Lizzy Leary
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Dire Straits: ROC Rapid Runway Repair and PRC Ballistic Missiles

A key assumption that individuals make in regards to a potential Cross Strait conflict is that the Republic of China (ROC) will have secure airbases from which to fly. A peaceful conclusion to the Cross Strait situation would be in US interests; however, it is important to understand what a potential conflict in the region could look like as well. Because the People's Republic of China's (PRC) air dominance and disruption of ROC Rapid Runway Repair (RRR) could be decisive in determining a Cross Strait conflict, one has to ask: Could the ROC withstand a People's Liberation Army's (PLA) missile bombardment?

The ROC likely wants to rely on its air force (ROCAF) to prevent the PRC from establishing and maintaining air superiority over the ROC; however, without access to its runways, ROC airbases will not be able to support air operations. The ROC's ability to prevent PRC air superiority translates directly into how long it can withstand the PLA without external assistance.

There are several uncertainties in regards to this topic due to limited knowledge released by both sides. For example, the exact amount and accuracy of PLA Rocket Force (PLARF) missiles is unknown; however, both numbers and circular error probability (CEP) has been estimated. Likewise, it is unknown whether or not the PLA Rocket Force (PLARF) can launch a simultaneous missile attack that would be substantial enough to cause harm.

I. ROC Strategy

The quick repair of damaged runways is critical for the ROC to maintain airpower against the PRC due to PLARF weapons that can target these runways during offensive operations. ROC strategy in regards to PLA modernization has focused primarily on maintaining the ROC's Air Force's (ROCAF) superiority in order to deny the PRC uncontested control over ROC air domain. The ROC focused primarily on maintaining air parity with the PLA through superior quality rather than quantity; however, eventually the quantity of PLA capabilities will likely be able to overwhelm the quality of ROCAF capabilities. As a result, the ROC has also invested heavily in RRR capabilities through both its own development and US assistance.

a. Rapid Runway Repair

In order to understand ROC RRR capabilities, one must first understand the process of RRR.[1] There are three levels of runway repair that are defined by the durability and permanence of the repair: 1) Expedient, 2) Sustainment, and 3) Permanent.[2] These types of repair have their own step functions that require different materials and processes. The faster the repair, the lower the durability; however, other factors can also impact the durability of repairs, such as aircraft types and crater size. There are three types of craters that result from missile damage on runways: 1) spalls, 2) small craters, and 3) larger craters. Spalls have a diameter of less than five feet, small craters have a diameter of less than 20 feet, and large craters have diameters greater than 20 feet.[3] Because aircraft require runways to be uncorrupted, the existence of a single crater can impact all air operations.

[1] Bowman, Brandon L. "Idiot's Guide to Airfield Damage Repair". United States Naval War College. Newport, Rhode Island. 2013.
[2]Bowman, pp. 9.
[3] "Air Force Pamphlet 10-219, Volume 4: Airfield Damage Repair." US Air Force. Washington, DC. 2008. Web. Pg 51.

In order to conduct RRR, the crater edge must be squared. This is achieved by digging down approximately 16 inches so that there are straight lines that allow for an installation of a sand grid, or other debris. There is additional room for backfill under these 16 inches. Reinforcing material, like a steel bar, can also be used but cannot exceed the surface. All standing water in the crater needs to be removed before continuing with the repairs; likewise, all debris with a diameter greater than 12 inches must also be removed. Debris needs to be pushed at least 30 feet away from the operating strip and should not exceed three feet in height so flight operations are not disturbed.[4]

Expedient repair is the fastest type of repair; however, it also wears out faster than Sustainment and Permanent repairs. Expedient consists of two possible methods of repair: the sand grid method or the crushed stone method. The sand grid method does not require a lot of stockpiled materials and is the most convenient. The crater is filled with debris, a sand grid fills the 16 inches under the surface, and a FOD cover is placed on top of the crater so that aircraft can pass over the surface.[5] Instead of sand, the crushed stone method means that the top 16 inches of the crater is filled with crushed stone instead of the sand grid. Although it is harder to stockpile stone, this method is advantageous because it is easier to repair since a sand grid is not required and aircraft can pass over the stone without a FOD cover.[6] The FOD covers and crushed stone layers can only endure approximately 100 aircraft passes before they wear out.

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[4] Bowman, pp. 12

[5] The covers are typically made of fiberglass or aluminum. The ROC has covers given to it by the United States, the exact number is unknown
Bowman, pp. 16-19

[6] "Unified Facilities Criteria 3-270-07: Airfield Damage Repair." US Department of Defense. Washington D.C. 2002. Web. 2-6. https://www.wbdg.org/FFC/DOD/UFC/ufc_3_270_07_2002.pdf

Sustainment repair can endure approximately 5,000 passes. This method takes longer than the other two because the top of the crater is placed with stone and grout, a concrete slab, or a pre-cast concrete slab.[7] This method is significantly more durable than Expedient and if pre-cast concrete slabs are prepared, then the repair could potentially be as fast as the Expedient repair.[8] Permanent repair is when the crater is repaired permanently and would not be conducted during a crisis. Expedient's sand grid method and Sustainment's pre-cast concrete slab method would be the two most conventional methods during a conflict due to their convenience and speed. Although the sand grid method would not take as much time as the pre-cast concrete slab method, the durability of the concrete slab could likely be worth the extra time.

b. Rapid Runway Repair in the ROC

Because of the threat of PRC ballistic missiles, ROC RRR investment has increased exponentially and now the ROC "has some of the world's fastest, largest, and best-equipped and dedicated runway repair teams".[9] By conducting frequent RRR drills, the ROC can prepare for potential PRC threats. For example, in a 2014 RRR exercise, the ROC was able to successfully repair seven craters in only 90 minutes.[10] The type of repair was not reported in this report and is unknown.[11] Although the ROC conducts these exercises, it is difficult to assess their capabilities since they have not conducted RRR during an actual attack. Likewise, the PRC can launch missiles at a much faster rate than the ROC can conduct RRR; therefore, the ROC would need to facilitate its RRR operations if it wanted to hold its own against a PRC bombardment. The ROC

[7] "Unified Facilities Criteria 3-270-07: Airfield Damage Repair."
[8] Bowman, pp. 20
[9] Easton, Ian. "Able Archers: Taiwan Defense Strategy in an Age of Precision Strike." Project 2049. September 2014. Web. pp. 52. http://www.project2049.net/documents/Easton_Able_Archers_Taiwan_Defense_Strategy.pdf
[10] "台模拟战机攻击机场 军官称90分钟可修7个弹坑". Huangqiu. 14 January 2014. Web. http://mil.huanqiu.com/china/2014-01/4752220.html
[11] Easton, Ian. Private Interview. December 2016.

RRR rate should surpass PLARF launch rate and repair craters faster than the PRC can bombard it. The rate of PLARF launches will be discussed in the next section.

The United States has been able to guide the ROC in RRR development. For example, the United States regularly sends USAF RED HORSE[12] advisors to visit Taiwan to work with the ROC to improve their RRR capabilities. Likewise, the United States has also given the ROC RRR kits and supplies. A typical RRR squadron consists of six teams, 70-100 personnel, and approximately 20 armored vehicles. A team of three vehicles was distributed to every airfield in the ROC and carry the RRR supplies, which allows for fast responses.[13] As a result, every base in the ROC is prepared to conduct RRR if attacked by the PRC. Because the supplies are located in trucks, they are less susceptible to PRC sabotage since they are harder to detect and are mobile.

The ROC has also implemented additional measures to safeguard its RRR trucks and airbases. This includes camouflage, concealment and deception (CCD) capabilities.[14] CCD is intended to confuse and disrupt PLA reconnaissance and planning through several methods, including smoke screens, crater decoys, and aircraft decoys.

II. PRC Strategy

In the 1990s, the PLA began focusing on military modernization and ballistic missile development due to the desire have the capabilities to overwhelm the ROC military and deter foreign intervention. PRC precision strike capabilities on ROC airbases could be decisive in

[12] RED HORSE is an acronym for Rapid Engineering Deployable Heavy Operation Repair Squadron Engineer Sommers, David W. "554th Red Horse: Semper Ducimus for 47 Years". Anderson Air Force Base. 9 October 2012. Web. http://www.andersen.af.mil/News/ArticleDisplay/tabid/1992/Article/414932/554th-red-horse-semper-ducimus-for-47-years.aspx

[13] Easton, pp. 53.

[14] Easton, pp. 55

controlling the skies during future operations against the ROC. Today, PLARF has the ability to threaten most ROC military bases with its ballistic missile capabilities.[15]

PLARF has deployed six SRBM types as of 2013, including the DONG FENG-11 (DF-11)[16], DF-15[17], DF-16[18] and their variants. PLA ballistic missiles are constantly being developed and modified in order to adapt strategically to the Cross Strait environment. Likewise, the PLA is consistently deploying advanced weapons systems to replace earlier generations and improve its ability to engage in conflicts.[19] For example, in 2016, PLARF introduced the DF-16B, which is designed for releasing cluster bombs.[20] The DF-16B would be able to utilize its cluster bombs to provide maximum damage to ROC airfields. By 2025, the PLARF could have 1,400 SRBMs opposite Taiwan, which would include DF-11, DF-15, and DF-16.[21] The PLARF currently has approximately between 1,000-1,200 SRBM[22] and 250-300

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[15] There are two ROCAF bases in Hualien that are underground. ROCAF officers worry that the PLA have figured out a way to strike these bases because the PLA has had many years to study these bases. Therefore, it cannot be assumed that the PLA has not found a vulnerability or two. Likewise, the ROCAF is constantly changing their defenses and it also cannot be assumed that the ROCAF has not found a way to trick the PLA.
Easton, Ian. Private Interview. Email. December 2016.

[16]DF-11 missiles have an effective range of 300 km and take approximately thirty minutes to prepare launch

[17]DF-15 missiles have a maximum range of 600 km and take approximately thirty minutes to prepare launch. The DF-15 missile head has a small radar section which results in it being difficult to detect on anti-missiles systems. At the end of the missile flight, the missile body separates from the missile head. The missile body then produces a greater radar signal after separation, which provides cover for the missile head.
"DF-15 [CSS-6/M-9]". Global Security. Web. GlobalSecurity.org.
http://www.globalsecurity.org/wmd/world/china/df-15.htm

[18] The DF-16 has a longer range of 800-1000 km and takes approximately thirty minutes to prepare launch. Although it is technically a MRBM, the extended range is necessary to reach certain ROC targets (to be discussed in scenarios)

[19] "Military and Security Developments Involving the People's Republic of China 2016". Department of Defense. 2016. Arlington, VA. pp. i.
http://www.defense.gov/Portals/1/Documents/pubs/2016%20China%20Military%20Power%20Report.pdf

[20]Lin, Jeffrey and P.W. Singer. "New Chinese Ballistic Missile Crashes the Battlefield Party with Cluster Munitions." Popular Science. 19 February 2016. Web.
http://www.popsci.com/new-chinese-ballistic-missiles-crashes-battlefield-party-with-cluster-munitions

[21] "Defense Policy Advisory Committee, China's Military Threats against Taiwan in 2025". New Frontier Foundation. Taipei, Taiwan. March 2014. pp. 73. Web.
http://www.dpp.org.tw/upload/news/20140304120411_link.pdf.

[22] The estimated range of these SRBM is 300-1000 km

launchers with approximately four missile loads per launcher[23] This could mean possible missile inventories of 2,400 missiles,[24] 6,000 missiles,[25] or 9,600 missiles[26] depending on the ones utilized.[27] In a recent report, a scholar outlined how PLA SRBMs could jump from the estimated 1,200 to over 5,000 by one-for-one replacement of existing numbers of single missile CASIC DF-11 and CASC DF-15 TELs with new multi-missile TELs for the CASC DF-12 and CASIC BP-12 family. Likewise, it takes approximately 30 minutes to reload each of these launchers.[28] With a good team, the whole operation could probably take approximately an hour once launcher inspections and pre-launch checks and power ups were taken into account. Finally, the SRBM systems reportedly have a CEP of less than 30 meters.[29] These are more indicators of the continued development of SRBM systems. It is estimated that the Chinese have approximately 300 DF-11s, between 30-50 D-16s, and 500 DF-15 systems. All of these systems are either conventional or nuclear.[30] It is important to take into account that the PLARF could conduct a nuclear attack against the ROC; however, for this paper we will address the conventional missile systems.

From 1985-2015, the PLA military regions (MR) did not change; however, in 2016, the PLA underwent massive re-organization of military regions by consolidating PLA MR.

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[23] "Military and Security Developments Involving the People's Republic of China 2016". pp. 109.
[24] 2x large SRBMs
[25] 1x large and 4x small SRBMs
[26] 8x small SRBMs
[27] Fisher, Richard D. "Recent Trends in China's Missile and Strategic Strike Forces." International Assessment and Strategy Center. 1 October 2016. Web. pg. 9.
[28] Fisher, 2016
[29] "Is China's New Short-Range Missile System Designed to Compete with Iskander." Sputnik International. 26 October 2016. Web. https://sputniknews.com/military/201610261046764752-donfeng12-vs-iskander-analysis/ and Fisher, Richard D. "Analysis: Chinese Moves to Adopt New Guided Rocket System Show Ongoing Value of Domestic Competition to PLA." IHS Jane's Defense Weekly. 26 March 2015. Web. http://www.janes.com/article/50254/analysis-chinese-moves-to-adopt-new-guided-rocket-system-show-ongoing-value-of-domestic-competition-to-pla
[30] "Is China's New Short-Range Missile System Designed to Compete with Iskander."

Because information on the current re-organization is limited, it is important to take into account the SRBM variants at the pre-reorganization brigades since the SRBM variants could still be in the same regions. Previously, the ROC 52 Base commanded the PLARF's SRBM infrastructure across from the ROC in Huangshan City.[31] As of 2013, the 52 Base had at least six SRBM brigades and three MRBM brigades. The 53 Base in Kunming had two more brigades that can reach the ROC. Each brigade had "a command post that oversees six launch battalions, a technical support battalion, a communications battalion, an electronic countermeasures group, and a rail transfer point."[32] The identified SRBM brigades were as follows:

Brigade	Unit	Location	Known/Possible SRBM Variants
Leping/Shangrao	96165	Jiangxi Province	DF-15; DF-16
Yong'an	96169	Fujian Province	DF-15
Meizhou	96169	Guangdong Province	DF-11
Ganzhou	96162	Jiangxi Province	DF-11
Jinhua	96164	Zhejiang Province	DF-11
Xianyou	96180	Fujian Province	unknown
Puning	96212	Guangdong Province	unknown

[33]

Fujian and Jiangxi provinces were in the closest proximity to the ROC, which would result in less probability of ROC missile detection and a higher probability of target accuracy. Likewise, the SRBM variants at these locations, DF-15 and DF-16, would be ideal for a ROC attack because of their range. Currently, the most advantageous bases would be located in the

[31] Huangshan City is located in Anhui Province
[32]Easton, pp. 4.
[33]Because this information is from 2013, it is likely that SRBM variants at these brigades have changed due to the rapid modernization process.
Stokes, Mark. "Expansion of China's Ballistic Missile Infrastructure Opposite Taiwan." AsiaEye.18 April 2011. Web. http://blog.project2049.net/2011/04/expansion-of-chinas-ballistic-missile.html

Eastern Theater and the Southern Theater due to their proximity to the ROC. The advantages these locations provide to the PRC will be further investigated in the following section of this paper.

III. Military Analysis of a PRC Attack on the ROC

If a Cross Strait conflict erupted today, the probability for ROC success would be slim. Although the ROC could likely withstand PRC bombardment for a short period, eventually PLA capabilities would overwhelm the ROC. The PRC would probably achieve victory faster if it could ground the ROCAF at the beginning of the military campaign in order to obtain sovereignty in ROC airspace. The most effective way of doing this would be through cratering ROC runways.

The PRC would most likely initially utilize its airbases in the Fujian and/or Jiangxi provinces to target the ROC because they are directly across the Taiwan Strait.[34] These airbases are in the Eastern and Southern Theaters.[35] Based of off information from 2013, both airbases had DF-15 systems; however, the Jiangxi airbase also has DF-16. Even though the Jiangxi airbases are farther away than the Fujian bases, it is likely that the PLARF would first utilize DF-16B missiles from Jiangxi because of their cratering capabilities.[36] Likewise, the DF-16 systems have the ability to reach ROC bases along the Pacific coast because they can go over the mountain range. The PRC would not be able to do multiple rounds of D-16 launches due to limited numbers; therefore, it would focus primarily on utilizing DF-15 missiles due to the

[34] "Chinese Airfields - Overview". GlobalSecurity.org. Web. http://www.globalsecurity.org/military/world/china/airfield-overview.htm

[35] "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016." Department of Defense. Web. 2016. http://www.defense.gov/Portals/1/Documents/pubs/2016%20China%20Military%20Power%20Report.pdf

[36] PLARF should use half of these missiles (around 15) so that its DF-16B resources are not used up but it still sufficiently harms the ROC in the first wave of missile attacks

higher quantity of the missiles. The combination of DF-15 and DF-16 systems having radars that are hard to detect and it taking ballistic missiles approximately seven minutes to reach the ROC from their PRC bases make it difficult for ROC counter-missile systems to detect them. In addition, if the ROC was able to detect the missiles, it would not have a lot of time to react.

In 2013, a PLA study found that the ROCAF has the ability to repair a large segment of runway to conduce emergency take-off and landing operations. This study recommended utilizing SRBM to not only crater runways, but to create hazards for RRR crews and aircraft attempting takeoffs.[37] This would indicate the desire for the PLA to continue submunitions in order to contain the ROCAF and attain superiority in the ROC airspace. The PLARF would likely have multiple waves of missile launches because a "more ambitious offensive air campaign is conceived as having two general phases: first strikes and follow-on strikes."[38] The first wave would cause the initial damage to the ROCAF; however, the ROCAF would immediately begin undergoing RRR. Because the ROC has a successful RRR system, the PRC would probably use a second wave of missile launches to ensure that the ROCAF does not sustain air sovereignty and to try and eliminate the RRR teams.

The ROC should respond to the initial attacks by RRR and implementing its CCD strategies in an attempt to confuse and disrupt PRC operations. For example, the ROC should use dummy craters and fog to disrupt PRC attacks and to get more time to recover from the attacks. If an attack did occur and the ROC is able to prevent an immediate second round of munitions, the ROC should use its Sustainment RRR repairs. The ROC currently has pre-cast

[37]Gao Zhiyang. "搶修跑道之外-機場被動防禦的新思維." Quanqiu Fangwei Zazhi. Defence International. May 2006. Web. http://www.diic.com.tw/mag/mag261/261-38.htm.
[38]Hallion, Richard P., Roger Cliff, and Phillip C. Saunders. "The Chinese Air Force: Evolving Concepts, Roles, and Capabilities." Center for the Study of Chinese Military Affairs; Institute for National Strategic Studies; National Defense University. 2012. Print. pp. 44.

concrete slabs for RRR. These would be able to withstand more aircraft passes if needed. In order to prepare for a potential PLARF attack, the ROC should focus on developing Sustainment RRR capabilities and reaction times. This is essential due to the estimated rapid rate of PLARF launches. Assuming that the PRC decided to target one of the more strategically important ROC airbases, it is likely that there could be more aircraft traffic passing through there.

The ROC currently has eleven airbases that could serve as potential targets to the PLARF. A study[39] identified the five airbases most likely to be targeted by the PRC (in order of importance) to be the 1. Pingtung[40], 2. Hualien[41], 3. Hsinchu[42], 4. & 5.[43] Chiayi and Chiashan Airbases. By grounding the aircraft at these locations, the PRC would have a decisive advantage over the ROC; however, it would need to ensure that it can maintain this advantage.

The Hsinchu and Chiayi Airbases are both located in relatively flat areas on Taiwan with the Taiwan Strait to the west, which means these would be easier targets for the PLARF. The Pingtung Airbase is located on the Pingtung Plain and has the Taiwan Strait to the west, the Bashi Channel to the south, and a mountain range to the east.

Hualien is the hardest target for PLARF due to the mountain range that goes down the middle of the ROC; however, this mountain range does not significantly disrupt PLARF targeting. Due to PLARF missile capabilities, not only are the two bases in Hualien strategically harder to target because they have a high mountain range to the west and the Pacific to the east,

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[39]Easton, pp. 14.
[40]The Pinging Airbase would be attacked first because this would ground E-2T “Hawkeye” aircraft, Early Warning and Control (AEW&C) aircraft, and a C-130 “Hercules” military cargo aircraft, and electronic warfare aircraft.
[41] The Hualien Airbase would be targeted next because it fields the most advanced ROCAF F-16 fighters
[42] Hsinchu would be targeted next because it might station 57 F-5 “Tiger" fighter aircraft variations during a military conflict
[43] Neither of these trumps the other in importance. They would be targeted next because they are the respective wartime locations of F-16 and Mirage-2000 fighter squadrons

but they are also subterranean. These two bases are connected together by a very long taxiway. There is a multimillion dollar bunker located here; likewise, parts of the tunnels and mountains are made of marble. Some ROC military officials are proud of these bases; however, others worry that the PLA have figured out these targets' vulnerabilities due to years of studying.[44] These bases are likely still vulnerable to PLA SRBM attacks if hit directly; likewise, operations from these bases could be disrupted if their overground runways were cratered.[45]

Aircraft need approximately 2,500 feet of uninterrupted runway and the ROC has fourteen runways which range from 5,000-12,000 feet long and 150 feet wide.[46] A SRBM crater can segment the runway drastically and disrupt takeoff capabilities. As a result, the ROC began investing in additional runways in order to circumvent this vulnerability. For example, the Hualien Airbase has ten blast doors that exit to a long taxiway (which can be used as a runway) that leads to even more runways.[47] Likewise, the ROCAF also maintains emergency highway strips in case the runways are cratered.[48]

After the PRC's first wave of munitions, it will likely respond with another wave targeting the Hualien Airbase. Because the majority of this base is underground, it will target the above-ground runways once more to insure the unharmed, underground aircraft cannot be used. The Hualien Airbase will likely be targeted for a second time before the Pingtung Airbase

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[44] Easton, Ian. Private Interview. December 2016.

[45]The PLARF DF-16B is a MRBM which can be shot into the atmosphere, which allows it to get around the mountain range. The velocity it gains when it descends can harm the Hualien province bases.
Kastner, Jens. "China Keeps New and Old Rivals in Range." Asia Times. 19 April 2012. Web. http://www.atimes.com/atimes/China/ND19Ad02.html?fb_comment_id=10150660479991360_23064033#f25fc2866a2726

[46]Murray, William. "Revisiting Taiwan's Defense Strategy." United States Naval War College. 2008. Web. pp. 23. https://www.usnwc.edu/getattachment/ae650b06-a5e4-4b64-b4fd-2bcc8665c399/Revisiting-Taiwan-s-Defense-Strategy---William-S--.aspx

[47]Easton, Ian. "Taiwan, Asia's Secret Air Power." The Diplomat. 25 September 2014. Web. http://thediplomat.com/2014/09/taiwan-asias-secret-air-power/

[48] Hallion, Cliff and Saunders, pp. 332.

because it will probably have sustained more damage due to its location. Despite this, the other locations will also be targeted again in order to disrupt RRR and prolong the grounding of the aircraft. The ROC should prepare for an attack on Hualien by ensuring that the underground runways cannot be disrupted by a PLARF attack. Likewise, the ROC should equip this base with anti-SRBM capabilities in order to insure that the aircraft can successfully takeoff from this base.

Another factor that the ROC should look into are alternative landing airfields in case the ROC airfields are too cratered or targeted by PLARF. These airfields could be USAF counterparts in Guam or Okinawa. Due to their proximity to the ROC, it is likely that ROC aircraft could reach these bases for recovery without fear of being bombarded by PLARF SRBM.

According to the 2014 ROC RRR exercise, the ROC repaired seven craters in 90 minutes; although this was a fast rate, the PRC has approximately 300 launchers and 1,200 missiles that are multi-shot and can be reloaded in approximately thirty minutes. When compared to ROC RRR, the PRC could currently overwhelm ROC capabilities due to its rapid launch rate and SRBM quantity. Although the ROC has been investing in its counter-missile capabilities, if an attack occurred today, the PRC would likely dominate a Cross Strait conflict due to the quantity and stealthiness of its missiles capabilities. The PRC would be able to ground ROC aircraft and disrupt RRR by multiple waves of ballistic missile attacks. Taking control of the ROC airspace could result in a decisive PRC assault on the island.

In order to withstand a PLARF attack, the ROC would need to increase its RRR teams and ensure that they are trained via numerous assault exercises. The ROC needs to increase its RRR rate if it wants aircraft to takeoff before the PRC targets that base once more. The ROC also should invest in the ability to deny the PRC accurate battle damage assessment through

decoys. As a result, it is likely that the PRC would think that that particular base is still unusable. The ROC should also invest in more underground airfields. It would be very difficult for the PRC to target an underground airbase and would give ROC aircraft an opportunity to get airborne. Likewise, if the ROC aircraft were able to get airborne, the ROC should look into obtaining access to landing strips in other party of the Asia Pacific, such as with USAF counterparts in Guam and Okinawa.

IV. Conclusion

I assess that in the case of a Cross Strait conflict, the PRC would primarily target the ROC's runways in order to obtain control over the ROC airspace. Although the ROC has highly developed and effective RRR capabilities, the PRC would be able to disrupt RRR through its ballistic missiles. Without access to its runways, the ROC will not be able to maintain control over its airspace, which could possibly influence a Cross Strait conflict concluding in favor of the PRC. The ROC should continue its focus on developing RRR capabilities in order to prevent a PRC victory and sustain its air sovereignty.

Works Cited

Bowman, Brandon L. “Idiot’s Guide to Airfield Damage Repair”. United States Naval War College. Newport, Rhode Island. 2013.

“Air Force Pamphlet 10-219, Volume 4: Airfield Damage Repair.” US Air Force. Washington, DC. 2008. Web.

“Unified Facilities Criteria 3-270-07: Airfield Damage Repair.” US Department of Defense. Washington D.C. 2002. Web. 2-6. https://www.wbdg.org/FFC/DOD/UFC/ufc_3_270_07_2002.pdf

Easton, Ian. “Able Archers: Taiwan Defense Strategy in an Age of Precision Strike.” Project 2049. September 2014. Web. http://www.project2049.net/documents/Easton_Able_Archers_Taiwan_Defense_Strategy.pdf“

台模拟战机攻击机场 军官称90分钟可修7个弹坑”. Huangqiu. 14 January 2014. Web. http://mil.huanqiu.com/china/2014-01/4752220.html

Easton, Ian. Private Interview. December 2016.

Sommers, David W. “554th Red Horse: Semper Ducimus for 47 Years”. Anderson Air Force Base. 9 October 2012. Web. http://www.andersen.af.mil/News/ArticleDisplay/tabid/1992/Article/414932/554th-red-horse-semper-ducimus-for-47-years.aspx

“DF-15 [CSS-6/M-9]”. Global Security. Web. GlobalSecurity.org. http://www.globalsecurity.org/wmd/world/china/df-15.htm

“Military and Security Developments Involving the People’s Republic of China 2016”. Department of Defense. 2016. Arlington, VA. http://www.defense.gov/Portals/1/Documents/pubs/2016%20China%20Military%20Power%20Report.pdf

Lin, Jeffrey and P.W. Singer. “New Chinese Ballistic Missile Crashes the Battlefield Party with Cluster Munitions.” Popular Science. 19 February 2016. Web. http://www.popsci.com/new-chinese-ballistic-missiles-crashes-battlefield-party-with-cluster-munitions

"Defense Policy Advisory Committee, China's Military Threats against Taiwan in 2025". New Frontier Foundation. Taipei, Taiwan. March 2014. pp. 73. Web. http://www.dpp.org.tw/upload/news/20140304120411_link.pdf.

Fisher, Richard D. "Recent Trends in China's Missile and Strategic Strike Forces." International Assessment and Strategy Center. 1 October 2016. Web.

"Is China's New Short-Range Missile System Designed to Compete with Iskander." Sputnik International. 26 October 2016. Web. https://sputniknews.com/military/201610261046764752-donfeng12-vs-iskander-analysis/ and

Fisher, Richard D. "Analysis: Chinese Moves to Adopt New Guided Rocket System Show Ongoing Value of Domestic Competition to PLA." IHS Jane's Defense Weekly. 26 March 2015. Web. http://www.janes.com/article/50254/analysis-chinese-moves-to-adopt-new-guided-rocket-system-show-ongoing-value-of-domestic-competition-to-pla

Stokes, Mark. "Expansion of China's Ballistic Missile Infrastructure Opposite Taiwan." AsiaEye.18 April 2011. Web. http://blog.project2049.net/2011/04/expansion-of-chinas-ballistic-missile.html

"Chinese Airfields - Overview". GlobalSecurity.org. Web. http://www.globalsecurity.org/military/world/china/airfield-overview.htm

"Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016." Department of Defense. Web. 2016. http://www.defense.gov/Portals/1/Documents/pubs/2016%20China%20Military%20Power%20Report.pdf

Gao Zhiyang. "搶修跑道之外-機場被動防禦的新思維." Quanqiu Fangwei Zazhi. Defence International. May 2006. Web. http://www.diic.com.tw/mag/mag261/261-38.htm.

Hallion, Richard P., Roger Cliff, and Phillip C. Saunders. "The Chinese Air Force: Evolving Concepts, Roles, and Capabilities." Center for the Study of Chinese Military Affairs; Institute for National Strategic Studies; National Defense University. 2012. Print.

Kastner, Jens. "China Keeps New and Old Rivals in Range." Asia Times. 19 April 2012. Web.

http://www.atimes.com/atimes/China/ND19Ad02.html?fb_comment_id=10150660479991360_23064033#f25fc2866a2726

Murray, William. “Revisiting Taiwan's Defense Strategy.” United States Naval War College. 2008. Web. pp. 23. https://www.usnwc.edu/getattachment/ae650b06-a5e4-4b64-b4fd-2bcc8665c399/Revisiting-Taiwan-s-Defense-Strategy---William-S--.aspx

Easton, Ian. “Taiwan, Asia’s Secret Air Power.” The Diplomat. 25 September 2014. Web. http://thediplomat.com/2014/09/taiwan-asias-secret-air-power/