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Comparison of States vs. Non-State Actors in the Development of a BTW Capability

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Comparison of states vs. non-state actors in the development of a BTW capability

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Introduction and summary

The following report is written for the Weapons of Mass Destruction Commission (WMDC). It will focus on development and use of biological and toxin weapons (BTW). In particular it will focus on different motives and requirements when BTW are to be developed and used by states and by non-state terrorists. In order to understand today's objectives and incentives of potential developers, we shortly review the history of some former offensive BTW programs. The so called programs for "dirty tricks" that may be sources of inspiration for terrorists are also mentioned.

We conclude that most states already have or will have the technical competence for BW development. However, even if they have this capacity we argue that the motivation to develop BW is low and will be even further reduced with improved global security and increased transparency of states.

We also conclude that bioterrorism is an increasing threat. The motif is already there, but at present some key competences are still missing. Although we often find the bioterrorism issue exaggerated in the public debate, we still high-light the value in reducing the proliferation of key competences.

It is our hope that the report may identify and high-light parameters important to the commission in its work to present proposals on how to reduce the dangers from weapons of mass destruction.

Short description of some former offensive BTW programs

The US program
An offensive biological program was begun in 1942. The program included research, development, testing and production. No production of biological weapons occurred during World War II. The effort was expanded during the beginning of the 50s. Technical advances allowed large-scale fermentation, concentration, storage, and weaponisation of microorganisms.

Extensive field-testing of the BTW agents illustrated their effectiveness. Once mastering the art of aerosolisation, the agents proved to spread and contaminate the ground more than hundred miles downwind in favourable conditions. The United States also developed a biological arsenal directed against crops to induce crop failure and famine. Also here extensive field testing was done to assess the effectiveness of agents on crops.

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Up to 1969, offensive agents were developed at the United States Army's biological-warfare laboratories at Fort Detrick, Maryland. These products, mainly powdered bacteria and viruses, were loaded into bombs and other delivery systems. In anticipation of the 1972 Biological and Toxin Weapons Convention (BTWC), President Nixon terminated the United States offensive biological weapons program. The biological warfare demilitarization program was completed in February 1973.

The US today funds the world's largest and most advanced defensive BW program.

The program of the USSR
Soviet BW activities started in the late 1920s. Most elements of the program were controlled by the Soviet military. Several facilities through the years have been involved. In 1936 Vozrozhdeniye Island in the Aral Sea, Kazakhstan became the major proving ground in the Soviet Union for the open-air testing of BTW agents.

Soviet Union signed the BTWC in 1972, but in the early 1970s, the Soviet authorities also began creating a new network of BTW facilities. This was to be a commercial organization, designated Biopreparat, officially designed to conduct civilian research. This network allowed a covert military BW programme to be continued also after Soviet Union agreed to stop all offensive BW activities.

The BW program of the USSR is assumed to have been larger than the US counterpart. More efforts were spent on research and development and the final capacity for production and weaponisation also seems to have been larger. Continuing for at least a decade after the BTWC came into force, the USSR program also reached a much more technologically advanced level compared to its US counterpart. The program during its course developed a capability for wartime production of hundreds of tons of a range of biological agents. Formulated agents would have been loaded into a variety of delivery systems, including aerial bombs and ballistic missile warheads. Soviet BW scientists as their American colleagues, also researched, developed, and produced anti-crop and anti-livestock agents.

The fate of the USSR and thereafter the Russian BW program is uncertain. A number of decrees were issued by the Russian and Kazakhstani governments after the collapse of the Soviet Union. Accordingly, Russia, in 1991-1992, halted funding to the former Soviet BW centres in Kazakhstan, closed their military programs, and abandoned the sites. Clearly, most of the former BW program is today dismantled or converted. However, the process of dismantling has not been transparent. Therefore most analysts believe that the former BW program is today hibernating in Russia as a "break-out" capability, from which it could be rapidly reconstituted.

The Iraqi program
Iraq began pursuing offensive biological weapons capabilities in the years following 1985. A number of facilities aimed at indigenous production of BTW agents were constructed. E.g. Iraqi military industries at al Hakam and al Falluja produced and weaponised biological agents for offensive purposes. Open-air testing of biological agents was performed between March 1988 and January 1991. This included *Bacillus* spores, botulinum toxin, aflatoxin, and ricin. At the beginning of the Gulf war in 1991 Iraq had weaponised wet formulations of anthrax spores, botulinum toxin and aflatoxin for use in aerial bombs and al-Hussein missile warheads.

Most of the BW weapons were unilaterally destroyed by Iraq in 1991. The remainder of the program was detected and destroyed under UN supervision between 1995 and 1998.

Other countries
Several other countries have entered into offensive military BW programs. Most well known are perhaps the programs pursued by Japan and the UK during Second World War. Research programs have also been active in for example Canada. The programs of Japan and the UK probably had a level of maturity comparable to that of Iraq.

Today other nations appear on the list of being suspected of an offensive program. It is highly unlikely that any program that have existed or may exist had a development and production capacity comparable to the former programs of the US and USSR.

"Dirty tricks" as part of BTW programs
We do not know for sure, but it may be assumed that some or most BTW programs also contained a "dirty tricks" department. These dealt with such sensitive issues as political sabotage and assassinations. Our information about these programs is either scarce or revealed and presented in a manner to create sensation. The issue is raised in this report since some of the goals of a terrorist group may be similar to the goals and purposes of these programs. Encapsulated in the U. S. offensive military BTW program was a program of BTW evaluation and "dirty tricks". This was referred to as the division of Special Operations (SO). The existence of the SO Division was revealed six years after it was shut down following a 1975 Senate investigation into CIA abuses. It was created following in a secret October 1948 report on covert biowarfare by the Pentagon's Committee on Biological Warfare. The report pointed out the value of using ventilating systems, subway systems, water supply systems, stamps, envelopes, money, cosmetics and food and beverages as targets for biological contamination.

In May 1949, the Special Operations Division was opened at Fort Detrick. It operated until 1969 and employed at its peak approximately 75 people. Their primary clients were the CIA and various Special Forces. As a true source of inspiration for modern terrorism the SO program for example:

- used light fixtures and car tailpipes to disseminate an invisible spray of anthrax.
- practiced germ attacks in airports and on the New York subway, tracking air currents and calculating the potential death toll.
- used light bulbs packed with a powder of an anthrax simulant on the tracks in the New York subway.

Project Coast was the name of the South African CW/BW program. The project was not a programme for development of a military capability. Instead, with the alleged purpose of crowd control, it studied toxic and infectious agents useful in the domestic political situation against crowds and individuals. Project Coast achieved little of value; its main emphasis seems to have been on CW related activity. BW related projects involving cholera, botulism and anthrax are mentioned. Moreover, poisons and lethal microorganisms should have been produced, and devises for their administration against individuals developed.

Very little information about a "dirty trick" development in the former program of the USSR is revealed. Unconfirmed allegations of KGB "dirty tricks" exist. The well-known umbrella assassination of the Bulgarian defector Markov by a toxin may have been an expression of this.

Concluding history
The US and the USSR both developed large programs. These were mainly for strategic use, as a complement to each state's nuclear and chemical weapons. After the implementation of the BTWC these two states went along different pathways. The US unilaterally determined to put a halt to their BW program, whereas the Soviet Union did not. What could have been the driving forces behind these different strategies?

The US decision to terminate its offensive biological program should probably be viewed as a prelude to the upcoming BTWC of 1972. In view of its own strategic nuclear capability and in view of the limited usefulness and a considerable risk for proliferation of BTW, an international ban of these weapons was for the US the most comforting development. Once the decision to implement the BTWC had been taken, the US being an open society could not continue to covertly harbour a large offensive BTW program without a substantial risk of that program being disclosed.

The USSR also acted in preparation for the entry into force of the BTWC. But in the closed society of the USSR their offensive program were planned to survive within the framework of a civilian cover, Biopreparat. Little is known about why the USSR decided to keep and even put enormous resources into expanding its programme. Possibly there was a doctrine for BTW use that was central to the defence of the state and this made it impossible to abandon the BTW program. Whether the more open Russian Federation is still hibernating small elements of an offensive BTW program or maintaining a break-out capacity is difficult to judge.

Iraq did not become a party to the BTWC until after the Gulf War. Yet, Iraq can be seen as a failure for the international community's intentions with the BTWC, i.e. to prevent proliferation of WMD. It is worth recalling that, Iraq achieved very little criticism from the international community during the Iran-Iraq war when it used mustard and nerve gases at several occasions. This could have been a signal, not just to Iraq, that a state could develop chemical weapons or BTW for "special situations".

Below we elaborate further on various driving forces for maintaining or developing a military BW capacity today or in the future.

Is there an objective for use of BTW today?

The use of BTW by states
The BTWC has been in force since 1975. The treaty regulates and bans all research, development, production, stockpiling and acquisition of biological agents for other purposes than peaceful. This means that no State Party to the convention can develop or maintain a military significant BTW program without serious risks, but in real terms also non-parties are as affected by the treaty's norms. As indicated in the previous paragraph, the main historic possessors of bioweapons, today see no need for a maintained strategic military capability. Both the US and the Russian Federation live under a nuclear weapons umbrella and is judged to have an adequate knowledge-base from which a BTW program may be reconstituted within a limited time if deemed necessary. This is probably enough to satisfy today's security needs.

What cost-benefit analysis in a state could result in the start of or the maintenance of a military BW programme today? There are states that today live under a perceived threat of being extinguished, e.g. Syria, Israel, Cuba, Iran and North Korea. Some of these states also

lack a mechanism, such as a nuclear umbrella, to secure their existence. Such states may as a last resort rely on a strategic BTW programme. The past BTW program of Iraq is of this category. Therefore, we predict a situation, if it does not already exist, where few if any states will maintain a military BTW capability of strategic importance. Still, lacking a nuclear deterrent some states may still choose to maintain a competence base allowing for a break-out capability.

The BTWC was negotiated and accepted in a cold war setting of relatively well defined conflicts and actors. The political setting and the situation for the global security is today quite different. In the aftermath of the cold war we have seen a dramatic increase in internal conflicts. Our present pattern of intra state conflicts may create the need and opportunity for a state to develop and use BTW, since small scale or tactical use of BW may be useful in some situations.

International control over the sovereign state or subgroups involved in domestic war may be difficult and erratic. Examples such as Bosnia, Kosovo and Sudan have been dominating the agenda where a key question have been how and when the military forces of the international community are to engage in an internal conflict. These situations generates scenarios where BTW could be superior to available conventional weapons, providing enough superiority for a state to take the risk of developing such weapons.

The US plans to use specific pathogenic fungi as a “biological weapon” against Columbian drug production may illustrate what is possible. The relatively tedious procedure of isolation, production, down-stream processing and dissemination of a pathogen that will attack and forcibly eradicate the coca crops in areas difficult to access, is deemed efficient compared with other methods.

Accordingly, we may identify scenarios in which a tactical BTW could be the preferred solution. The two scenarios provided below, are relatively similar but will differ in magnitude and in the use of agents and delivery means and therefore have different technical requirements.

In our first scenario, a guerrilla war is being fought in difficult terrain, where conventional weapon systems are insufficient. This could have been the case in mountainous parts of a country such as Afghanistan. In the second scenario, the assassination of guerrilla leaders by covert methods with the aim of minimising the reactions from the international community as well as from the public.

Our scenarios, either directed towards humans or livestock or crops, are not very demanding when it comes to their technical aspect. A small, low profile tactical programme would be relatively easy to hide and therefore, possibly worth the political risk taken by the state wanting to use them. When it comes to using infectious agents that are normally occurring in a geographical area it is also very difficult to actually prove that an epidemic is a result of intentional spreading of microorganisms. How difficult such an investigation is has been illustrated several times in modern history. One example is the allegations put forward that the government of Myanmar released odd devices over the mountainous and remote areas where the Karen guerrilla was and is residing. According to the accusations this resulted in a series of outbreaks of fatal intestinal disease. However, no evidence could be presented of intentional use of microorganisms against the guerrilla.

Non-state actors using BTW

The 11th of September 2001 has given terrorism a new face, that of long-term planning including competence building to achieve mass casualties. Following "9/11", one of the top priorities of the intelligence community has been to assess the threat from terrorist use of BTW. Terrorist's interest in BTW has been documented and includes some examples of use. The failed attempts by the Japanese sect Aum Shinrikyo to disseminate botulinum toxin and anthrax spores in Tokyo by aerosolisation illustrate the difficulties of effective release of agents to the air. The "successful" attack on customers using *Salmonella* bacteria in salad bars by an Indian sect in Oregon 1984 causing 750 persons to become ill shows that the dissemination of BTW in food can be quite effective as a terrorist weapon. The use of an agent causing gastro-intestinal disease also illustrates the wide range of bacteria and viruses that may be used as BTW. It is not necessarily so that a terrorist/criminal needs to use a lethal agent, such as anthrax spores, plague bacteria or Ebola virus, to cause terror. The dissemination of *Salmonella* or toxin-producing *Coli* bacteria in food, that technically is much easier than aerosolising an agent, can also result in a similar terror effect.

The BTW act of terror may vary substantially. The objective may be mass casualties or may just be to cause panic, fear and disorder. The potential to do so by using BTW is certainly there. An effective dissemination of a deadly infectious agent, like that reported by US Special Operations in the tests performed in the Metropolitan subway using an anthrax simulant, would truly cause mass causalities, panic and fear. No doubt, this example and others may serve as a source of inspiration for non-state actors. The spreading of the anthrax-tainted letters in the U. S. during the autumn of 2001 could well have been inspired by the dirty tricks program in the former offensive US program. The last example illustrates the usefulness of BW, in particular if a high fear factor is the goal.

In the case where terrorists want to use BTW, one of its major draw backs identified by large-scale offensive programs developers, the un-predictable result may actually be another asset for achieving fear among the target group. If terrorist groups develop their competence to master efficient delivery systems, we can expect the use of BW terrorism to increase.

Technical key issues significant for today's development and use of BTW

BTW has been named "the poor mans nuclear weapon". In spite of this, some of the involved technologies were so sophisticated that they had to be developed within the programs. In this way, critical technologies such as to master the technologies of drying, powdering and disseminating the bioagent could initially remain under state control. Unfortunately there is today a strong driving force to develop dual use competence for working with dried powder. An example of this the paint-, metallurgic and drug industry, where for parts of these industries it is essential to build knowledge around and to optimise processes handling aerosolised powder. Today this piece of information is not publicly available but accordingly this might change and it could be available for the public in the near future.

The technologies mentioned above are available to the modern state planning to develop and use BTW. In addition, modern biotechnology may contribute with especially useful designs of the infectious or toxic agent. Today, it is in theory possible to develop agents that could survive in harsh environments, have a low infectious dose and fairly long time of incubation, be deadly but not contagious, and have the potential to die off from the environment after a couple of days. Using this kind of manipulated bacteria, a user would reach the goal of infecting many people due to the low infection dose. The long incubation time (at least a

week) would result in a large spread of infected people. The source of the infection will be more difficult to assess. Finally, a microorganism that commits suicide will remove all evidence that BTW has been used. A manipulated agent as described above could be a very effective tool for using in a guerrilla war in remote areas.

The developer of BW for assassination could use so called bio-regulators; i.e. small molecules that we normally have in our body and that regulates different body functions such as pain, sleep etc. Bio-regulators can be produced by genetically modified organisms. A death caused by high amounts of such substances would be very difficult to detect, since our bodies normally contain significant amounts of them.

The development of more sophisticated agents, described above, would require a substantial effort in man power, time and money and is more difficult than often acknowledged. Although the necessary methods already exist, manipulation of a microorganism often ends up with a negative result regarding the performance of the agent. For example, manipulations, such as making a bacterium resistant to antibiotics could also reduce its capacity to cause the disease after the modification.

Non-state actors can never build a large offensive BTW capability. We do not believe that a non-state actor has the patience and/or the possibilities to build the infrastructure that is required for such a program. Even if the non-state group had the financial capacity and the motives, the risk of being discovered or substantially disturbed would be substantial. However, small-scale facilities for production of BW will not be a problem for a non-state actor.

Advanced knowledge in microbiology, fermentation or biotechnology is not needed for a terrorist group aiming at using BTW. The toxin or the infectious agents available in nature are normally quite sufficient. Non-state actors do not want or need to hide their use of BTW. On the contrary, the more their use is detected and announced to the public, the more successful they will be in spreading fear. This means that there is little extra value for a terrorist to genetically modify microorganisms. As mentioned above; these manipulations would take a lot of time, man power and infrastructure and the outcome would be rather unpredictable. However, terrorists could use a genetically modified organism if they could steal it from a state-sponsored program. This could be an agent that is developed for purely offensive purposes or an agent that is developed in a defensive program with the aim of testing protective measures against that type of agents.

Conclusions

Governments and offensive BW programs

Few governments will in the future be motivated to maintain or develop significant military BTW capabilities. Important factors for this would be a development where states such as Iran, Israel and Syria would perceive a reduced threat from its neighbours and, in parallel, an increased democratisation, openness and public awareness also in the most closed societies. Obviously, a security situation based on mutual respect and trust, combined with more democratic and transparent societies, would work against the development of covert BTW programs.

Defensive BW programs will remain. In these programs potentially offensive competences may be maintained and the latest techniques in biotechnology tried and developed. An efficient break-out capability may be achieved either from maintaining a core of offensive

BW capability, as may be the case in Russia, or from a larger well planned defensive program as is a possibility in for example the US.

Risk of proliferation from defensive BW programs
Today there is an increased emphasis on defence against bioterrorism. New actors, including private research institutions and industry are invited to share and build up sensitive knowledge. Therefore, for the future we are also concerned about the inherent risk of proliferation since the oversized biodefence research programs also results in increased and more widespread knowledge in these areas.

Sensitive technologies and competences
BTW is a potentially effective way of causing fear and casualties and has been an interest to terror groups in the past and is likely to be so also in the future. States have the competence, if motivated, to achieve and acquire BW technology and in our mind it is very difficult, if not impossible, to stop that. The terrorist on the other hand may be highly motivated but normally lack some key competences.

In our view, the area of technology most sensitive for the development of "efficient" bioterrorism is that of dry powders and their behaviour in particulate aerosols. The knowledge within this area is developed in for example the pharmaceutical industry. We find it important to highlight these problems.

Restrictions on publications of research on molecular biology and biotechnology
The evolution within molecular biology and biotechnology has certainly opened up the possibilities of creating new agents that might cause problems if misused. We have raised the issue of genetic manipulation and biotechnology and its impact on BTW development. During the last years there has been concern that the technical developments in molecular biology and microbiology could yield information which would allow bioterrorists to develop new modified agents. Therefore, several leading scientific journals in the US decided to introduce a censorship of scientific papers that were regarded to contain information that could be used by bioterrorists. This discussion is certainly important and we also agree that it is important to make scientists aware that some research on dangerous pathogens could potentially be misused. However, to our understanding the fear that these techniques would be used by terrorists is exaggerated. Although the techniques are not difficult to apply, the added value of the manipulations would be small and not compensated by the uncertainties that the infectious potential of the manipulated agent might have been lost. Hence, we should therefore be cautious when discussing restrictions of publications of this type of research.

Strengthen the mechanisms of the international community
An improved global security or an increased threat of bioterrorism may motivate key states to expand the mandate of international law in areas of confidence building measures and of restricting access to key competences.

In particular we would recommend improved and mandatory declarations of all governmentally funded biodefence research. We would also like procedures for handling allegations of BTW use and illegal development by the international community, including an international community that has access to efficient tools for detecting illegitimate activities. We would also like to see restrictions of sensitive knowledge about formulation techniques public in the patent application that is registered as part of the commercialisation of new products.

List of published studies and papers
All papers and studies are available as pdf-files at the Commission's website: www.wmdcommission.org

No 1 "Review of Recent Literature on WMD Arms Control, Disarmament and Non-Proliferation" by Stockholm International Peace Research Institute, May 2004

No 2 "Improvised Nuclear Devices and Nuclear Terrorism" by Charles D. Ferguson and William C. Potter, June 2004

No 3 "The Nuclear Landscape in 2004: Past Present and Future" by John Simpson, June 2004

No 4 "Reviving the Non-Proliferation Regime" by Jonathan Dean, June 2004

No 5 "Article IV of the NPT: Background, Problems, Some Prospects" by Lawrence Scheinman, June 2004

No 6 "Nuclear-Weapon-Free Zones: Still a Useful Disarmament and Non-Proliferation Tool?" by Scott Parrish and Jean du Preez June 2004

No 7 "Making the Non-Proliferation Regime Universal" by Sverre Lodgaard, June 2004

No 8 "Practical Measures to Reduce the Risks Presented By Non-Strategic Nuclear Weapons" by William C. Potter and Nikolai Sokov, June 2004

No 9 "The Future of a Treaty Banning Fissile Material for Weapons Purposes: Is It Still Relevant?" by Jean du Preez, June 2004

No 10 "A Global Assessment of Nuclear Proliferation Threats" by Joseph Cirincione, June 2004

No 11 "Assessing Proposals on the International Nuclear Fuel Cycle" by Jon B. Wolfsthal, June 2004

No 12 "The New Proliferation Game" by William C Potter, June 2004

No 13 "Needed: a Comprehensive Framework for Eliminating WMD" by Michael Krepon, September 2004

No 14 "Managing the Biological Weapons Problem: From the Individual to the International" by Jez Littlewood, August 2004

No 15 "Coping with the Possibility of Terrorist Use of WMD" by Jonathan Dean, June 2004

No 16 "Comparison of States vs. Non-State Actors in the Development of a BTW Capability" by Åke Sellström and Anders Norqvist, October 2004

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