

**International Forum “*Confronting Biological Threats: Biosecurity, Biological Weapons Proliferation and Regional Cooperative Mechanisms*”.**

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# **AN OVERVIEW ON BIOLOGICAL WEAPONS THREAT**

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## INTRODUCTION

During Cold War chemical, biological and nuclear warfare was potentially considered by some nations that devoted part of their military budget to build a substantial number of CBN arsenals.

The necessity to control this situation led to the signing of different treaties bound to survey the non-proliferation of this armament, its production, development and stockpiling:

- ❑ Non Proliferation of Nuclear Weapons (NPT, 1968)
- ❑ Biological Weapons and Toxins Convention (BWC, 1972)
- ❑ Chemical Weapons Convention (CWC, 1993)

## A NEW SCENARIO AFTER THE COLD WAR

The dissolution of the USSR, a first order nuclear power, opened a chapter in the 20th century that was going to influence international policy and international relations.

With this backstage in perspective, international community felt the responsibility to collaborate with the new Russian Federation government in the securing of former CBN installations.

Related to chemical and biological weapons facilities, the research by Dr. Amy E. Smithson gives a deep account of the contingencies that affected these centres in that period, and the different approaches taken to deal with the situation in the best way. *"The report provides an overview of a significant and complex proliferation dilemma and appraises the efforts being made to address it"* (Dr. Amy E. Smithson: 1999).

## SCIENTIFIC COOPERATION AT ISTC

A very relevant aspect of the international collaboration to reinforce international security, was the founding of the International Science and Technology Centre (ISTC), an intergovernmental organization that was established in 1992 among the European Union, the Russian Federation, the United States and Japan, to provide work opportunities to the scientists of the Commonwealth of Independent States that had formerly worked in weapons branch. By 2006 the ISTC had funded 67,684 scientists and their team members in 922 research institutes in projects for civil purposes. ([www.istc.ru](http://www.istc.ru))

Our Institute of Nuclear Fusion held since 1983 a scientific collaboration with the Lebedev Physical Institute of Moscow, due to the friendship of Academician Nicolai Basov, Nobel Prize of Physics, and Professor Guillermo Velarde, Director and founder of the Institute of Nuclear Fusion.



Academician Basov, Professor Velarde, Professor Perlado and our colleagues at Lebedev Physical Institute – Moscow 1994

## BIOTECHNOLOGY: A NEW CHALLENGE IN THE NON PROLIFERATION PROCESS

Biotechnology is an interdisciplinary process with a vast scope of applications which requires the contribution of concepts and methodologies from several scientific fields: genetics, microbiology, cellular biology, biochemistry, biocomputing, bioengineering, chemical engineering, etc.

One of the pillars of biotechnology is microbiology. Micro-organisms present many opportunities for numerous applications. They grow fast and from the genetic point of view is not difficult with the use, among other instruments, of bioreactors which acting as biological catalysers could provide their maximum efficiency.

However and although biotechnology has got as main objectives very important matters involving medicine (diagnosis of genetic and infection illnesses, new vaccines, etc); nutrition (vitamins); environment (biofuels); agriculture (pesticides) and so on, it cannot be left apart its potential malicious use or mismanagement.

## BIOSECURITY RESEARCH

Biotechnology companies in different countries around the world are presently doing research for the developing and improvement of devices that can detect and measure bio-organisms in the air. The methods applied for this detection and identification are based on mass spectrometry, culture and pyrolysis.

At Lawrence Livermore National Laboratory (LLNL) in the USA, a multidisciplinary project in the field of biodetectors is being carried out in the BioSecurity and Nanosciences Laboratory (BSNL). The research is based on nanoscience that, with the study of materials at a thousand-millionth-of-a-meter resolution, are giving scientists the possibility to work with molecules in their natural environment, and develop molecular machines the size of microbes and even smaller.

In November 2005 it was published that the Dutch Research Institute TNO Prins Maurits Laboratory, in cooperation with the Technical University of Delft and Bruker-Daltonik of Germany, has developed a new bioaerosol alarm detector that can measure the presence in the air of biological warfare agents in real time, based on fluorescence pre-selection.

## THE AWARENESS OF PREVENTION

The Biological Weapons and Toxins Convention (BWC), that complement the Geneva Protocol (1925), was open for signature on April 10, 1972 and entered into force on March 26, 1975. But, unlike its homonyms NPT and CWC, the BWC did not include a protocol with the mechanisms to verify the strict compliance of the States Parties.

In 2001 the Organisation for Economic Co-operation and Development (OECD) created the Biological Resource Centres (BRCs) to assess biological materials and their different biosecurity risk levels.

Project Bioshield was launched in the United States on July 21, 2004 as part of the Biodefense Program established by the American government in 2001. Within its frame, both the Centre for Disease Control (CDC) of Atlanta and the American Red Cross have opened an information centre in order to answer questions from the general public. ([www.redcross.org/prepandness](http://www.redcross.org/prepandness))

## THE AWARENESS OF PREVENTION

INTERPOL launched in 2004 a preventive Bioterrorism Program. The Bioterrorism Prevention Resource Centre is linked to this Program, together with the Biocriminalization Project (September 2006). This last initiative has among other objectives *"Identifying priority countries in need of assistance for strengthening laws that outlaw biological weapons activities and provide such assistance to the priority countries"*. ([www.interpol.int](http://www.interpol.int))

In the case of Spain, apart of other national programs, our preventive and defense policy related to biological incidents is also understood in the frame of NATO defence. As to the Spanish Army, there are several units especially trained in CBN threat and provided with specific systems for the analyses of samples in the form of gas, liquid or solid. Defence systems established by NATO are presently channelled by means of the NRF (NATO Response Force) that was approved at the Prague summit in November 2002 and which constitutes an international unit of response of the Alliance.

In 2003 NATO launched a Multinational CBRN Defence Battalion based in the Czech Republic, a relevant international authority in the area of CBRN defence.

## OTHER WMD THREATS

The potential perspective of WMD threat can also be extended to nuclear weapons. This threat includes nuclear terrorism which is an evil application of nuclear energy, in the same way as chemical and biological terrorism could be considered the evil application of chemistry and biology.

The concept of nuclear terrorism involves the use of:

- Radiological Dispersion Devices (RDDs) (commonly known as *dirty bombs*).
- Improvised Nuclear Devices (INDs).
- Attacks to Nuclear Facilities (ANFs).

## OTHER WMD THREATS

- RDDs have not military interest and are discarded as tactic weapons. Their objectives are to generate panic and chaos, with high costs of decontamination. They are also known as *Weapons of Mass Disruption*.
- INDs are nuclear fission bombs (atomic bombs) made of highly enriched uranium or plutonium which, due to both a deficient project or a lack of appropriate control on its materials, render a yield explosion of only a fraction of kiloton.
- ANFs would be that attack carried out with conventional explosives or by the impact with vehicles with explosives, gasoline, kerosene, etc

## GLOBAL INITIATIVES TO COMBAT WMD THREAT

In June 2002 during the Kananaskis (Canada) summit held by the G8, it was announced the creation of a **Global Partnership Against the Spread of Weapons and Materials of Mass Destruction**. This Global Partnership had as main goals the non-proliferation, disarmament and counterterrorism matters.

In July 2006 it was launched the **Global Initiative to Combat Nuclear Terrorism**. This Initiative, which works on a multilateral, bilateral and domestic bases, was taken during the celebration of the G8 countries meeting held in San Petersburg (Russian Federation). It is another international effort to collaborate in the fight against the potential acquisition by non-state actors of nuclear and radioactive materials.

Spain was invited to join this Initiative in June 2007 and 73 countries have presently endorsed the agreement, being the last meeting in Madrid on 16-18 June 2008. The Partners of the Global Initiative have met previously in Rabat (Morocco) in October 2006; in Ankara (Turkey) in February 2007 and in Astana (Kazakhstan) in June 2007.

## SOME CONCLUSIONS

- Biological research has still a long way ahead to combat the high rate of infectious diseases that dramatically affect many countries in the world.
- According to the WHO Report on Infectious Diseases, more than 13 million people die annually as a result of them. One in two deaths, in developing countries. One of these diseases, Mal de Chagas, (Chagas disease) is endemic in Mexico, Central America and South America. The parasite affects 11 million people annually. (*World Health Organization Report on Infectious Diseases. [www.who.int](http://www.who.int)*) Or malaria, which according also to WHO, have caused 881,000 deaths in 2006. (*World Malaria Report 2008*).
- Sophisticated advances in biotechnology are leading to engineered pathogens which, in turn, are an added challenge in the non-proliferation control process.

## SOME CONCLUSIONS

- Both biological weapons and nuclear weapons have in common to be the most damaging weapons in a worst-case scenario.
- Current international situation poses the necessity of restructuring former security patterns that were valid in the second half of the last century.
- The emerging of powerful non-state actors that has led to a new status in the policy of non-proliferation, requires a new approach in WMD control in which international, interdisciplinary and multidisciplinary collaboration are to play a definitive role.