

# Transformation of the global threat, what should we prepare? An analytical study of the Covid-19 pandemic

## Transformation de la menace mondiale, à quoi devons-nous nous préparer ? Une étude analytique de la pandémie de Covid-19

T. Nurrobi<sup>1,2</sup>. INDONESIA

### Abstract

The Covid-19 pandemic that occurred in 2020 was the largest pandemic event in the world in the last ten years. It has created a transformation of global threat priorities from non-biological to biological threats. However, the industrial revolution 4.0 and the societal revolution 5.0 as a result of globalization and modernization have triggered to another threats emerge, which called cyber threats [1]. Both biological and cyber threats are real threats that will exist for the next ten years, and are even predicted to grow rapidly. This article aims to analyze the impact of the Covid-19 pandemic from the Indonesia perspective, on the emergence of biological and cyber threats in the future. The combination of these two threats will cause the emergence of a new type of threat, called bio-cyber threats. With the further development of digital technology in the future, the bio-cyber threats will be easily spread widely in a short time but difficult to detect.

**Keywords:** biological threats, cyber threats, bio-cyber, Covid-19

### Résumé

La pandémie de Covid-19 qui s'est déclarée en 2020 a été l'événement pandémique le plus important de ces dix dernières années. Elle a entraîné une transformation des priorités des menaces mondiales, qui sont passées de menaces non biologiques à des menaces biologiques. Cependant, la révolution industrielle 4.0 et la révolution sociétale 5.0 résultant de la mondialisation et de la modernisation ont fait émerger d'autres menaces, les cybermenaces [1]. Les menaces biologiques et cybernétiques sont des menaces réelles qui existeront au cours des dix prochaines années et qui devraient même croître rapidement. Cet article vise à analyser l'impact de la pandémie de Covid-19, du point de vue de l'Indonésie, sur l'émergence des menaces biologiques et cybernétiques à venir. La combinaison de ces deux menaces entraînera l'émergence d'un nouveau type de menace, appelé menace bio-cyber. Avec le développement de la technologie numérique, les menaces biologiques et cybernétiques seront facilement répandues en peu de temps, mais difficiles à détecter.

**Mots-clés :** menaces biologiques, cybermenaces, bio-cyber, Covid-19

### INTRODUCTION

The 2017 edition of Time magazine predicted that no country would be prepared to face the upcoming pandemic [2]. And indeed, at the end of 2019, a pneumonia outbreak emerged, caused by a new type of Coronavirus, SARS CoV2 [3]. This outbreak was transmitted through bats, which was later named Covid-19, which stands for Coronavirus Disease 2019 [4]. Covid-19 quickly spread throughout the world, including Indonesia. Finally, on March 11<sup>th</sup>, 2020, this disease was declared as a pandemic by WHO [5].

The Covid-19 pandemic is a global biological threat [6]. Moreover, Covid-19 is the worst pandemic in the last 10 years after the H1N1 virus Influenza outbreak in 2009,

as it has affected 210 countries [7]. Covid-19 is also included in the 10 worst pandemics that have ever occurred in the world. Even according to Antoni Fauci MD., Director of the National Institute of Allergy and Infectious Disease (NIAID), Covid-19 is the largest outbreak in the US in the last 100 years, surpassing the Spanish Flu [8].

Modernization and Globalization as influences from the development of science and technology are basically like two sides of a knife, where one side has positive effects and the other side has negative impacts [9]. Some technological developments that can influence modernization and globalization include the discovery of computers, the internet, social media networks, digital technology, molecular biology technology, etc.

Modernization and globalization will impact the transformation of threats, either directly or indirectly. Indirectly, moderniza-

tion and globalization will lead to several extraordinary events which then trigger a transformation of threats. These extraordinary events can occur abroad or within the country. Examples of several extraordinary events that occurred outside Indonesia include: the Anthrax letter attacks (2001), the Eleven September attacks (2001), and the Covid-19 Pandemic (2019). Then examples of extraordinary events that occurred in Indonesia include: Bali Bombing (2002), Aceh Tsunami (2004). The transformation of threat itself can trigger ideas for further development of science and technology. So that a circular process will emerge as shown in Figure 1 [10].

On the other hand, the existence of modernization and globalization that leads to the era of digitalization causes the emergence of the industrial revolution 4.0 and the society revolution 5.0, which can have an impact on the emergence of threats in

<sup>1</sup> Deputy TNI Surgeon General

<sup>2</sup> Lecturer at the Republic of Indonesia Defense University

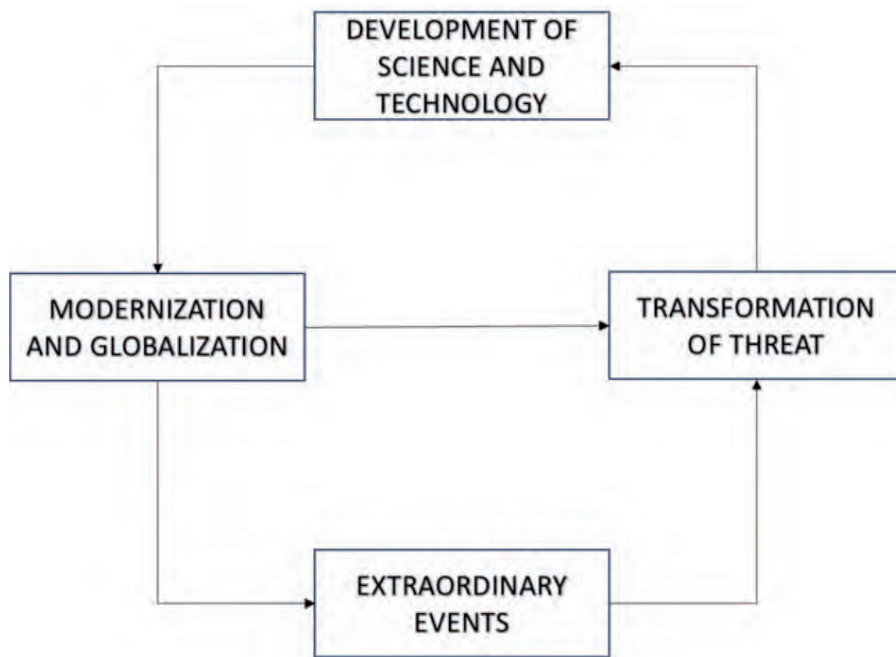


Figure 1. The circular process of the transformation of threat [10]

cyberspace called cyber threats [11]. This cyber threats can lead to a 5<sup>th</sup> war generation, known as cyber war. Various types of cyber threats content can affect all aspects of life starting from ideology, politics, economy, social, culture, defense and security. One of the cyber contents which have a real impact for human life is a cyber with biological content. However, when cyber threats combine with biological threats, there will be a new born threat known as bio-cyber threats. Bio-cy-

ber threats is a kind of cyber threats which has related to living things content. The content usually can generate the emergence of biological threats [12]. With the increasing development of the digital world, the bio-cyber world will also advance. Currently, with the advancement of science and technology, there has been a discovery of Synthetic DNA which has become a milestone in the Cell Culture Revolution in the future. The discovery in the field of Biosynthetics is believed as the be-

ginning of the Industrial Revolution 5.0 [13]. Of course, this condition will make bio-cyber threats in the future increasingly growth and become more and more dangerous.

### TRANSFORMATION OF GLOBAL THREATS

Indonesia, as the largest archipelagic country located between two oceans and two continents, has a very strategic geographical location for world trade. Coupled with abundant natural resources, this causes many countries have intention in Indonesia, so Indonesia indirectly has a large potential threat, weather military, non-military and hybrid threats [14]. Therefore, Indonesia continues to strengthen its military power in line with the increasing of potential threats. Based on the Global Fire Power survey (2024), Indonesia's current military strength is ranked 13<sup>th</sup> in the world [15].

The nature of the threat according to the Indonesian Defense White Paper (2015) is the main factor in the preparation of the national defense system based on strategic analysis and identification of the nature of the threat [14]. According to Law No. 34 of 2004 concerning the Indonesian National Armed Forces (TNI), the definition of a threat is any effort and activity, either from domestic or outside the country, which is considered to threaten or endanger the

Table 1. Types and Differences of War Generation [10]

1 <sup>st</sup> War Generation	2 <sup>nd</sup> War Generation	3 <sup>rd</sup> War Generation	4 <sup>th</sup> War Generation	5 <sup>th</sup> War Generation
				
<ul style="list-style-type: none"> <li>Line and column tactics</li> <li>Requires substantial personnel</li> </ul>	<ul style="list-style-type: none"> <li>Early modern phase</li> <li>Utilizes machine guns and artillery</li> <li>Supported by radio communications</li> <li>Camouflage uniforms</li> </ul>	<ul style="list-style-type: none"> <li>Late modern phase</li> <li>Superior in speed</li> <li>Employs helicopters</li> <li>Utilizes missiles (over-the-horizon capability)</li> </ul>	<ul style="list-style-type: none"> <li>Decentralization</li> <li>Asymmetric warfare</li> <li>Non-state actors</li> <li>Proxy warfare</li> </ul>	<ul style="list-style-type: none"> <li>Imperceptible operations</li> <li>Wide-ranging effects</li> <li>Deployment of disinformation</li> <li>Infiltration of information systems</li> </ul>

## MODERNIZATION and GLOBALIZATION lead to a TRANSFORMATION OF THREAT

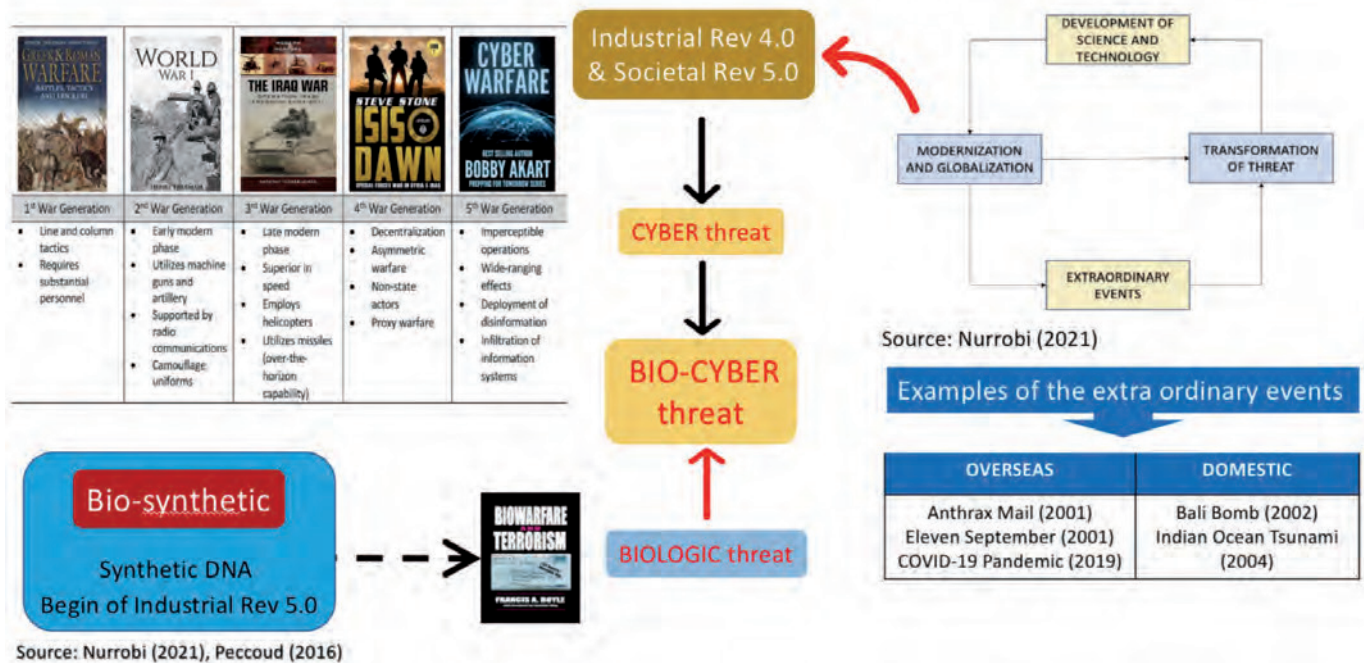


Figure 2. Transformation of Bio-Cyber Threats [12,13]

sovereignty of the state, the territorial integrity of the Republic of Indonesia, and the safety of the entire nation [16].

Prior to the Covid-19 pandemic, there were several forms of threats consisting of natural disasters, terrorism and radicalism, separatism and armed rebellion, border violations, piracy and theft of natural resources, disease outbreaks, cyber attacks and espionage, drug trafficking and abuse, as well as open conflicts or conventional wars. These threats are divided into military, non-military and hybrid threats as well as real and potential threats [14].

In accordance with Law No. 34 of 2004, all those threats can disrupt state sovereignty and thus require the involvement of the TNI as the main component of defense. This is the main task of the TNI. In order to realize its main tasks, TNI carries out the Military Operations of War (MOW / OMP) and the Military Operations Other than War (MOOW / OMS) [15].

One of the MOOW which common act by TNI is a Humanitarian Assistant and Disaster Relief (HADR), as Indonesia located in the Pacific Ring of Fire area which has many disaster events occur. Besides, there are three tectonic plates converge in Indonesia, generating earthquakes, landslides, as well as tsunamis [17].

Natural disaster threats are essentially threats that have existed since ancient times. Various types of natural disasters can

cause loss of life. Richie and Roser (2019) state that about 60,000 natural disaster victims die each year [18]. Drought and floods were initially the most fatal disasters causing many casualties. However, with advances in technology, recently drought and flood victims can be minimized.

Besides natural disasters, disease outbreaks are also threats that have existed since ancient times. The first reported disease outbreak was in 429 BC [19]. The emergence of outbreaks can also cause death. And with the advancement of science, humans are increasingly aware of ways to prevent, detect and response to outbreak threats, so that over time, the mortality rate has also decreased.

Modern scientific and technological advances since the 19th century have led to modernization and globalization. Several important discoveries such as the invention of chemicals, ammunition, weapons, computers and the internet, have caused changes in human civilization leading to the emergence of new types of threats, such as modern warfare, terrorism, armed rebellion, drug trafficking, espionage and cyber [20].

### SEVERAL PANDEMICS IN THE WORLD

According to Honigsbaum (2009), the definition of a Pandemic is a widespread epi-

demic of infectious disease across countries in one or more continents at the same time [21]. Meanwhile, according to Kelly, H (2011), a Pandemic is an epidemic that occurs worldwide, or in a very wide area, crossing international borders and usually affecting a large number of people [22].

Outbreak events have been known for a long time since before Christ with the Plague of Athens. This disease outbreak reportedly affected 25% of the Athens population in Greece for three consecutive years. In the modern literature, it turns out that the evidence found in this outbreak points to two types of diseases, known as Smallpox and Typhoid Fever [23].

From the historical data, it can be seen that pandemics in the world were caused by four microorganisms: Bubonic Plague, Influenza virus, HIV and Coronavirus. The Bubonic Plague pandemic occurred in three stages that lasted from 521 to 1960. The first stage was the Plague of Justinian followed by the second stage of Bubonic Plague (Black Death) and the third stage (Third Plague). Meanwhile, the Influenza pandemic occurred in two stages, namely Spanish Flu and H1N1 Influenza. While Covid-19 occurred in three stages, namely SARS CoV-1, MERS CoV and COVID-19 [7].

If we look at the comparison of the number of cases of the nine pandemics, it can be seen that pandemics caused by influenza viruses resulted in the most infected peo-

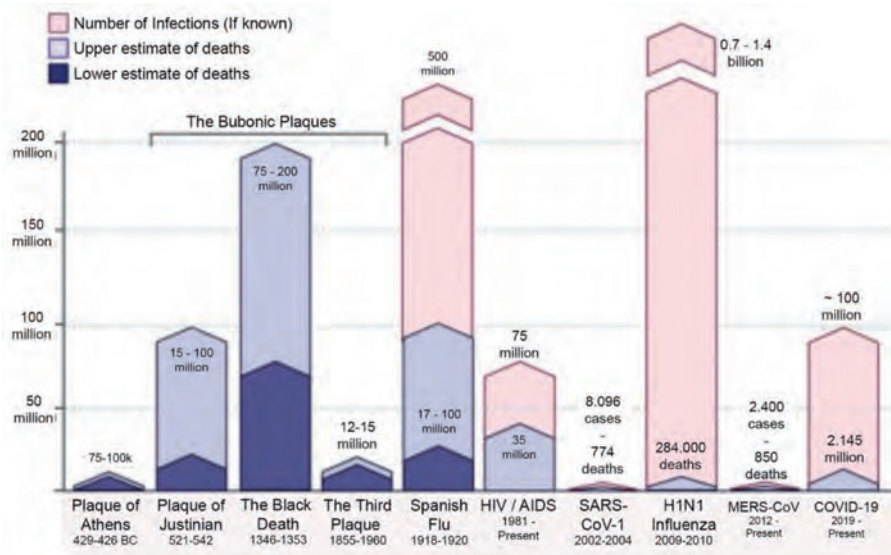


Figure 3. Types of World Pandemic [7]

ple. Meanwhile, the second Bubonic Plague pandemic, known as the Black Death, was the pandemic which causing the most deaths. It killed 200 million or 60% of the European population at that time. Meanwhile, the number of infected and dead cases due to Covid-19 is still higher than the other two Coronavirus pandemics (SARS-CoV-1 and MERS-CoV). However, when looking at the Case Fatality Rate (CFR) of Covid-19 is the lowest (2-4%) compared to the CFR of SARS-CoV-1 (11%) and MERS CoV (35%). This shows that Covid-19 is not the most lethal pandemic or the one that causes the highest morbidity rate [7].

## ANALYSIS OF THE COVID-19 PANDEMIC

From the comparison of SARS CoV2 virus with other viruses, viewed from animal reservoirs, mortality rates and number of affected countries, it can be seen that most pandemics are spread by bats. The largest mortality rate is the pandemic caused by the Marburg virus (80%). And the H1N1 virus is the most widespread virus in the world (214 countries). Meanwhile, Covid-19 is a virus caused by bats with a low mortality rate (2.09%) and affecting 210 countries [24].

If we look at the graph of the rise and fall of Covid-19 cases globally and in Indonesia, we can analyze that Covid-19 spreads quickly to all corners of the world due to the high mobility of humans. All developed countries with high levels of population mobility were not spared from the Covid-19

pandemic. The most Covid-19 cases in Indonesia are on the islands of Java and Bali, which are notably the most densely populated islands with the highest levels of mobility compared to other islands in Indonesia. In addition, Indonesia benefits from its geographical condition as an archipelagic country, so that the sea becomes a barrier to population mobility as well as a barrier to the spread of the virus throughout Indonesia. Several countries consisting of one continental region such as the US, India and several countries in Europe also have high cases of Covid-19. This is in line with their higher population mobility compared to archipelagic countries [25].

Another thing to note is that Covid-19 is a new disease (new-emerging disease) that has never existed before. As a result, experts still have no experience and tend to provide therapy on a trial and error basis. This is what makes Covid-19 spread so rapidly and lethally to all countries in the world, even in developed countries. Drawing from the experience of pandemics that have occurred before, a new disease may potentially develop into three things: re-emerge (re-emerging disease), develop into a new variant (new variant) or disappear from the face of the earth (eradicate). For this reason, we are required to have preparedness in facing these three potential possibilities that may arise in the future by carrying out prevention, detection and response continuously. One of the things that must be anticipated by the government and the TNI is to prevent, detect and response to the Covid-19 bio-cyber threat [26].

In addition to the above, currently Indonesia is becoming the country in Southeast Asia that has the lowest Covid-19 cases. This is a joint success between the government and all components of society in tackling Covid-19 both through Micro-scale Public Activity Restrictions (*PPKM Mikro*) and vaccination. However, we must not be complacent and continue to implement health protocols through 3M (consist of wearing masks, washing hands and maintaining distance). In addition, we should support the vaccination program until Herd Immunity is formed, which is communal immunity that can be achieved after vaccination of at least 70% of the population in the area [26]. It cannot be denied that civil-military collaboration which has been established with the pentahelix concept is the key to success. It was collaborate of five elements: Academic, Business, Community, Government and Mass Media [28].

## BIO-CYBER THREATS IN THE FUTURE

With the development of technology, the types of warfare also adapt to the types of threats that use technology aimed at hacking systems, sabotage, spreading hoax news, hate speech about SARA (ethnicity, religion, race, and inter-group relations), cyber-crime to espionage. This type of threat is known as a cyber-threat which then causes the emergence of cyber-war or cyber-attack. This type of warfare does not require a battlefield unlike other generations of warfare. The advantage of cyber warfare is more massive, faster but invisible [27].

Based on the Microsoft Security Intelligence report (2017), Indonesia is among the 5 countries most vulnerable to cyber attacks in the world. In addition, Indonesia is also recognized by Akamai (world cyber analyst) as the largest country conducting cyber attacks in the world. Indonesia controls up to 38% of cyber attacks carried out by 175 countries and has succeeded in defeating China which controls 34% and the United States which only controls 6.9%. With these two reports, Indonesia currently has a large potential cyber threat, because these reports state that Indonesia is vulnerable to receiving cyber attacks while also being the country that conducts the most cyber attacks [29].

The content of cyber attacks certainly depends on the objectives to be achieved. There are several objectives that are used as the basis for carrying out cyber attacks,

for example such as cyber-crime, cyber-terrorism, cyber-hack, cyber-bullying, cyber-espionage, cyber-sabotage, cyber-propaganda, or cyber-war. In addition to the above objectives, there are also cyber attacks that are used for fighting back to other cyber attacks, for example anti-cyber-crime, anti-cyber-war, etc [27].

The Covid-19 pandemic has caused the emergence of new cyber attack content known as bio-cyber as previously mentioned. The bio-cyber will develop increasingly in the future along with the development of cyber technology. And it will be grouped into its derivatives, such as bio-cyber-crime, bio-cyber-terrorism, bio-cyber-propaganda, bio-cyber-war, etc [12]. The bio-cyber attacks basically have been occurred a lot in our daily lives. One example of a bio-cyber attack that emerged at the beginning of the pandemic was the hoax of *haram* vaccines (forbidden vaccine for moslems). With this hoax, people will en masse refuse to be vaccinated with certain vaccines because they are considered haram. However, behind this hoax, it turns out that there is a trade war being waged by large vaccine producing companies [30].

With the increasing development of science and technology in the future, it will have an impact on transformation in various aspects of life. The Industrial Revolution 4.0 and Societal Revolution 5.0 developed respectively by Germany and Japan will later transform into the Industrial Revolution 5.0 and Society Revolution 6.0 which will bring increasingly sophisticated nano-digitalization technology. As a result, bio-cyber techniques will also develop in the future [13].

## THE ROLE OF THE TNI IN OVERCOMING BIOSYBER THREATS IN THE FUTURE

In accordance with Law No. 34 of 2004 concerning the Indonesian National Armed Forces, the TNI has the main task of upholding state sovereignty, maintaining the territorial integrity of the Unitary State of the Republic of Indonesia based on Pancasila and the 1945 Constitution of the Republic of Indonesia, and protecting the entire nation and all of Indonesia's bloodshed from threats and disturbances to the integrity of the nation and state. This task is carried out through MOW (OMP) and MOOW (OMSP) [16].

The TNI has always been the main element and the first team sent in every disaster

management in Indonesia. This is because the TNI has trained personnel and complete facilities for disaster management and is on standby for 24 hours / 7 days and ready to be moved at any time to all corners of Indonesia in any difficult terrain [10].

The transformation of cyber threats as a threat to the sovereignty of the Republic of Indonesia, as written in the Indonesian Defense White Paper (2015), has been anticipated by the Indonesian government by establishing a National Cyber and Encryption Agency (BSSN) in 2017. Meanwhile, in the same year, the TNI as the main component of defense also formed the TNI Cyber Unit (Satsiber TNI) to strengthen the cyber countermeasure function which is directly under the control of the TNI Commander. Several institutions that also have cyber teams that already exist in Indonesia today include the Cyber Defense Center of the National Defense Institute of the Ministry of Defense, the Cyber Intelligence Field of the State Intelligence Agency (BIN), the TNI Strategic Intelligence Agency (BAIS TNI), the Directorate of Cyber Crime of the Criminal Investigation Agency of the National Police, and the National Counter-Terrorism Agency (BNPT). Each of these cyber teams coordinates with each other to form cyber patrol networks and cyber security [31].

In order to face future bio-cyber threats, it is necessary to increase the capacity of existing cyber teams by deepening biological contents that have the potential to become cyber threats and collaborating with existing health units in the Ministry of Defense, BSSN, TNI, National Police, BAIS and BNPT to form a special desk on bio-cyber [32].

## CONCLUSION

Covid-19 is a real global biological threat which is a new infectious disease (new emerging disease) and also has the potential to re-emerge (re-emerging disease) [33]. The emergence of Covid-19 in the era of industrial revolution 4.0 and societal revolution 5.0 can trigger the emergence of new threats which are a combination of cyber and biological threats known as bio-cyber threats [13]. With the increasing development of digitalization, the potential for bio-cyber threats in the future will be even greater. For this reason, the role of the TNI as the main component of defense assisted by other components is very much needed in facing bio-cyber threats in the future by forming special units that are a combina-

tion of intelligence and health elements [12].

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### FIRST ADMIRAL Tjahja NURROBI, MD, PhD (Ortho-Hand)



First Admiral NURROBI is a Navy high rank officer of the Indonesian Defense Forces (TNI). He is an Orthopaedic Hand Surgeon and had his Doctor degree of Disaster Management Epidemiology. He has enriched his study as an Orthopedic and Traumatology Surgeon and Hand Consultant in the University of Airlangga (2007 and 2014). He also got his additional competency of Emergency Medicine with the Health Aspect of Disaster Management Course in the University of Queensland in Brisbane (2015), Medical Strategic Leadership Program (MSLP) in San Antonio Texas (2018) and Doctor degree in Disaster Management Epidemiology in the University of Indonesia (2022). Right now his job is the Deputy of TNI Surgeon General and also as a lecturer as well as researcher in the Republic of Indonesia Defense University (RIDU). Prior to that, he was the TNI Navy Surgeon General (2023). Admiral Nurrobi also fostering the regional EMT capacity with his militaries counterpart in the ASEAN countries. He has many experiences in the disaster management in Indonesia, including the preparation and the operational of the biggest COVID-19 hospital in the world in Jakarta. He also an instructor of WHO-EMT in the Multi Countries Training Hub Emergency Operational Readiness (MULTHEOR) and ATLS (Advance Trauma Life Support). The MULTHEOR has been started the training for Asian and Australia region since 2022. Many decorations has been received by Admiral Nurrobi including the decoration of military operation of war and military operation other than war within the country. He has been deployed for the international health diplomacy at the several countries such as Armenia, Australia, China, India, New Zealand, Rusia, Philippina, Singapore, Thailand, Timor Leste and United States. As a researcher, he focusing the studies about health security, biodefense, orthopedic and traumatology, epidemiology as well as disaster management. He already accomplish four articles or sections in the four different books. Currently, he becomes the principal investigator of a joint research between Indonesia and Australia Defence Forces. During his 30 years assignment in the Navy, he also becomes the committee at several civilian organization such as Head of Supporting Management and Disaster Response Compartment of Indonesia Hospital Association (PERSI), Indonesia Orthopedic Association (PABOI) Jakarta Section, Indonesia Microsurgery, Hand and Upper Extremity Association (PERAMOI), Indonesia Emergency Association (PDEI) Jakarta Section and Fellow of Internasional College of Surgeon (FICS) Indonesia Section. As a father of two sons and two grand daughters, he's always teach to his family about the important role of being a leader that become a role model, as well as the important of togetherness, spirit of helping each other and always pray to the God wherever and whenever we are.