.S. firms like Raytheon and Lockheed Martin were unwilling to transfer design information to Turkey, whose technological demands are unlikely to be matched.¹³ Nevertheless, Ankara has indicated that the United States’ bid had come in third place (behind China and Europe’s MBDA) and Russia had been eliminated.

¹¹ “Turkish defense company ASELSAN to develop strategic naval radar,” *The Journal of Turkish Weekly*, August 20, 2013, at: <http://www.turkishweekly.net/news/154492/turkish-defense-company-aselsan-to-develop-strategic-naval-radar.html>

¹² “Kimyasal tehdide karsi yeni savunma sistemi,” *Star*, August 26, 2013, in Turkish, at: <http://haber.stargazete.com/guncel/kimyasal-tehdide-karsi-yeni-savunma-sistemi/haber-783844>

¹³ Aaron Stein, “Turkey Wants Missile Defenses and the Accompanying Design Information,” *Nukes of Hazard*, November 16, 2012, at: <http://nukesofhazardblog.com/story/2012/11/16/75538/919>

Turkey's Policy Options and Implications

If Turkey finalizes the a deal with China, it is likely that the HQ-9 will not be interoperable with NATO's missile defense system.¹⁴ Nevertheless, Ankara will continue to benefit from the EPAA. For example, when Turkey and China begin production of the HQ-9, the NATO Alliance will continue to pay for the development of the command and control system for NATO's ALTBMD system. And Turkey, despite the T-LORAMIDs choice, will still benefit from the continued development of the SM-3 missile defense architecture in Europe.

According to NATO records, 150 million Euros have been spent on theater missile defense, and an additional 850 million Euros will be needed to expand the system in the next decade.¹⁵ These costs are divided between the 28 allies.¹⁶ According to U.S. Deputy Assistant Secretary for Space and Defense Policy Frank Rose, European allies plan to contribute more than \$1 billion to develop the missile shield.¹⁷ Currently, Turkey hosts a U.S. early-warning radar system in the southeastern city of Kurecik, Malatya, which is 450 miles away from the Turkish-Iranian border. The radar is exclusively operated by U.S. personnel and has a twin system in the Negev desert in Israel. The U.S. is also building an early warning facility in Qatar.¹⁸

¹⁴ For the technical specifications of the HQ-9, see Aaron Stein, Can Kasapoglu, Sinan Ulgen, "Turkey Goes Chinese for Missile Defense," EDAM Discussion Paper Series 2013/12, October 7, 2013, at: http://edam.org.tr/eng/document/TR_China_MD.pdf

¹⁵ "Ballistic Missile Defense," North Atlantic Treaty Organization, May 20, 2012, Media Backgrounder, at: http://www.nato.int/nato_static/assets/pdf/pdf_topics/20120520_media-backgrounder_NATO_ballistic_missile_defence_en.pdf

¹⁶ Ibid.

¹⁷ Rachel Oswald, "Next Phases of European Missile Shield on Track: DOD," *Global Security Newswire*, March 13, 2013, at: <http://www.nti.org/gsn/article/next-phases-european-missile-shield-track-pentagon/>

¹⁸ Barbara Opall-Rome, "US Maintains full control of the Turkish-based radar," *Defense News*, January 30, 2012, at: <http://www.defensenews.com/article/20120130/DEFREG04/301300013/U-S-Maintains-Full-Control-Turkish-Based-Radar> and "Qatar Requests AN/FPS-132 Block 5 Early Warning Radar," *Defense Talk*, July 31, 2013, at: <http://www.defencetalk.com/qatar-requests-anfps-132-block-5-early-warning-radar-48622/>

The Army Navy/Transportable Radar Surveillance (AN/TPY-2) is an X-band, high-resolution radar designed for ballistic missile defense that can be “coupled with layered sensors, to give the ballistic missile defense systems a continuous tracking and discrimination capability.”¹⁹ Each radar system costs the United States approximately \$200 million.²⁰ More advanced systems include the Space Tracking and Surveillance System, which is the experimental layer operated by the U.S. Missile Defense Agency to generate three-dimensional tracks reported to BMD systems for boosting targets.²¹ Former Turkish Minister of Defense Gonul had stated that the NATO missile shield system would bring significant cost reductions for Turkey because the allies share costs.²² So far, the U.S. has provided the early warning radar and the NATO declarations at the Lisbon Summit have been met, but the future role of Turkey within the missile defense system is undecided and Turkish demands for the command and control of the radar and comprehensive territorial coverage have not been addressed.

Moreover, NATO air and missile systems might pose a conflict for Turkey vis-à-vis regional cooperative security. For instance, Turkey might face retaliatory consequences from Iran for hosting the NATO radar, in case of an Israeli military attack on Iranian nuclear facilities. Ali Hajizadeh, an Iranian Revolutionary Guards Corps commander, has said “If Iran wants to dispatch a ballistic missile, no threat will be effective and we declare they should be on alert about their own defense missile shield if they want to shoot down our missiles.” In addition, other Iranian officials have threatened to target the Kurecik radar as a response to Turkish help to Israel.²³ Iran made similar threats, after the

¹⁹ Missile Defense Agency, Fact Sheet, July 2011, at:

http://www.mda.mil/global/documents/pdf/an_tpy2.pdf

²⁰ Sydney J. Freedberg Jr, “Raytheon’s Tippy Two Radar Gets Back in the Budget,” *Breaking Defense*, March 15, 2013, at: <http://breakingdefense.com/2013/03/15/raytheons-tippy-two-radar-gets-back-in-the-budget-knock-on/>

²¹ Missile Defense Agency Fact Sheet, “Space Tracking and Surveillance System,” at: <http://www.mda.mil/global/documents/pdf/stss.pdf>

²² “Turkey conditionally approves NATO missile shield,” *Hurriyet Daily News*, October 15, 2010, at: <http://www.hurriyetdailynews.com/default.aspx?pageid=438&n=turkey-conditionally-approve-for-missile-shield-2010-10-15>

²³ “Iran says deployment of NATO shield in Turkey ‘inefficient’,” *ISNA*, September 22, 2011, at: <http://www.isna.ir/en/news/9006-21384/Iran-says-deployment-of-NATO-shield-in-Turkey>

deployment of PAC-3 batteries at the Turkey-Syria border. Officials have claimed that the PAC-3 system was meant to protect Israel from Iran, and that it would escalate the conflict further with Syria.²⁴ While these statements should certainly be taken into account, it must be noted that Turkey has hosted American military facilities since 1952, and has therefore been a potential target for Iranian counter attacks aimed at punishing the United States or Israel for quite some time.

Turkey agreed to host the radar under the condition that no document would directly name Iran as a rogue threat, that the missile shield would cover all of Turkish territory, and that no information would be passed to non-NATO states, i.e. Israel. The X-band radar in Kurecik is intended to detect the launch of a ballistic missile in Iran and elsewhere in the Middle East, transfer the information to the U.S. SM-3 interceptors based on Aegis destroyers, which will then try and hit the missile mid-flight.

For robust defense, forward-based large radars in proximity to the origin of the missile are required, as the interceptor launches only 100 seconds after the ballistic missile detection by the sea-based and land-based sensors.²⁵ Proximity of the city of Malatya to the Iranian border provides an advantage to the NATO system, as the radar is the first chain loop in the system to transfer information to the interceptors. However, due to the trajectory of ballistic missiles and Turkey's geographical proximity to the region, the existing architecture doesn't cover Turkey's Eastern territories.²⁶ Turkey therefore has a strong incentive to pursue an indigenous system that could be included in NATO's missile defense architecture.

²⁴ Joshua Davidovich, "Iran says Patriot batteries in Turkey meant to protect Israel," *The Times of Israel*, December 30, 2012, at: <http://www.timesofisrael.com/iran-says-patriot-batteries-in-turkey-meant-to-protect-israel/> "Iran Warns Turkey not to deploy Patriot missiles," *Hurriyet Daily News*, November 24, 2012, at: <http://www.hurriyetaidailynews.com/iran-condemns-turkeys-patriot-missile-demand.aspx?pageID=238&nid=35384>

²⁵ Defense Science Board Task Force Report on Science and Technology Issues of Intercept Ballistic Missile Defense Feasibility, September 2011, at: <http://www.acq.osd.mil/dsb/reports/ADA552472.pdf>

²⁶ M.K. Kaya, "How much security will NATO's missile defense shield provide for Turkey?" *Turkey Analyst*, vol. 5, no.2, January 23, 2012, at: <http://www.silkroadstudies.org/new/inside/turkey/2012/120123A.html>

According to information in the National Academy of Sciences study on ballistic missile defense, Turkey needs to procure Terminal High-Altitude Area Defense System (THAAD) or other equivalent systems to defend against shorter-range threats.²⁷ The SM-3 interceptor engages the target midcourse – at the aperture of the missile’s ballistic flight in space – and in the terminal phase – atmospheric reentry – and therefore cannot engage the missile while it is in eastern Turkey during its ascent phase.²⁸ ALTBMD cannot address shorter-range missiles originating from Syria or Iran, either, restating the need to protect eastern provinces and the air bases that Turkey and the alliance have in proximity to possible missile launches from the Middle East.

On the other hand, coverage does not mean defense will always be successful. The primary responsibility of intercepting missiles in boost and mid-course phases relies on the sea-based U.S. Aegis destroyers, which relies on the data generated by early-warning radars in proximity to the origin of the missile. The integrated transatlantic architecture also includes a limited number of ground-based interceptors to provide the maximum protection over U.S. and Europe against long-range ballistic missile threats from the Middle East. SM-3s are designed to intercept missiles above the atmosphere, meaning that they are vulnerable to decoys, countermeasures and multiple missile attacks, and they do not address the cruise missile threat. In February 2010, the Obama administration published the “Ballistic Missile Defense Review Report” that indicated that the vast majority of the SM-3 experiments would have failed to destroy warheads.²⁹

In the recent case of Syrian shells causing civilian casualties in border provinces of Turkey, Germany and Netherlands provided the Patriot missiles for protection of the Turkish-Syrian border, but were criticized due to the delays in the arrival of the batteries.

²⁷ “Making Sense of Ballistic Missile Defense: An Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives (2012)” The National Academies Press, at: http://www.nap.edu/catalog.php?record_id=13189

²⁸ “A System of Elements,” Missile Defense Agency, U.S. Department of Defense, at: <http://www.mda.mil/system/elements.html>

²⁹ George N. Lewis and Theodore A. Postol, “A Flawed and Dangerous U.S. Missile Defense Plan,” May 2010, at: http://www.armscontrol.org/act/2010_05/Lewis-Postol

The PAC-3, however, does not provide any defense against artillery shells or short-range rockets. Turkey has not announced plans to address these threats.

The cost of the six PAC-3 missile batteries for Turkey was declared as \$8.5 million per year, while the total cost for the allies for six batteries would be approximately \$18 million.³⁰ The perceived vulnerability and dependence to NATO in the Syrian case is analogous to the 1991 Gulf War, when Turkey faced Scud threats from Saddam Hussein's Iraq. Due to disagreements within NATO over the urgency of the Iraqi threat, there were serious delays with the dispatch of Patriot systems for Turkish use, leading to controversy that Turkey could not rely on NATO for security guarantees and needed to develop its national defense capabilities.³¹ Similarly, in 2003, France, Germany, and Belgium had blocked the deployment of NATO equipment to Turkey, including Patriot missile batteries and Airborne Warning and Control System (AWACS) surveillance planes, before the 2003 American invasion of Iraq. The three countries were concerned that the defensive measures would lead to a "premature" decision for NATO to be involved in the Iraq crisis.³²

If Turkish government adopts the Chinese system and finalizes the bilateral contract negotiations with CPMIEC, it would not be able to integrate the full air data into the NATO early warning systems, which would create efficiency problems for the radar systems. For example, if Turkey's system had been interoperable, the X-band radar in Malatya, working in conjunction with American early warning satellites, would have been able to pick up the missile launch, which would then narrow the window in which the missile battery's radar would have to "search" for the incoming ballistic missile. And, based on the information, the theater missile defense's radar would then compute a likely

³⁰ "NATO Patriots to Cost Turkey \$8.5 mln annually," *Ria Novosti*, February 24, 2013, at: <http://en.rian.ru/world/20130224/179658740.html> and "Patriot TMD Deployment," *Global Security*, at: <http://www.globalsecurity.org/space/systems/patriot-unit.htm>

³¹ Saban Kardas, "Patriot Missile Procurement Option Sparks Controversy in Turkey," *European Dialogue*, available at: <http://eurodialogue.org/Patriot-Missile-Procurement-Option-Sparks-Controversy-In-Turkey>

³² "Three countries delay NATO's decision over Iraq measures," *The New York Times*, February 7, 2003, at: http://www.nytimes.com/2003/02/07/news/07iht-nato_ed3.html

intercept point and fire the interceptor. While the interceptor is in flight, the missile battery's radar makes adjustments to the missile. Turkey, however, is not likely to have access to this cueing information and will instead only rely on the HQ-9's radar and other Turkish assets. In turn, this strongly suggests that Turkey chose to forego NATO integration for a co-production arrangement, in order to enhance domestic production capability to reduce dependence.

The possibility of Turkish acquisition of a Chinese system has been questioned on intent by diplomats from NATO countries, as one of them stated that: "Turkey has every right to choose its own air defense system but we do not quite understand the logic of opting for a Chinese system with no interoperability with the existing [NATO] assets."³³ In addition to not having access to the early warning information, Turkey would not benefit from working with NATO partners for training on tactics and procedures in missile defense operations.³⁴ Adopting the U.S. Patriot or Europe's SAMP/T Aster 30 would have resolved this conflict.

Beyond Air and Missile Defense: Turkey's Ambitions in the Space

As if technical and political repercussions of air and ballistic missile defense are not complicated enough, Turkey plans to carry its offensive, defensive, reconnaissance, surveillance, and early warning resources and capabilities into space within the next ten years.³⁵ The Turkish Air Force is establishing a Space Group Command, i.e. an aerospace force unit that will specialize in satellite launches, reconnaissance space-based imagery,

³³ Burak Bekdil, "Ankara's move to Chinese air systems appals NATO allies," *Hurriyet Daily News*, July 3, 2013, at: <http://www.hurriyetdailynews.com/ankaras-move-to-chinese-air-systems-appals-nato-allies.aspx?pageID=238&nID=49835&NewsCatID=483>

³⁴ Aaron Stein, "Turkey in quandary over missile threat," *Southeastern European Times*, 05/07/2011, at: http://www.setimes.com/cocoon/setimes/xhtml/en_GB/features/setimes/features/2011/07/05/feature-03

³⁵ "Turkey: Defense White Paper 2000," at: <http://www.isn.ethz.ch/Digital-Library/Articles/Special-Feature/Detail/?lng=en&id=154907>

early warning, satellites, and satellite communications.³⁶ The early concept design of a proposed satellite launch vehicle (SLV) will be commissioned to ROKETSAN, the national missile manufacturer. Turkish Aerospace Industries (TAI) will develop the synthetic aperture radar (SAR) for the Gokturk-3; with support from defense electronics manufacturer ASELSAN and the national science and technology research council TUBITAK, to provide radar imagery for the command and control network.

The space program is intended to achieve interoperability between aerial and space assets. Turkey intends to network its future space-based assets with manned and unmanned systems. Turkey plans to use its recently procured AWACS early-warning planes, as well as unmanned remotely piloted aircraft (RPAs, or more commonly known as drones) to augment Turkey's imagery and communications, as well as to help cue missile defense interceptors. Turkey is currently developing the unmanned ANKA drone, which will also carry a SAR for imaging. The ambitious national air and space project also includes the country's first national fighter jet, an advanced unmanned combat aerial vehicles – dubbed the ANKA +A –, and building a missile with a range of 2,500 kilometers.³⁷

Turkey plans to invest \$100 million to develop an SLV, which it has dubbed the Turkish Satellite Launching System (UFS). There is some speculation that the SLV could be used as a platform for Ankara to develop the proposed 2,500 km ballistic missile.³⁸ Currently the government has not specified whether or not the proposed 2,500 km missile will be ballistic or cruise. Thus, there is ambiguity over feasibility of the project and its

³⁶ Burak Ege Bekdil, "Turkey plots path toward space command," *Defense News*, April 9, 2013, at: <http://www.defensenews.com/article/20130409/DEFREG01/304090011/Turkey-Plots-Path-Toward-Space-Command>

³⁷ Burak Ege Bekdil, "Ambitious Turkey seeking to sync national air and space firepower," *Space News*, July 1, 2013, at: <http://www.spacenews.com/article/military-space/36075ambitious-turkey-seeking-to-sync-national-air-and-space-firepower>

³⁸ Burak Ege Bekdil, "Turkey's Sat-Launcher Plans Raise Concerns," *Defense News*, July 28, 2013, at: <http://www.defensenews.com/article/20130728/DEFREG04/307280004/Turkey-s-Sat-Launcher-Plans-Raise-Concerns>

connection to the SLV. Turkey should clear up the confusion and clearly articulate its long-term missile plans.

In 2014, Turkey plans to launch Gokturk 1, an Earth-observation spacecraft developed in cooperation with Italy and France. Ankara then plans to launch three military communication satellites in the next decade and eventually build an early-warning satellite equipped with sensors to detect ballistic missiles.³⁹ In total, Turkey plans launch sixteen satellites by 2020. Turkey's satellite program is valued at approximately \$2 billion worth of contracts. The Turkish government is expected to invest approximately \$100 million for the satellite infrastructure and electronics.⁴⁰

Given the high costs, short timeframe and technological risks involved, the program is overly ambitious. Hence, Turkey is likely to seek defense partnerships to share the burden. For instance, in August 2013, the Brazilian Ministry of Defense announced that Brazil and Turkey would be cooperating in five working groups on naval, aeronautics, space, command and control and cyber defense fields.⁴¹ Within these groups, Turkey will develop technologies with Brazil on launch systems and satellite, military communications through "Software Defined Radio" (SDR.)

As a more technically feasible, politically acceptable, and cost-effective alternative Turkey could increase its influence in NATO. In July 2013, NATO announced the launch of a new combined air and space operations center (CAOC) for southern Europe in the

³⁹ Amy Svitak, "Ankara Plans To Loft 25 Satellites By 2033," *Aviation Week & Space Technology*, June 10, 2013, at: http://www.aviationweek.com/Article.aspx?id=/article-xml/AW_06_10_2013_p54-583373.xml

⁴⁰ Burak Ege Bekdil, "Turkey's Sat-Launcher Plans Raise Concerns," *Defense News*, July 28, 2013, at: <http://www.defensenews.com/article/20130728/DEFREG04/307280004/Turkey-s-Sat-Launcher-Plans-Raise-Concerns>

⁴¹ "Brazil and Turkey Create Groups to Study Defense Development Projects," Source: Brazil Ministry of Defense; issued Aug. 22, 2013 in Portuguese only, edited unofficial translation by defense-aerospace.com at: <http://www.defense-aerospace.com/article-view/release/147372/brazil%2C-turkey-to-cooperate-on-ships%2C-aircraft.html#>

north east of Madrid, at the Torrejon de Ardoz airbase.⁴² The new center is expected to generate better control and air picture over the Aegean by abrogating the air headquarters in Izmir (Turkey) and the CAOC-7 in Larisa-Greece, through a less sub-regional solution.⁴³ EDAM Chairman Sinan Ulgen argues that this development will help Turkey strengthen its air defenses in response to potential ballistic missile attacks from Syria.⁴⁴

Conclusion

Given the high costs, technical limitations, and political repercussions of air and missile defense systems, Turkey should choose to remain integrated into the NATO structure and push for a change in NATO policy to receive an assurance to cover entire Turkish territory by alternative area defense systems such as THAAD. Given the huge financial burden of these systems, consideration of how imminent the missile threats are to Turkey is also a crucial consideration in the procurement decision. Operating in a complex web of security and trade relations in the Middle East, investing in a massive, confrontational defense program would also be detrimental on Turkish cooperative engagement in the region.

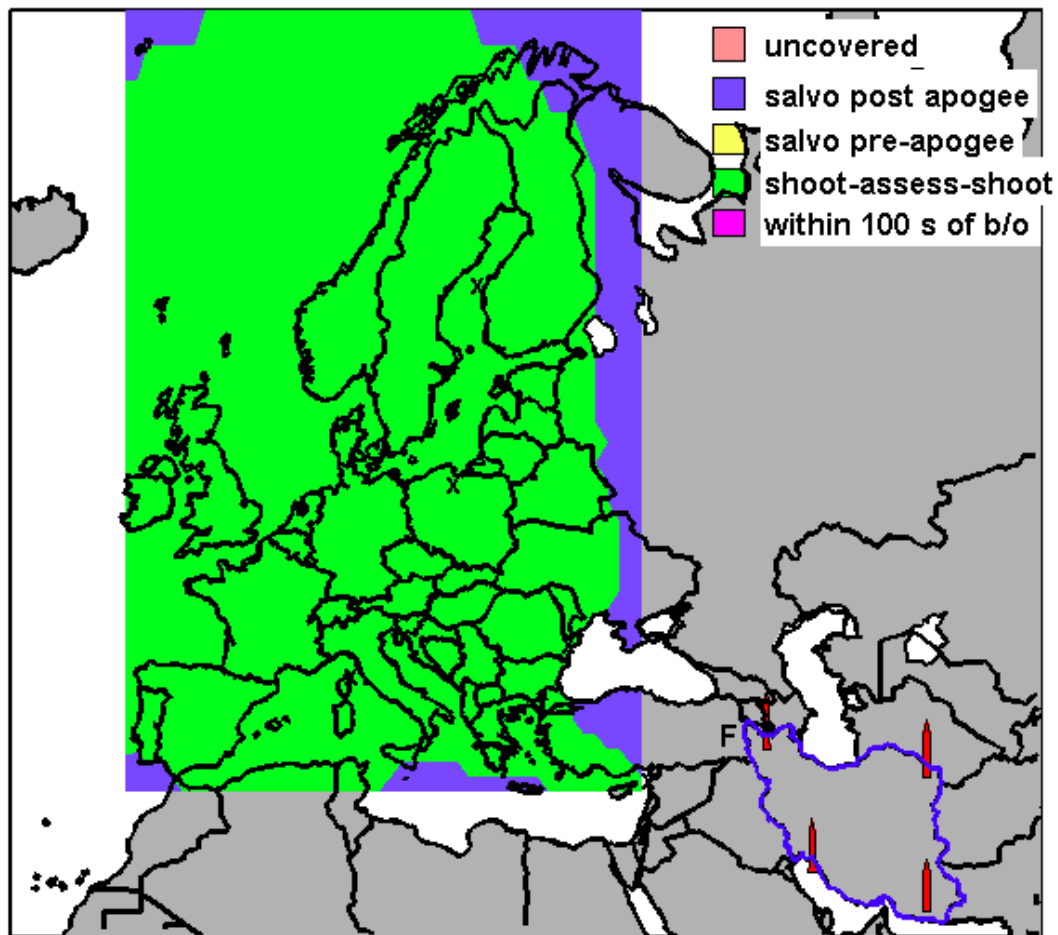
⁴² Alakbar Raufoglu, "NATO facility boosts Turkey's defense," *Southeast European Times*, August 26, 2013, at:

http://www.setimes.com/cocoon/setimes/xhtml/en_GB/features/setimes/features/2013/08/26/feature-03

⁴³ Ibid.

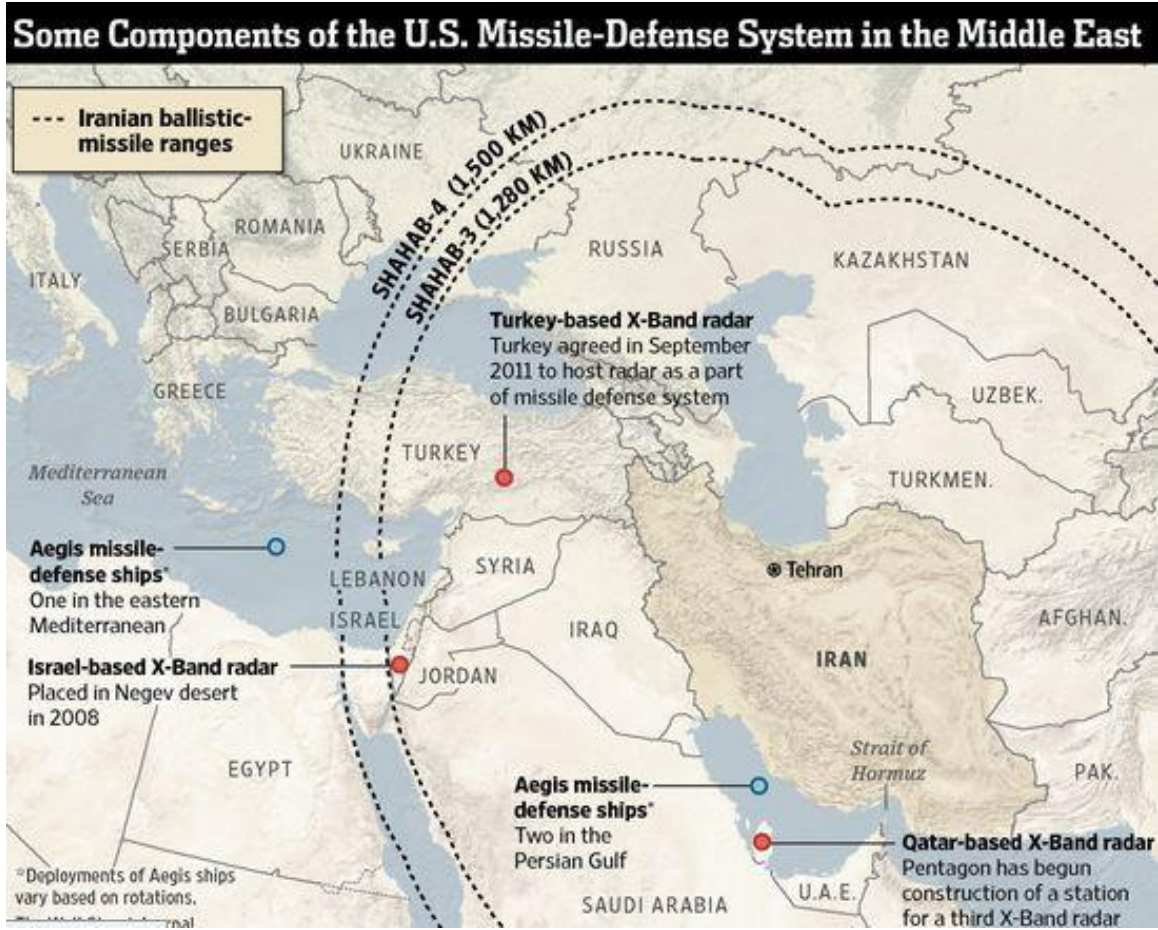
⁴⁴ Ibid.

APPENDIX



Coverage Achievable with Fast Missile and Netted Local Surveillance and Tracking

Source: Defense Science Board Task Force Report on Science and Technology Issues of Intercept Ballistic Missile Defense Feasibility, September 2011, at: <http://www.acq.osd.mil/dsb/reports/ADA552472.pdf>



Source: "Pentagon Bulks up Defenses in the Gulf," *The Wall Street Journal*, July 17, 2012, at: <http://www.theblaze.com/stories/2012/07/17/war-drums-u-s-military-building-missile-defense-radar-station-in-qatar/>

Missile defence: Further Nato capabilities, due by 2018



Source: "NATO's Missile Defense Shield 'up and running,'" *BBC News Europe*, May 19, 2012, at: <http://www.bbc.co.uk/news/world-europe-18093664>