

**GLOBAL SPENDING ON NUCLEAR DISARMAMENT
VERIFICATION WORK TOM MILNE**

verification**matters**

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Foreword and acknowledgements

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Although I believe that the picture presented in this report is a fair reflection of the overall situation, it is inevitable that some of the data may be incomplete, inaccurate or unbalanced. I would be glad to receive comments, through VERTIC, from practitioners in the field and interested readers, with a view to a possible revision and updating of the report.

Acronyms

Atomic Weapons Establishment (UK)	AWE
Federal Institute for Geosciences Natural Resources (Germany)	BGR
Brookhaven National Laboratory	BNL
Chemical and Biological Weapons	CBW
Commissariat à L'Énergie Atomique	CEA
Comprehensive Nuclear Test Ban Treaty (1996)	CTBT
Comprehensive Nuclear Test Ban Treaty Organization	CTBTO
Cooperative Threat Reduction	CTR
Defense Advanced Research Projects Agency (US)	DARPA
Department of Defense (US)	DOD
Department of Energy (US)	DOE
European Atomic Energy Community	Euratom
Fiscal Year	FY
Highly-Enriched Uranium	HEU
International Atomic Energy Agency	IAEA
International Data Centre	IDC
International Monitoring System (under the CTBT)	IMS

Initiatives for Proliferation Prevention	IPP
Los Alamos National Laboratory	LANL
Low-Enriched Uranium	LEU
Lawrence Livermore National Laboratory	LLNL
Mixed Oxide	MOX
Material Protection, Control and Accounting	MPC&A
Member State Support Programme (IAEA)	MSSP
National Data Centre	NDC
Nuclear Explosion Monitoring Research and Engineering Programme	NEM
Non-Governmental Organisation	NGO
National Nuclear Security Administration (US)	NNSA
Nonproliferation and Arms Control	NPAC
Non-Proliferation and Arms Control Technology Working Group	NPAC TWG
Nuclear Non-Proliferation Treaty (1968)	NPT
National Technical Means	NTM
Provisional Technical Secretariat (of the CTBTO)	PTS
Russian American Nuclear Security Advisory Council	RANSAC
Research and Development	R&D
Research, Development, Testing and Evaluation	RDT&E
Strategic Arms Reduction Treaty	START
Weapons of Mass Destruction	WMD

Introduction

It is sometimes argued that advances in the technologies and techniques that are vital for implementing and verifying nuclear arms reductions would facilitate the political decisions necessary to achieve deep cuts in nuclear weapons and, ultimately, the creation of a nuclear weapon-free world.¹ To assess the scope for such advances being made in the near future, it is useful to survey current worldwide patterns of expenditure on verification and related research and development (R&D). The scale, geographical location, organisation and technical objectives of existing work will help suggest where opportunities lie for reform or expansion of efforts worldwide.

Even allowing a broad definition of relevant work—say, ‘verification and other aspects of nuclear arms control, nonproliferation and disarmament’—there is ambiguity over whether certain areas of research, or particular government or institutional programmes, should count as verification and arms control expenditure or be considered part of a more general ‘national security’ budget. Indeed, even in cases where expenditure on monitoring technologies can be tied directly to a requirement to monitor compliance with an arms control treaty, it may be that some countries would want to obtain the same kind of information for national security purposes regardless of the specific treaty context. Clearly, there is no simple means of classifying such R&D, since it has applicability to arms control and to broader national security interests. This caveat does not, however, obscure the scale of the resources spent on scientific and technical work bearing on nuclear arms control and disarmament or the main thrusts of this work.

A cursory look at the field shows that the greater part by far of the global total of such scientific and technical work—probably more than 90 percent—is performed in the US. The work is funded from a variety of sources and spread among a great many establishments, with the largest programmes located at the national nuclear weapon laboratories. The first part of this paper looks at the main components and objectives of US-based work.

Russia, China, France and the UK, the other nuclear weapon states recognised as such by the 1968 Nuclear Non-Proliferation Treaty (NPT), also support at least some relevant work, as do a number of other countries either in connection with civil nuclear power programmes or as part of their involvement in multilateral arms control. This worldwide body of work is described in the second part of this report. Because negotiating and verifying nuclear disarmament is likely to be an international enterprise, more detail is given about some of the non-US-based work than is warranted by the size and objectives of the actual activity.

The overall picture is one of very uneven patterns of expenditure, especially as between the US and the rest of the world. This raises the question how a country might decide on judicious levels of investment in this field—a complex issue briefly discussed in the final section of this study.