

**WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY**  
Control No. (TCN) 08152 with Battelle Chapel Hill Operations for the U.S. Army Environmental Policy Institute

**MARCH 2010 REPORT**

Note to Readers: Pages 1-15 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 16.

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**Item 1. UN Panel Meeting on World Water Day to Discuss How to Avoid Water Wars**

The UN General Assembly held a high-level dialogue on World Water Day with three panels on: water related to the Millennium Development Goals; water, climate change and disasters; and water and peace and security. Since potential water wars could be triggered by combinations of climate change, population growth, rapid urbanization, and increasing inequalities between those who could and could not cope with water scarcity, several participants suggested that greater efforts by the international community to promote dialogues for equitable and sustainable use and management of transboundary rivers, lakes and aquifers are needed. It was also suggested that water issues be included on the agenda of the next session of the Conference of Parties (COP16) of the UNFCCC, to be held in Mexico at the end of the year, and that 2012 be declared the International Year of Water Diplomacy.

More people now die from contaminated and polluted water than from all forms of violence, including wars, notes the UNEP report, *Sick Water?* Some two million tons of waste, estimated to equal two or more billion tons of wastewater, is being discharged daily into rivers and seas, harming key ecosystems and human health. The report underlines the need for global and comprehensive water-related regulations and enforcement mechanisms, including international standards and guidelines for water and ecosystem quality management.

**Military Implications:**

The military should liaise with these efforts, as possible, to contribute experience and add water-related information to its early warning information and analysis.

**Sources:**

Sustainable Management of Water Resources

<http://www.un.org/News/Press/docs//2010/ga10925.doc.htm>

World Water Day Website:

<http://www.unwater.org>

Time to Cure Global Tide of Sick Water

<http://www.unep.org/Documents/Multilingual/Default.asp?DocumentID=617&ArticleID=6504&l=en>

**Item 2. Nanomaterials Guidelines Adopted by 53 African Countries**

Representatives of 53 African governments attending the African regional meeting on Strategic Approach to International Chemicals Management adopted a non-binding resolution on handling manufactured nanomaterials. The resolution calls for: 1) a ban on shipment of wastes containing nanomaterials to countries that lack capacity for adequately managing them; 2) the establishment and implementation of legal frameworks for the safe production, use, transport, and disposal of nanomaterials; 3) a health assessment of people exposed to nanomaterials; 4) the establishment of partnerships for capacity building related to nanotechnology. In the preamble to the International Conference on Chemical Management focusing on nanotechnologies and manufactured nanomaterials, to be held in 2012, the delegates suggested that the report should address all the aspects relative to nanotechnology and safe handling of nanomaterials throughout their life cycles and application of the ‘no data, no market’ principle prior to commercialization. [Related items: *Nanotechnology Safely Issues* in the monthly environmental security reports.]

**Military Implications:**

AFRICOM should explore the potential for military-to-military programs to develop capacity to manage nanomaterials in the continent. While global regulations on nanotechnologies are moving slowly, it is possible that countries lacking assessment and handling capacity for nanomaterials will adopt local and regional precautionary policies. Although the African resolution is non-binding, military components and their contractors dealing with nanomaterials should be prepared to comply with probable future regulations along these lines, not only in Africa but also in all developing countries.

**Sources:**

African Resolution Urges Nations Worldwide to Ensure Safe Handling of Nanomaterials

<http://www.merid.org/nanodev/more.php?id=2459>

CIEL welcomes and supports African resolution on nanomaterials

[http://www.ciel.org/Chemicals/African\\_Nano\\_17Feb10.html](http://www.ciel.org/Chemicals/African_Nano_17Feb10.html)

**Item 3. UN Economic Commission for Europe Adopts Electric and Hybrid Vehicle Regulations**

The UN Economic Commission for Europe (UNECE) adopted the first international technical regulation on safety for fully electric and hybrid cars, within the 1958 UNECE framework. The Regulation will ensure that cars with a high voltage electric power train, such as hybrid and fully electric vehicles, are as safe as conventional cars. These standards on manufacturing and marketing are expected to increase sales and will apply not only in the EU, but in a number of other markets, such as South Korea, Japan, and Russia. Mutual recognition of approvals among contracting parties of the 1958 agreement will be possible as soon as the Regulation is applied.

**Military Implications:**

It would be wise to review these new UNECE regulations for their potential incorporation into the technical standards for vehicles around the world. For their own benefit, military organizations and personnel stationed in Europe and countries adopting the new UNECE regulations should ensure that their vehicles comply with the respective or tougher safety standards.

**Source:**

Car safety: European Commission welcomes international agreement on electric and hybrid cars

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/260&format=HTML&aged=0&language=EN&guiLanguage=en>

**Item 4. Iran and Qatar Sign Environmental MOU**

Qatar and Iran have signed a memorandum of understanding regarding preservation of the environment. The agreement covers managing green reserves and various flora and fauna aspects, as well as the environmental management of coastal areas, desertification control, and know-how exchange. Qatar has already undertaken several environmental projects, including a green convention center in Doha and an agreement between the Doha Bank and UNESCO to "Green the Middle East". [Related item: *Jordan Armed Forces Upgrade, Part of Global Warming Debate* in the February 2010 environmental security report.]

**Military Implications:**

The Army Strategy for the Environment and related documents should be shared with the US military liaison in Qatar to explore applications and share US military experience to reduce the military “bootprint.” Qatar might set a precedent for holding the sector accountable the same way transportation and different industries are, or even more so, since climate change impacts may exacerbate conflicts. [Note: the AEPI website lists several reports that deal with environmental considerations related to military functions and operations.]

**Source:**

Iran and Qatar Align to Help the Environment

<http://www.greenprophet.com/2010/02/28/17972/qatar-iran-environment>

**Item 5. Thailand, Other Asian Countries, May Tighten Environmental Regulations**

A Thai court has sided with the country’s growing green movement and suspended \$12 billion in industrial investments until their environmental impacts can be properly assessed. The government hopes to set up a new environmental monitoring agency within five months to quickly assess and approve new projects. Environmental activists have similarly increased their pressures in Indonesia, Vietnam, and China over the past few years. [Related item: *International Lawsuits for Environmental Crime Proliferate* in January 2010 environmental security report.]

**Military Implications:**

Although current actions concern industrial development, the military and its contractors in East and Southeast Asia should be aware of this case as an example of the growing influence of the environmental movement in the region and be informed of the Army Strategy for the Environment, as a vehicle for exploring better environmental relations in the region.

**Source:**

Thailand Tightens Environmental Regulation

<http://online.wsj.com/article/SB10001424052748704182004575056421383885014.html>

**Item 6. Technological Advances with Environmental Security Implications****6.1 Desalination Reverse Osmosis Improved by Ion Concentration Polarization**

Sung Jae Kim and Prof. Jongyoon Han of MIT’s Dept. of Electrical Engineering and Computer Science, and colleagues in Korea, have developed a new technique – ion concentration polarization – which promises to avoid two of reverse osmosis’s problems: large power consumption and membrane fouling. The system is based on using microfluidics fabrication methods to produce microscopic filtration cells that could be assembled into an array with 1,600 units on an 8-inch-diameter wafer, capable of producing about 15 liters of water per hour. Since the system removes only salts and larger particles, it may need to be supplemented by a conventional filtration component (e.g. charcoal) for certain types of pollutants.

**Military Implications:**

The military should follow this development for future use in providing small, low-power desalination capability.

**Sources:**

A system that's worth its salt: New approach to water desalination could lead to small, portable units  
<http://www.physorg.com/news1883998888.html>

Direct seawater desalination by ion concentration polarization  
<http://www.nature.com/nnano/journal/vaop/ncurrent/abs/nnano.2010.34.html>

**6.2 New Detection and Cleanup Techniques****6.2.1 New Polymer Fights Both Biological and Chemical Toxins.**

A team led by Dr. Alan Russell of the McGowan Institute for Regenerative Medicine, Univ. of Pittsburgh School of Medicine, claims synthesis of a single, multifunctional polymer material that can decontaminate both biological and chemical toxins, such as are used in weapons. According to an announcement, it comprises a “polyurethane fiber mesh containing enzymes that lead to the production of bromine or iodine, which kill bacteria, as well as chemicals that generate compounds that detoxify organophosphate nerve agents.”

**Military Implications:**

The military should follow this development in its progress toward commercial availability as an environmental cleanup technology.

**Source:**

Multifunctional polymer neutralizes both biological and chemical weapons  
[http://www.eurekalert.org/pub\\_releases/2010-03/uops-mpn031810.php](http://www.eurekalert.org/pub_releases/2010-03/uops-mpn031810.php)

**6.2.2 Project Developing Sensors for Engineered Nanoparticles**

According to Nanowerk News, Prof. Omowunmi Sadik, director of SUNY's Binghamton University Center for Advanced Sensors and Environmental Systems, is leading research on developing sensors that will detect and identify engineered nanoparticles. This should advance understanding of the risks associated with the environmental release and transformation of these particles, as well as naturally occurring cell particles.

**Military Implications:**

The military should keep in touch with this research, in order to learn of techniques and new findings in the field of nanoparticle/environment interaction.

**Source:**

Chemist monitors nanotechnology's environmental impact  
<http://www.nanowerk.com/news/newsid=15415.php>

**6.2.3 New Material Will Aid Radioactive Cleanup**

Mercouri Kanatzidis, at the Argonne National Laboratory, and Nan Ding, a chemist at Northwestern University, report developing a new material, composed of metal sulfides, that binds radioactive cesium isotope ions to sulfur atoms inside its crystalline structure, giving it the ability to aid clean-up at radioactively contaminated sites.

**Military Implications:**

The military should investigate this development for its possible use in environmental remediation.

**Sources:**

Snag radioactive waste like a Venus flytrap

<http://futurity.org/science-technology/snag-radioactive-waste-like-a-venus-flytrap/>

Selective incarceration of caesium ions by Venus flytrap action of a flexible framework sulfide

<http://www.nature.com/nchem/journal/vaop/ncurrent/abs/nchem.519.html>

### 6.2.4 Genetically Engineered Tobacco Plant May Clear Polluted Water

Dr. Pascal M.W. Drake from the Centre for Infection at St. George's University of London and his team claim success in genetically engineering a strain of tobacco that produces an antibody to microcystin-LR (MC-LR), an environmental toxin pollutant produced by a species of cyanobacteria that makes water unsafe for human use. The authors claim that this plant could serve as a major tool for helping keep water sources safe to use, especially in developing nations.

**Military Implications:**

The military should follow this development, as it may proceed toward a practical system for aiding in the decontamination of polluted environments.

**Sources:**

Genetically engineered tobacco plant cleans up environmental toxin

<http://www.physorg.com/news186660152.html>

Generation of transgenic plants expressing antibodies to the environmental pollutant microcystin-LR

<http://www.fasebj.org/cgi/content/abstract/24/3/882?maxtoshow=&hits=10&RESULTFORMAT=&fulltext=tobacco&searchid=1&FIRSTINDEX=0&volume=24&issue=3&resourcetype=HWCIT>

## **6.3 Increasing Energy Efficiency Technologies**

### 6.3.1 Advances in Generating Electricity from the Body

The Parametric Frequency Increased Generators (PFIGs) developed by researchers of the Univ. of Michigan's Engineering Research Center for Wireless Integrated Microsystems are reported to be able to generate 0.5 milliwatts from typical vibrations in the human body. Both piezoelectric and electromagnetic induction types have been tested and are claimed to be more efficient than previous devices with vibrations that are non-periodic and occur at low frequencies. [Related item: "*Energy Harvesting*" Offers Possibilities for Environment-sparing Power in December 2009 environmental security report.]

**Military Implications:**

The military should follow this research for its possible applicability to replacing batteries in personal systems with very low power requirements.

**Source:**

Mini generators make energy from random ambient vibrations

<http://www.physorg.com/news188569711.html>

### 6.3.2 Biofuels Production from Sunlight and CO<sub>2</sub>

Prof. David Wendell and colleagues at the Univ. of Cincinnati describe a design for foam loaded with natural (e.g. algal) enzymes that produce sugars from sunlight and carbon dioxide. The sugars can then be converted into biofuels. The process is more efficient than the natural one

since all the incoming solar energy is used for the conversion, without part being diverted to support a living organism.

Meantime, Joule Biotechnologies, Inc. of Cambridge, MA announced arrangements for building its first pilot plant, in Leander TX, for developing and testing its continuous process system that uses genetically engineered organisms to directly convert sunlight and CO<sub>2</sub> into ethanol or other fuels. It claims that its lab-scale ethanol tests have already reached productivity rates exceeding 6,000 gallons/acre/year.

**Military Implications:**

The military should follow these developments as possible future techniques for more environmentally friendly fuel production systems.

**Sources:**

Frogs, Foam and Fuel: Researchers Convert Solar Energy to Sugars

<http://www.physorg.com/news187951045.html>

Joule Biotechnologies Secures Pilot Site for Renewable Solar Fuel

<http://joulebio.com/news/2010/joule-biotechnologies-secures-pilot-site-renewable-solar-fuel>

**6.3.3 New Developments in Hydrogen Production**

Several new techniques have been added to the published set of tools for economical production of hydrogen; e.g. as input to fuel cells. Sun Catalytix of Cambridge, MA has been awarded \$4 million through ARPA-E for work on its artificial photosynthesis based on a cobalt-phosphate catalyst that converts water and carbon dioxide into hydrogen and oxygen. The laboratory of Prof. Craig Hill at Emory Univ. has announced the fastest homogeneous carbon-free molecular water oxidation catalyst (WOC) yet created, based on cobalt. Univ. of Wisconsin-Madison geologist and crystal specialist Huifang Xu and colleagues have designed “a simple and cost-effective technology for direct water splitting that may generate hydrogen fuels by scavenging waste energy, such as noise or stray vibrations from the environment”, according to the developers. The new piezoelectric device uses zinc oxide and barium titanate nanofibers placed in water. Dr. Di Zhang, of Shanghai Jiao-Tong University, and collaborators have embedded a nitrogen-doped titanium dioxide catalyst in a complex physical structure modeled on natural plant leaves’ micro-architecture to produce, “enhanced light-harvesting and photocatalytic hydrogen evolution activities”.

**Military Implications:**

The military should follow these developments for their possible future application in environment-sparing power sources.

**Sources:**

Catalyst could power homes on a bottle of water, produce hydrogen on-site (w/ Video)

<http://www.physorg.com/news187031401.html>

Water oxidation advance boosts potential for solar fuel

<http://www.nanowerk.com/news/newsid=15268.php>

Scavenging energy waste to turn water into hydrogen fuel

<http://www.nanowerk.com/news/newsid=15264.php>

Nanotechnology artificial leaves for hydrogen production

<http://www.nanowerk.com/spotlight/spotid=15381.php>



Light Harvesting: Artificial Inorganic Leafs for Efficient Photochemical Hydrogen Production Inspired by Natural Photosynthesis (Adv. Mater. 9/2010)

<http://www3.interscience.wiley.com/journal/123301807/abstract?CRETRY=1&SRETRY=0>

(Requires cookie download permission.)

#### 6.3.4 Carbon Nanotubes Yield Threefold Increase in Thermocell Efficiency

Dr. Ray Baughman, director of the Alan G. MacDiarmid NanoTech Institute at the Univ. of Texas at Dallas, and an international team of collaborators, report a way to use carbon nanotubes in large thermocells to generate electricity from heat at about 60% of the cost per watt of existing solar cells. [Related item: *Quantum Dots Offer New Possibilities for Energy from Waste Heat* in November 2009 environmental security report.]

#### **Military Implications:**

The military should follow this development as a possible source of recycling low-cost energy from waste heat from a variety of engines and devices.

#### **Sources:**

Nanotube Thermocells Hold Promise as Energy Source

<http://www.physorg.com/news186409698.html>

Harvesting Waste Thermal Energy Using a Carbon-Nanotube-Based Thermo-Electrochemical Cell

<http://www.me.gatech.edu/nest/images/nl903267n.pdf>

### **Item 7. Updates on Previously Identified Issues**

#### **7.1 New Measure to Enforce Maritime Environmental Protection**

The Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO) 60<sup>th</sup> session held March 22-26, 2010, made further steps to strengthen maritime environmental regulations, such as:

- adopted amendments to the MARPOL Convention to formally establish a North American Emission Control Area in which emissions of sulphur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), and particulate matter from ships will be subject to more stringent controls than the limits that apply globally—expected to enter into force on August 1, 2011
- adopted a new MARPOL regulation to protect the Antarctic from pollution by heavy grade oils—expected to enter into force on August 1, 2011
- worked on developing guidelines related to safe and environmentally sound ship recycling, and agreed on the need to develop guidance concerning the recycling of flag-less and non-Party ships by Parties to the Convention—progress to be reported to MEPC 61
- agreed that the discharge requirements for the Wider Caribbean Region Special Area under MARPOL Annex V Regulations for the prevention of pollution by garbage from ships are to take effect on May 1, 2011
- prepared draft text on mandatory requirements for the Energy Efficiency Design Index (EEDI) for new vessels and on the Ship Energy Efficiency Management Plan (SEEMP) for all ships in operation; but negotiations continue on details, including target dates and reduction rates
- in order to advance work on measures to regulate and reduce greenhouse gas (GHG) emissions from international shipping, the Committee decided to establish an

intersessional Working Group on technical and operational measures to increase the energy efficiency of ships and an Expert Group to assess the impact of various market-based instruments for international maritime transport—both to report to the MEPC 61<sup>st</sup> session, to be held in September 2010.

[Related items: *Tougher Global Limits Imposed on Air Pollution from Large Ships* in October 2008 and other previous environmental security reports.]

**Military Implications:**

The new adopted and proposed measures do not seem to exempt military craft or activities. The Navy and its contractors should explore this omission and be prepared to comply with new anti-pollution regulations.

**Source:**

IMO environment Committee makes progress. MEPC – 60th session: 22-26 March, 2010  
[http://www.imo.org/Newsroom/mainframe.asp?topic\\_id=1859&doc\\_id=12724](http://www.imo.org/Newsroom/mainframe.asp?topic_id=1859&doc_id=12724)

**7.2 European Agency for the Cooperation of Energy Regulators to Become Operational in March 2011**

The new European Agency for the Cooperation of Energy Regulators (ACER) will complement and coordinate the work of National Regulatory Authorities, supporting the liberalization of the energy markets and the creation of European network rules. While encouraging international cooperation and integration to achieve energy security and combat climate change, the agency might restrict national policymaking, as its decisions will be binding. Its tasks involve advancing green energy development policies (potentially including a European ‘supergrid’.) The Agency will open in March 2011, in Ljubljana, Slovenia. [Related item: *European Climate and Energy Package Formally Adopted* in April 2009 environmental security report.]

**Military Implications:**

[Similar to previous on related issues] Military stationed in EU member states should review their actions to support the EU energy policy and seek opportunities to apply the Army Strategy for the Environment. Energy-related purchase contracts could be affected.

**Sources:**

European energy agency could form super-regulator  
<http://www.guardian.co.uk/business/2010/mar/29/european-commission-energy-regulator>  
Ljubljana designated as seat of the Agency for the Cooperation of Energy Regulators  
<http://www.eumonitor.net/modules.php?op=modload&name=News&file=article&sid=141533&mode=thread&order=0&thold=0>

**7.3 New UN Satellite Standards to Help in Natural Disaster Situations**

The UN International Telecommunication Union (ITU) approved a set of new recommendations for radio-communication standards for satellite services in case of natural disasters. They refer to radio frequencies that can be used by both fixed-satellite service (FSS) and mobile-satellite service (MSS) systems for facilitating emergency and disaster relief operations. The ITU calls on the international community, policymakers, and service providers to further enhance efforts for developing robust and comprehensive systems for early warning, relief, and mitigation in case of emergencies and disasters at international, regional, and national levels. [Related item: *Increased*

*Use of Space Technology for Monitoring Environmental Events* in September 2008 environmental security report.]

**Military implications:**

Relevant military disaster liaisons should review these standards for military-to-military disaster training and coordination with civilian and UN agencies.

**Sources:**

New ITU standards enhance satellite communications for emergencies

[http://www.itu.int/newsroom/press\\_releases/2010/13.html](http://www.itu.int/newsroom/press_releases/2010/13.html)

**7.4 Dialogues for Creating a Northeast Asia Nuclear Weapon-Free Zone**

Representatives of the Japanese and Republic of Korea parliaments held the first in a series of regional parliamentary dialogues for creating a Northeast Asian Nuclear Weapons-Free Zone. The joint declaration calls on the governments of the Republic of Korea and Japan to advance the proposal at the May 2010 Non-proliferation Treaty (NPT) Review Conference. The subject was also informally discussed by the Parliamentarians for Nuclear Non-proliferation and Disarmament (PNND) with UN Secretary-General Ban Ki-moon, and with government officials of Japan, Korea, and the United States. [Related item: *Entire Southern Hemisphere Covered by Nuclear-Free Zone Treaties* in August 2009 environmental security report.]

In the meantime, Australia and Japan submitted a proposal for the NPT Review Conference containing 16 nuclear disarmament and nonproliferation measures for achieving a world without nuclear weapons and a successful outcome at the NPT review conference. [Related item: *Australia to Propose Panel to Advance Work for the NPT Review in 2010* in June 2008 and other similar items in previous environmental security reports.]

**Military Implications:**

Military stationed in Northeast Asia should be prepared to participate in talks and actions leading to an eventual nuclear-free zone. Also, the military should assess all the opportunities to facilitate the NPT negotiations and international cooperation to improve global nuclear safety, as well as to recommend policy, training, and institutional or physical changes needed to implement the recommendations – all within the context of overall U.S. policy.

**Sources:**

Joint Statement by Parliamentarians of Japan and the Republic of Korea toward the Denuclearization of Northeast Asia

[http://www.gs institute.org/pnnd/docs/02\\_28\\_10\\_Japan-ROK\\_Statement.pdf](http://www.gs institute.org/pnnd/docs/02_28_10_Japan-ROK_Statement.pdf)

Treaty on the Northeast Asia Nuclear-Weapon-Free Zone (tentative translation)

<http://www.gs institute.org/pnnd/docs/NEA-NWFZ.pdf>

Australia, Japan Submit Disarmament Proposals For NPT Review Conference

[http://gsn.nti.org/gsn/nw\\_20100324\\_4743.php](http://gsn.nti.org/gsn/nw_20100324_4743.php)

**7.5 New Measures to Continue the Fight against Biodiversity Loss**

The summit of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) decided to include several reptiles and amphibians in its endangered species trade list—some species of iguanas, an entire genus of tree frogs from Central America, and Kaiser’s newt salamander from Iran. In the meantime, the EU, admitting to have missed the target of stopping biodiversity loss by the end of 2010, decided to set two new targets: a mid-term one that

all species loss within the EU be ended by 2020, and a long-term target to protect and restore all ecosystems by 2050 to prevent future losses. [Related item: *International Year of Biodiversity is 2010 and Convention on Biological Diversity COP10 to Meet in Japan This Year* in January 2010 environmental security report.]

**Military implications:**

Personnel with environmental responsibilities, particularly regarding training, land management, and border control in affected regions, should review and update monitoring and inspection protocols to prevent harm to and illegal trafficking of newly regulated species.

**Source:**

More terrestrial fauna placed under CITES

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=617&ArticleID=6506&l=en>

'We failed' on species extinction, admits EU

<http://euobserver.com/9/29685/?rk=1>

**7.6 Two New Pesticides Added to the Rotterdam Convention on the Prior Informed Consent (PIC) Watch List**

Endosulfan and azinphos-methyl were added to the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade watch list by the Chemical Review Committee. Endosulfan is a persistent organic pollutant (POP), while azinphos-methyl is derived from nerve agents developed during World War II. Both pesticides have been linked to reproductive and developmental damage in humans and animals. [Related item: *New Compounds Considered under the Stockholm and Rotterdam Conventions* in October 2008.]

**Military implications:**

Although the inclusion is not a ban, exporting nations should ensure prior consent of the recipient country. There are currently 29 pesticides and 11 industrial chemicals on the Rotterdam Convention's watch list. Relevant personnel should ensure compliance with the PIC requirements during trans-border movement of the respective substances.

**Sources:**

New Chemicals Recommended for Listing Under the Rotterdam Convention

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=617&ArticleID=6503&l=en>

**7.7 Factors to Consider in Establishing and Operating Marine Protected Areas**

Although the number of marine protected areas increased over the past years, the world is still far from the commitment that by 2012, 10%-30% of waters will be protected. Scientists now warn that in order for the protection to be efficient, marine protected areas, which currently limit fishing in 1.6% of the waters claimed by countries, need to be located in the right spots. [Related items: *World Database on Marine Protected Areas* in June 2009 and "Roving" *Marine Protected Areas as Climate Change Affects Migration* in March 2008.]

**Military Implications:**

The military should consider these principles in international, regional, and national planning and operations in marine protected areas. It should also be prepared to comply with new restrictions as marine protected areas expand.

**Source:**

Placement of marine reserves is key. Focusing on the heaviest-fished areas can help meet conservation goals

[http://www.sciencenews.org/view/generic/id/56511/title/Placement\\_of\\_marine\\_reserves\\_is\\_key](http://www.sciencenews.org/view/generic/id/56511/title/Placement_of_marine_reserves_is_key)

**7.8 Arctic Debates Continue**

As foreign ministers of five Arctic states—Canada, Denmark, Norway, Russia and the U.S.—met in Chelsea, Quebec, on March 29, 2010, states member of the Arctic Council that were left out of the talks (Iceland, Sweden, and Finland) along with various northern aboriginal groups publicly expressed their frustration. Although the outcomes of the meeting were not available at the time of this writing, there are speculations that in view of some military strategies calling for measures to ensure that the Arctic remains free of nuclear weapons, Canada might declare the Northwest Passage a nuclear-free-zone.

The Russian Security Council announced that over the next 10-15 years, Russia might face serious national security problems as melting permafrost—that covers roughly 60% of Russian land—could jeopardize important infrastructure, including pipelines, railways, roads, and several urban areas. [Related items: *Arctic Opens to International Commercial Use* in January 2010 and other items on this issue in previous environmental security reports.]

**Military Implications:**

Military-to-military collaboration should increase among all the Arctic countries to support friendly political and economic negotiations and to assure security in the increasingly vulnerable region.

**Sources:**

Canada's 'Arctic Summit' highlights global tensions, competing interests

<http://www.canada.com/news/Canada-Arctic-Summit-highlights-global-tensions-competing-interests/2736963/story.html>

Medvedev says that Russia must push its claim to Arctic resources

[http://ca.news.yahoo.com/s/capress/100317/world/eu\\_russia\\_arctic\\_claim](http://ca.news.yahoo.com/s/capress/100317/world/eu_russia_arctic_claim)

National security challenged by Arctic climate change. BarentsObserver, 2010-03-23

<http://www.barentsobserver.com/national-security-challenged-by-arctic-climate-change.4762526-58932.html>

Arms Control Advocates Call for Nuke-Free Arctic Zone

[http://gsn.nti.org/gsn/nw\\_20100310\\_5264.php](http://gsn.nti.org/gsn/nw_20100310_5264.php)

**7.9 Climate Change****7.9.1 Scientific Evidence and Natural Disasters**

Global temperatures have risen steadily since the 1970s, reveals the 'Current GISS Global Surface Temperature Analysis' by the NASA Goddard Institute for Space Studies (GISS). Comparing the global surface and ocean temperature changes, researchers conclude that global temperature continued to rise at a rate of 0.15-0.20°C per decade, despite large year-to-year fluctuations associated with the El Niño-La Niña cycle. (See graph in the [Appendix](#))

Australia's temperatures rose 0.7°C (0.4°F) over the past 50 years, with warming occurring across the country, with the last decade being the hottest on record, reveals the "State of The Climate" report by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The report also shows that sea levels rose 7-10 millimeters (0.3-0.4 inches) per year around Australia's north and west, while rainfall patterns varied sharply among regions. The past

southern hemisphere summer was 0.2°C (0.32°F) warmer than the previous high in 1997-1998, reaching an average of about 29.6°C (85.3°F).

Severe droughts affecting some East and Southeast Asian countries caused water levels of rivers and reservoirs to drop at dangerous levels. China's State Commission of Disaster Relief announced that the worst drought in Southwest China in 60 years is affecting 51 million people and is having a devastating effect on regional power supply and farming. In the Philippines, what seems to be the worst drought since 1998 affects 23 provinces. In Vietnam, drought dried up riverbeds and aggravated saline water intrusion into coastal areas, threatening the country's southern Mekong Delta. Thai Department of Disaster Prevention and Mitigation announced that nearly 4 million people in some 36 out of Thailand's 76 provinces have been affected by drought since November.

CO<sub>2</sub> levels rose to a median 393.71 parts per million in the first two weeks of March, from 393.17 ppm in the same period of 2009, and the increase seems accelerating, reveal new measures at Norway's Zeppelin station on the Arctic Svalbard archipelago. Similarly, a 2009 study of the ocean off Africa indicated CO<sub>2</sub> levels in the atmosphere were at their highest in 2.1 million years.

#### 7.9.2 Food and Water Security

The multiple crises in the Arab world, exacerbated by the effects of climate change, might increase the number of emergency situations, requiring food and water distribution to millions of people, warned officials attending the third conference of humanitarian organisations in the member states of the Organisation of the Islamic Conference (OIC). Similarly, the UNEP report "Environment Outlook for the Arab Region: Environment for Development and Human Well-being," compiled at the request of the Council of Arab Ministers Responsible for the Environment, outlines the multiple challenges facing the Arab region, ranging from climate change and food insecurity to decreasing water availability and unemployment. Highlighting that the region is one of the most water-scarce in the world, the report notes that biofuels and food security are key emerging and intertwined challenges facing the region. The region is predicted to be among the hardest hit by the potential direct and indirect climate change impacts, including: loss of coastal zones; more severe droughts and desertification; increased groundwater salinity; and a surge in epidemics and infectious diseases.

Experts warn that unless swift action is taken to improve water management, Lebanon might lack freshwater by 2015, due to the interplay of several factors, including: the 1975-1990 civil war and years of political unrest, water rights disputes with Israel, weak water management, and inappropriate infrastructure, exacerbated by a growing population. Additionally, some transboundary rivers are not exploited due to their strategic locations—such as the Nahr al-Kabeer and Orontes shared by Lebanon and Syria, and the Wazzani and Hasbani shared with Israel.

The report "An Overview of the Food Security Situation in Eastern Africa" by the UN Economic Commission for Africa's (UNECA) Sub-Regional Office for Eastern Africa (SRO-EA) is an assessment of food security-related initiatives, plans, and strategies in the SRO-EA mandate area. Describing the status of food security in six specific Eastern African countries (Uganda, Rwanda, Kenya, Tanzania, Burundi and the Democratic Republic of the Congo), it concludes that East Africa is the sub-region in Africa most affected by food insecurity. Recommendations include: increase investments in the agricultural sector to at least 10% of national budget; promote domestic and regional trade of agricultural products; and implement targeted input subsidies programs to enhance production and productivity.

### 7.9.3 Health

The WHO and UNDP has launched the first global project on public health adaptation to climate change. It involves a series of pilot projects that will seek to increase the adaptive capacity of national health system institutions. The projects will be undertaken by Ministries of Health and other relevant national partners in Barbados, Bhutan, China, Fiji, Kenya, Jordan and Uzbekistan, with varying foci. The project in China, for example, will focus on strengthening early warning and response systems to extreme heat in urban settings.

### 7.9.4 Melting Glaciers

A new study reveals that Greenland ice loss is happening faster than anticipated and spreading along the northwest coast, with acceleration likely since late 2005. The research is based on results from a combination of satellite [Gravity Recovery and Climate Experiment (GRACE)] and by GPS measurements. They estimate the mass loss equivalent to be about 0.02 inch of global sea-level rise per year.

The Arctic melt might cost from \$2.4 trillion to \$24 trillion by 2050, due to rising sea levels, floods, and heat waves, according to the report “Arctic Treasure, Global Assets Melting Away” by the Pew Environment Group. It is estimated that the loss of Arctic sea ice and snow cover has already cost the world about \$61 billion to \$371 billion annually.

### 7.9.5 Rising Sea Level

A tiny island in the Bay of Bengal, known as New Moore Island to the Indians and South Talpatti Island to the Bangladeshis, claimed for years by both countries, has disappeared beneath the rising sea, says the Indian School of Oceanographic Studies in Calcutta. Studies reveal that sea levels in this part of the Bay of Bengal have risen much faster over the past decade than in the previous 15 years. Therefore, it is likely that other islands in the Sundarbans delta region will be covered by the sea, forcing large numbers of people to move.

### 7.9.6 Adaptation

The number of people around the world needing humanitarian assistance due to natural catastrophes triggered by climate change might increase from 250 million today to more than 375 million, by 2015. Therefore, the British Government announced that it would recommend a doubling of the UN relief funds budget from the current \$500 million to \$1 billion, along with a reconsideration of the entire system.

The UNDP released a report titled “Screening Tools and Guidelines to Support the Mainstreaming of Climate Change Adaptation into Development Assistance – A Stocktaking Report” which summarizes existing tools and good practices from a range of organizations to guide development practitioners in their climate change mainstreaming efforts. The report provides a comparative overview of existing tools and guidelines, explores the components and entry points of the mainstreaming process, and presents definitions of key climate change adaptation and mainstreaming concepts.

The International Food Policy Research Institute (IFPRI) launched a new project, Global Futures for Agriculture, which will evaluate promising technologies, investments, and policy reforms to improve agricultural productivity and environmental sustainability in developing countries. The project will improve IFPRI’s International Model for Policy Analysis of Agricultural Commodities and Trade, focusing on regions most vulnerable to global changes over the next 30 to 50 years, with special attention on the rural poor and smallholder farmers.



### 7.9.7 Post-Copenhagen Negotiations

On March 9, 2010, China and India formally announced at the UN Framework Convention on Climate Change that they agree to be listed as parties to the Copenhagen accord. India specifically stipulates that the accord is not legally binding, but serves as a negotiating framework for a post-Kyoto treaty. There is increased agreement that it is unlikely that a treaty will be signed at the Mexico meeting in 2010, but rather hopes for it to happen at the December 2011 meeting to be held in South Africa.

#### **Military Implications:**

[Same as previous on this issue] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change is increasing the development of international policies and strategies to mitigate and adapt to climate change.

**Sources:** (see a more expanded list in the [Appendix](#))

Current GISS Global Surface Temperature Analysis

[http://data.giss.nasa.gov/gistemp/paper/gistemp2010\\_draft0319.pdf](http://data.giss.nasa.gov/gistemp/paper/gistemp2010_draft0319.pdf)

Global cooling is bunk, draft NASA study finds

<http://www.dailyclimate.org/tdc-newsroom/2010/03/global-cooling-is-bunk-draft-nasa-study-finds>

Australia '0.7 degrees warmer over past 50 years'

<http://www.google.com/hostednews/afp/article/ALeqM5gSMhzJlxY-feCKAbLpnD0sZy3G1Q>

Droughts bring severe damage to some Asian countries

[http://www.nst.com.my/Current\\_News/NST/articles/20100327120018/Article/index.html](http://www.nst.com.my/Current_News/NST/articles/20100327120018/Article/index.html)

CO2 at new highs despite economic slowdown

<http://www.reuters.com/article/idUSTRE62E2KJ20100315>

The Environment Outlook for the Arab Region

<http://www.unep.org/dewa/westasias/eoar/>

Lebanon's liquid treasure is just trickling away

<http://www.france24.com/en/20100321-lebanons-liquid-treasure-just-trickling-away>

An Overview of the Food Security Situation in Eastern Africa:

[http://uneca.org/eca\\_programmes/srdc/ea/meetings/srdc2010/Food%20Security%20OVERVIEW.pdf](http://uneca.org/eca_programmes/srdc/ea/meetings/srdc2010/Food%20Security%20OVERVIEW.pdf)

WHO and UNDP launch new project for Health adaptation to climate change

[http://www.who.int/globalchange/news/climate\\_change\\_adaptation/en/index.html](http://www.who.int/globalchange/news/climate_change_adaptation/en/index.html)

Spread of ice mass loss into northwest Greenland observed by GRACE and GPS

<http://www.agu.org/pubs/crossref/2010/2010GL042460.shtml>

Arctic Melt To Cost Up To \$24 Trillion By 2050: Report

<http://planetark.org/enviro-news/item/56999>

Disputed Bay of Bengal island 'vanishes' say scientists

<http://news.bbc.co.uk/2/hi/business/8584665.stm>

UN faces problems coping with natural disasters, minister warns

<http://www.guardian.co.uk/world/2010/mar/28/un-disasters-policy>

Global Futures. New project to identify best approaches to improve agriculture in developing countries

[http://www.ifpri.org/pressrelease/global-futures?utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A+Ifpriupdate+%28IFPRI+Website+Update%29](http://www.ifpri.org/pressrelease/global-futures?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+Ifpriupdate+%28IFPRI+Website+Update%29)

India and China to be Listed in Chapeau of Copenhagen Accord

<http://climate-l.org/2010/03/10/india-and-china-to-be-listed-in-chapeau-of-copenhagen-accord/>



## 7.10 Nanotechnology Safety Issues

More detailed descriptions of the following nanotechnology issues are in the [Appendix](#)

- Review of US National Nanotechnology Initiative ([more](#))
- Comments Solicited on Proposed UN Strategic Approach to International Chemicals Management (SAICM) ([more](#))
- UK government has published *Nanotechnologies Strategy: Small Technologies, Great Opportunities*, a comprehensive overview of all aspects related to regulations, standardization, policies, and strategies for advancement of nanotechnology in a safe and economically sound way ([more](#))
- Guide for Unbound Nanoparticles in Occupational Settings Made Available ([more](#))
- *Governing Uncertainty: Environmental Regulation in the Age of Nanotechnology* ([more](#))
- *What Is Nanotechnology and Why Does It Matter?: From Science to Ethics*, published by Wiley-Blackwell and resulting from a collaboration between ethicists and nanotechnology scientists ([more](#))
- Final version of the FramingNano Governance Platform ([more](#))
- First ENPRA (Engineered NanoParticle Risk Assessment) Newsletter is now available ([more](#))
- *Nano Meets Macro: Social Perspectives on Nanoscience and Nanotechnology* explores the diversity in social perspectives on the emergence of nanotechnologies ([more](#))
- Study shows nano damage differs by medium, target kingdom ([more](#))
- New technique allows study of nanoparticles in embryos ([more](#))
- Paper discusses the idea that the safety aspects of nano products can be ensured by proper design ([more](#))
- Safer Nanomaterials and Nanomanufacturing Initiative's 5<sup>th</sup> annual conference, GN10: Reducing principles to practice will be held June 16-18, 2010 in Portland, Oregon ([more](#))
- "Nanotechnology for Sustainable Energy" conference to be held July 4-9, 2010, at Universitätszentrum Obergurgl, Austria ([more](#))
- 2010 NanoAgri and NanoAqua Conferences will be held in Cairo April 11-12, 2010 ([more](#))

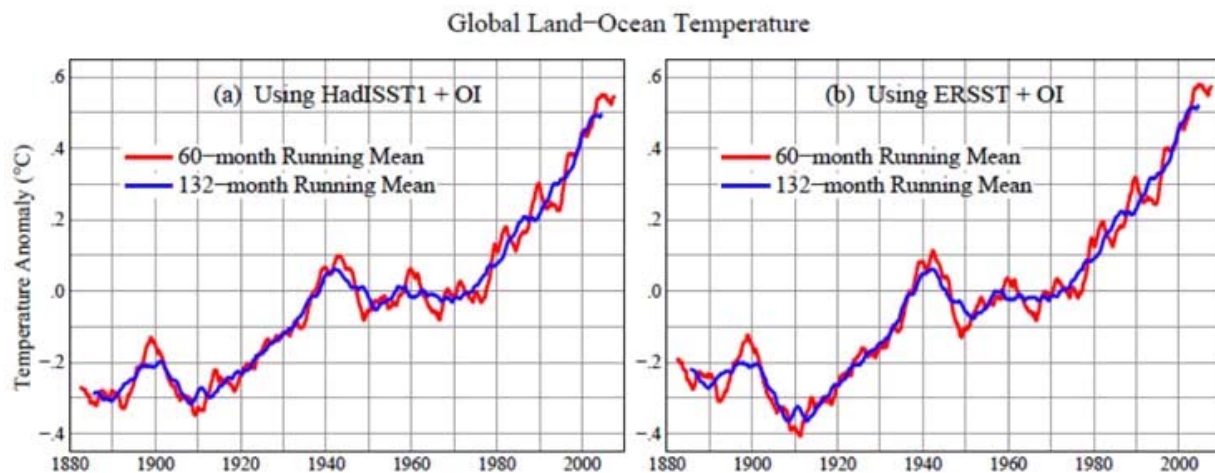
## APPENDIX

### Reference Details

This Appendix contains expanded background information on some items.

## 7.9 Climate Change

### 7.9.1 Scientific Evidence and Natural Disasters



60-month and 132-month running means through February 2010 for two alternative choices for the ocean data set

Source: Current GISS Global Surface Temperature Analysis. J. Hansen, R. Ruedy, M. Sato, and K. Lo, NASA Goddard Institute for Space

Studies [http://data.giss.nasa.gov/gistemp/paper/gistemp2010\\_draft0319.pdf](http://data.giss.nasa.gov/gistemp/paper/gistemp2010_draft0319.pdf)

### Sources: (more expanded list)

#### 7.9.1 Scientific Evidence and Natural Disasters

Current GISS Global Surface Temperature Analysis

[http://data.giss.nasa.gov/gistemp/paper/gistemp2010\\_draft0319.pdf](http://data.giss.nasa.gov/gistemp/paper/gistemp2010_draft0319.pdf)

Global cooling is bunk, draft NASA study finds

<http://www.dailyclimate.org/tdc-newsroom/2010/03/global-cooling-is-bunk-draft-nasa-study-finds>

Australia '0.7 degrees warmer over past 50 years'

<http://www.google.com/hostednews/afp/article/ALeqM5gSMhzJlxY-feCKAbLpnD0sZy3G1Q>

Oz has hottest-ever summer

[http://www.iol.co.za/index.php?set\\_id=1&click\\_id=143&art\\_id=nw20100301095130980C303860](http://www.iol.co.za/index.php?set_id=1&click_id=143&art_id=nw20100301095130980C303860)

Droughts bring severe damage to some Asian countries

[http://www.nst.com.my/Current\\_News/NST/articles/20100327120018/Article/index\\_html](http://www.nst.com.my/Current_News/NST/articles/20100327120018/Article/index_html)

CO2 at new highs despite economic slowdown

<http://www.reuters.com/article/idUSTRE62E2KJ20100315>

#### 7.9.2 Food and Water Security

Climate change could spark crises 'in Arab world'

[http://www.gulf-times.com/site/topics/article.asp?cu\\_no=2&item\\_no=347316&version=1&template\\_id=36&parent\\_id=16](http://www.gulf-times.com/site/topics/article.asp?cu_no=2&item_no=347316&version=1&template_id=36&parent_id=16)

The Environment Outlook for the Arab Region

<http://www.unep.org/dewa/westasia/eoar/>

Lebanon's liquid treasure is just trickling away

<http://www.france24.com/en/20100321-lebanons-liquid-treasure-just-trickling-away>

An Overview of the Food Security Situation in Eastern Africa:

[http://uneca.org/eca\\_programmes/srdc/ea/meetings/srcm2010/Food%20Security%20OVERVIEW.pdf](http://uneca.org/eca_programmes/srdc/ea/meetings/srcm2010/Food%20Security%20OVERVIEW.pdf)

#### 7.9.3 Health

WHO and UNDP launch new project for Health adaptation to climate change

[http://www.who.int/globalchange/news/climate\\_change\\_adaptation/en/index.html](http://www.who.int/globalchange/news/climate_change_adaptation/en/index.html)

#### 7.9.4 Melting Glaciers

Spread of ice mass loss into northwest Greenland observed by GRACE and GPS

<http://www.agu.org/pubs/crossref/2010/2010GL042460.shtml>

Study: Greenland ice loss accelerating

<http://content.usatoday.com/communities/sciencefair/post/2010/03/study-greenland-ice-loss-accelerating/1>

Arctic Melt To Cost Up To \$24 Trillion By 2050: Report

<http://planetark.org/enviro-news/item/56999>

#### 7.9.5 Rising Sea Level

Disputed Bay of Bengal island 'vanishes' say scientists

<http://news.bbc.co.uk/2/hi/business/8584665.stm>

#### 7.9.6 Adaptation

UN faces problems coping with natural disasters, minister warns

<http://www.guardian.co.uk/world/2010/mar/28/un-disasters-policy>

Aid must double to respond to natural disasters, UN warned

<http://www.independent.co.uk/news/world/politics/aid-must-double-to-respond-to-natural-disasters-un-warned-1929992.html>

Screening Tools and Guidelines to Support the Mainstreaming of Climate Change Adaptation into Development Assistance – A Stocktaking Report

[http://content.undp.org/go/cms-service/download/asset/?asset\\_id=2386947](http://content.undp.org/go/cms-service/download/asset/?asset_id=2386947)

Global Futures. New project to identify best approaches to improve agriculture in developing countries  
[http://www.ifpri.org/pressrelease/global-futures?utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A+Ifpriupdate+%28IFPRI+Website+Update%29](http://www.ifpri.org/pressrelease/global-futures?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+Ifpriupdate+%28IFPRI+Website+Update%29)

#### 7.9.7 Post-Copenhagen Negotiations

India and China to be Listed in Chapeau of Copenhagen Accord

<http://climate-l.org/2010/03/10/india-and-china-to-be-listed-in-chapeau-of-copenhagen-accord/>

China and India join Copenhagen accord

<http://www.guardian.co.uk/environment/2010/mar/09/china-india-copenhagen-accord>

China's letter to the UNFCCC

[http://unfccc.int/files/meetings/application/pdf/china\\_090310.pdf](http://unfccc.int/files/meetings/application/pdf/china_090310.pdf)

India's letter to the UNFCCC

<http://unfccc.int/files/meetings/application/pdf/indiacphaccord.pdf>

### **7.10 Nanotechnology Safety Issues**

More detailed descriptions of the nanotechnology issues

#### 7.10.1 Review of US National Nanotechnology Initiative

The President's Council of Advisors on Science and Technology (PCAST) discussed a review of the US National Nanotechnology Initiative Program Report in a meeting on March 12. The webcast of the meeting is archived

at <http://www.whitehouse.gov/administration/eop/ostp/pcast/meetings> ; the nanotech portion is at 5:30 into the recording.

#### **Military Implications:**

Military personnel concerned with nanotech should consider watching the discussion.

#### **Sources:**

President's Council of Advisors on Science and Technology, March 12, 2010 meeting

<http://www.whitehouse.gov/administration/eop/ostp/pcast>

webcast: <http://www.tvworldwide.com/events/pcast/100312/>

#### 7.10.2 Comments Solicited on Proposed UN Nanotech Safety Report

According to Meridian Nanotechnology and Development News, "The United Nations' (UN) Strategic Approach to International Chemicals Management (SAICM), a policy framework to promote chemical safety around the world, has developed an outline for a report focusing on nanotechnologies and manufactured nanomaterials including, in particular, issues of relevance to developing countries and countries with economies in transition... Comments are invited and may be submitted until May 1, 2010. The final report will be submitted at the first meeting of the Open ended Working Group, in 2011, and at the third session of the International Conference on Chemicals Management."

#### **Military Implications:**

Military personnel concerned with nanotech safety policy should consider commenting on the proposed report.

**Sources:**

Report on Nanotechnologies and Manufactured Nanomaterials

<http://www.merid.org/nanodev/more.php?articleID=2481&search=%2Fnanodev%2Farchive.php%3FdoSearch%3D1%26items%3D20%26q%3DSAICM%26sortField%3DPosted%26submit%3DSearch&scorePrecent=73>

Nanotechnology and manufactured nanomaterials (resolution II/4 E) (report request)

<http://www.saicm.org/index.php?menuid=9&pageid=425&submenuheader=>

**7.10.3 UK Nanotechnologies Strategy: Small Technologies, Great Opportunities report**

The UK government published *Nanotechnologies Strategy: Small Technologies, Great Opportunities*, a comprehensive overview of all aspects related to regulations, standardization, policies, and strategies for advancement of nanotechnology in a safe and economically sound way. According to Meridian Nanotechnology and Development News, "The overall aims of the strategy are as follows: 1. Transparent, integrated, responsible and skilled nanotechnologies industry with good links to, and support from Government; 2. Better understanding of the risks associated with the use of, and exposure to, nanomaterials, and enough people with the right skills to assess them; 3. Better informed policies and regulations relating to nanomaterials and nanotechnologies; and, 4. Well-informed public and stakeholders and a leading position on nanotechnologies for the UK on the world stage."

**Military Implications:**

Relevant military personnel s should review the UK report to assess potential implications of nanotech regulations globally and eventual recommendations for national nanotech development.

**Sources:**

UK Nanotechnologies Strategy: Small Technologies, Great Opportunities

<http://interactive.bis.gov.uk/nano/>

UK Nanotechnologies Strategy; Small Technologies, Great Opportunities

<http://bis.gov.uk/assets/biscore/corporate/docs/n/10-825-nanotechnologies-strategy>

The UK Nanotechnologies Strategy – disappointing (commentary article by Dr. Andrew Maynard of PEN)

<http://2020science.org/2010/03/18/the-uk-nanotechnologies-strategy-disappointing/>

**7.10.4 Guide for Unbound Nanoparticles in Occupational Settings Made Available**

According to Meridian Nanotechnology and Development News, ASTM International offers for purchase its Standard Guide for Handling Unbound Engineered Nanoscale Particles in Occupational Settings, which, in addition to providing handling principles and techniques, describes actions that can be taken to minimize human exposure to the particles.

**Military Implications:**

Military personnel concerned with nanoparticle risks should review this guide. A detailed description of its contents can be found at the cited site.

**Source:**

ASTM E2535 - 07 Standard Guide for Handling Unbound Engineered Nanoscale Particles in Occupational Settings

<http://www.astm.org/Standards/E2535.htm>

Standard Guide for Handling Unbound Engineered Nanoscale Particles in Occupational Settings  
<http://www.merid.org/nanodev/more.php?articleID=2496&search=%2Fnanodev%2Farchive.php%3FdoSearch%3D1%26items%3D20%26q%3DASTM%2Bunbound%26sortField%3DPosted%26submit%3DSearch&scorePrecent=100>

7.10.5 Governing Uncertainty: Environmental Regulation in the Age of Nanotechnology  
*Governing Uncertainty: Environmental Regulation in the Age of Nanotechnology*, according to a review, "makes a significant contribution to the issues it sets out to address, namely how government confronts conditions of acute uncertainty about environmental and health risks, and how, given such uncertainty, government structures its regulatory policy," And, Meridian Nanotechnology and Development News says, "it addresses the dilemma faced by governments wanting to satisfy the desire for scientific innovation while also taking into account the direct and indirect effects of such emerging technologies."

**Military Implications:**

Military personnel concerned with nanoparticle risks should review this book for additional input to their own work.

**Source:**

Environmental Regulation in the Age of Nanotechnology

<http://www.earthscan.co.uk/?tabid=102261>

Environmental Regulation in the Age of Nanotechnology

<http://www.rffpress-earthscan-usa.com/Books/BookDetail.aspx?productID=236827>

Governing Uncertainty: Environmental Regulation in the Age of Nanotechnology

<http://www.merid.org/nanodev/more.php?articleID=2508&search=%2Fnanodev%2Farchive.php%3FdoSearch%3D1%26items%3D20%26q%3Duncertainty%26sortField%3DPosted%26submit%3DSearch&scorePrecent=100>

7.10.6 New Book on Nanotechnology and Ethics

Nanoethics Group announced the release of a new book, *What Is Nanotechnology and Why Does It Matter?: From Science to Ethics*, published by Wiley-Blackwell and resulting from a collaboration between ethicists and nanotechnology scientists. The book comprises three units. Unit 1 — What is Nanotechnology; Unit 2 — Risk, Regulation, and Fairness— risk, precaution, regulation, equity, and access. Unit 3 —Ethical and Social Implications— urgent issues: environment, military, privacy, medicine, and enhancement.

**Military Implications:**

Relevant military personnel should consider the book for additional inputs on potential nanotech-related ethical aspects that could have implications for nanotech use by the military.

**Source:**

Collaboration between ethicists and nanotechnology scientists reveals unique synergies and insights

[http://www.nanowerk.com/news/newsid=15191.php?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+nanowerk%2FagWB+%28Nanowerk+Nanotechnology+News%29](http://www.nanowerk.com/news/newsid=15191.php?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+nanowerk%2FagWB+%28Nanowerk+Nanotechnology+News%29)

#### 7.10.7 Final FramingNano Governance Platform Now Available

The final version of the FramingNano Governance Platform [See *European FramingNano Governance Platform Draft Now Available* in the January 2010 issue of these reports] is now available. According to Nanowerk News, it, "describes a heuristic process of how current and future challenges in nanotechnology governance can be identified, assessed and decided on, and proposes a number of structural elements to achieve this", among them, " governance and regulation of nanotechnologies must be considered a dynamic affair which needs to be continuously adapted", and, "the relevant stakeholders and the interested public have to be meaningfully included in the definition of commonly accepted principles, criteria and values to be used for the assessment of these changes."

#### **Military Implications:**

[Same as previous on this issue] Given the close collaboration between EU and U.S. nanotech experts and the high level of the Governance Platform, it is likely that it will set the stage for an international regulatory framework for responsible nanotech development. Military personnel concerned with nanotech regulation policy should review this [possibly revised] document for potential guidelines and collaboration.

#### **Sources:**

FramingNano report on current and future challenges in nanotechnology governance  
[http://www.nanowerk.com/news/newsid=14269.php?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+nanowerk%2FagWB+%28Nanowerk+Nanotechnology+News%29](http://www.nanowerk.com/news/newsid=14269.php?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+nanowerk%2FagWB+%28Nanowerk+Nanotechnology+News%29)

FramingNano Project: A multistakeholder dialogue platform framing the responsible development of Nanosciences & Nanotechnologies  
[http://www.innovationsgesellschaft.ch/media/archive2/publikationen/FramingNano\\_Complete\\_Final\\_Report.pdf](http://www.innovationsgesellschaft.ch/media/archive2/publikationen/FramingNano_Complete_Final_Report.pdf)

#### 7.10.8 ENPRA (Engineered NanoParticle Risk Assessment) Newsletter Available

The first ENPRA Newsletter is now available. ENPRA (Engineered NanoParticle Risk Assessment) is a major new EU FP7 project to develop and implement a novel integrated approach for engineered nanoparticle risk assessment. According to the Newsletter, the approach, "uses in vitro, in vivo and in silico models to assess the hazard of ENP and then combines the results with an assessment of workplace and consumer exposure of these materials for a rigorous final assessment of the potential health risk."

#### **Military Implications:**

Military personnel concerned with nanotech risk assessment should plan to review the issues of this newsletter to keep apprised of the project's progress.

#### **Sources:**

European project for Engineered NanoParticle Risk Assessment publishes first newsletter  
[http://www.nanowerk.com/news/newsid=15139.php?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+nanowerk%2FagWB+%28Nanowerk+Nanotechnology+News%29](http://www.nanowerk.com/news/newsid=15139.php?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+nanowerk%2FagWB+%28Nanowerk+Nanotechnology+News%29)

ENPRA Newsletter

<http://www.enpra.eu/LinkClick.aspx?fileticket=x1ipU9U4IPI%3d&tabid=78&mid=435>



#### 7.10.9 "Nano Meets Macro: Social Perspectives on Nanoscience and Nanotechnology"

According to the announcement, "This book explores the enormous diversity in social perspectives on the emergence of nanotechnologies. The diversity is structured by applying five broad categories: Philosophy, governance, science, representations and arts."

##### **Military Implications:**

The book should be especially valuable to military personnel concerned with communicating to the public the current state of nanotechnology and related issues, such as risk.

##### **Source:**

Nano Meets Macro: Social Perspectives on Nanoscience and Nanotechnology  
[http://www.researchandmarkets.com/product/8aa2c4/nano\\_meets\\_macro\\_social\\_per](http://www.researchandmarkets.com/product/8aa2c4/nano_meets_macro_social_per)

#### 7.10.10 Study Shows Nano Damage Differs by Medium, Target Kingdom

Research by Prof. Pu-Chun Ke of Clemson Univ. indicates that the biological damage from carbon nanoparticles varies both with the state of the particles (pristine vs. well-functionalized fullerene) and whether the target cells are plant or mammalian, reports a story in nanowerk.com.

##### **Military Implications:**

This paper adds to the growing picture of the complexity of the nanomaterial vs. biosphere interaction, a complexity that those concerned with nanotech risk assessment must constantly keep in mind in evaluating research results.

##### **Source:**

Nanotoxicology - mammalian and plant cells respond differently to fullerenes  
<http://www.nanowerk.com/spotlight/spotid=15231.php>

#### 7.10.11 New Technique Allows Study of Nanoparticles in Embryos

Prof. David Cramb of the Univ. of Calgary Chemistry Dept. and colleagues report development of a methodology to measure various aspects of nanoparticles in the blood stream of chicken embryos. This will allow measurement and understanding of nanoparticle uptake into embryonic tissues, to aid in bioaccumulation studies involving embryos.

##### **Military Implications:**

The military should follow these studies, to take advantage of their results in nanotech risk assessment.

##### **Sources:**

Vigilance needed in nanotechnology

<http://www.physorg.com/news186839917.html>

Measuring properties of nanoparticles in embryonic blood vessels: Towards a physicochemical basis for nanotoxicity

[http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6TFN-4YCG05D-1&\\_user=10&\\_coverDate=02%2F12%2F2010&\\_alid=1233416266&\\_rdoc=1&\\_fmt=high&\\_orig=search&\\_cdi=5231&\\_sort=r&\\_docanchor=&\\_view=c&\\_ct=4&\\_acct=C000050221&\\_version=1&\\_urlVersion=0&\\_userid=10&md5=885fe697f75d566b4bc79ca84701d2ef](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6TFN-4YCG05D-1&_user=10&_coverDate=02%2F12%2F2010&_alid=1233416266&_rdoc=1&_fmt=high&_orig=search&_cdi=5231&_sort=r&_docanchor=&_view=c&_ct=4&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=885fe697f75d566b4bc79ca84701d2ef)

#### 7.10.12 Paper Examines "Nanotechnology: Safe By Design?" (REPORT)

As summarized by Meridian Nanotechnology and Development News, this paper discusses the idea that the safety aspects of nano products can be ensured by proper design, pointing out the difficulties of identifying the specific physical and chemical properties that produce the distinct sets of beneficial or adverse effects, and manipulating those properties to produce the final product objective.

##### **Military Implications:**

Relevant military should review this paper for additional input in its own development and risk assessment work.

##### **Source:**

Examining the Holy Grail of Nanotechnology: Safe By Design

<http://www.azonano.com/details.asp?ArticleId=2508>

#### 7.10.13 "Greener Nanotechnology" Conference to be Held in June

The Safer Nanomaterials and Nanomanufacturing Initiative's 5th annual conference, GN10: Reducing principles to practice will be held June 16-18, 2010 in Portland, Oregon. According to the Conference announcement, it "will feature the latest developments in the design and production of greener nanomaterials, discuss and debate how to move the technology forward while developing environmentally sound products and processes, and focus on a few critical developments that will determine whether the U.S. will be a leader or a follower in this critical field."

##### **Military Implications:**

Military personnel concerned with nanotech development and EHS should consider attending this conference.

##### **Source:**

5<sup>th</sup> Annual Greener Nanoscience Conference & Program Review. Reducing principles to practice

<http://oregonstate.edu/conferences/greenernano/>

#### 7.10.14 Conference on Nanotech and Sustainable Energy to Be Held

There will be a "Nanotechnology for Sustainable Energy" conference, July 4-9, 2010, at the Universitätszentrum Obergurgl, Austria. The conference announcement states, "Topical areas covered by this conference are those where Nanoscience and Nanotechnology (N&N) will, or may, have an impact on the development of a sustainable energy system, including environmental aspects. The conference includes both basic science of relevance for energy/environmental technology and more application oriented research. The objective is to gather experts in the respective fields at one conference, with the aim to make both an inventory and exposure of the state-of-the-art N&N based energy research, technologies and opportunities."

##### **Military Implications:**

Military personnel in the European Theater concerned with nanotech should consider attending this conference to learn of the newest developments in nanotech and the environment, both preventive and remedial.

**Source:**

Nanotechnology for Sustainable Energy conference

<http://www.esf.org/index.php?id=6489>

7.10.15 Nanotech Agriculture and Water Conferences to Be Held In Cairo

The 2010 NanoAgri and NanoAqua Conferences will be held in Cairo April 11-12, 2010 to review current developments in applications of nanotechnology to agriculture and water management. They will both feature discussions on environmental health and safety issues.

**Military Implications:**

Military personnel in the area and concerned with nanotech EHS questions should consider attending this joint event.

**Source:**

NanoAgri 2010 Conference

<http://www.merid.org/nanodev/more.php?articleID=2453&search=%2Fnanodev%2Farchive.php%3FdoSearch%3D1%26items%3D20%26q%3Dcairo%2BNanoAgri%26sortField%3DPosted%26submit%3DSearch&scorePrecent=100>