

Overview of nuclear data efforts for homeland security: Funding and staffing

Dennis P. McNabb

David A. Brown

Substantial growth in the visibility and funding for nuclear data for homeland security related programs



- Conferences

 - Homeland security sessions are becoming common at major conferences

- Journal publications is trending upward

 - NIM, Sensors IEEE, Nuclear Physics A, J. Appl. Phys.

- Funding has increased and may begin leveling off

 - Transformational R&D efforts at DHS are funded at \$57 M

 - DOE/NA-22 has been flat for a while

 - ASC program is planning to shift funds into this area

- My vision of the future here is integrated simulations of detection systems

Nuclear engineering, accelerator, and nuclear physics conferences are typically including homeland security



- The examples are numerous

- CAARI 2006

- APS/DNP 2006

- SORMA 2006

- Topical areas related to nuclear physics

- Improved accelerator technologies (gammas and neutrons)

- Better detectors

- Detection techniques

- Architecture approaches

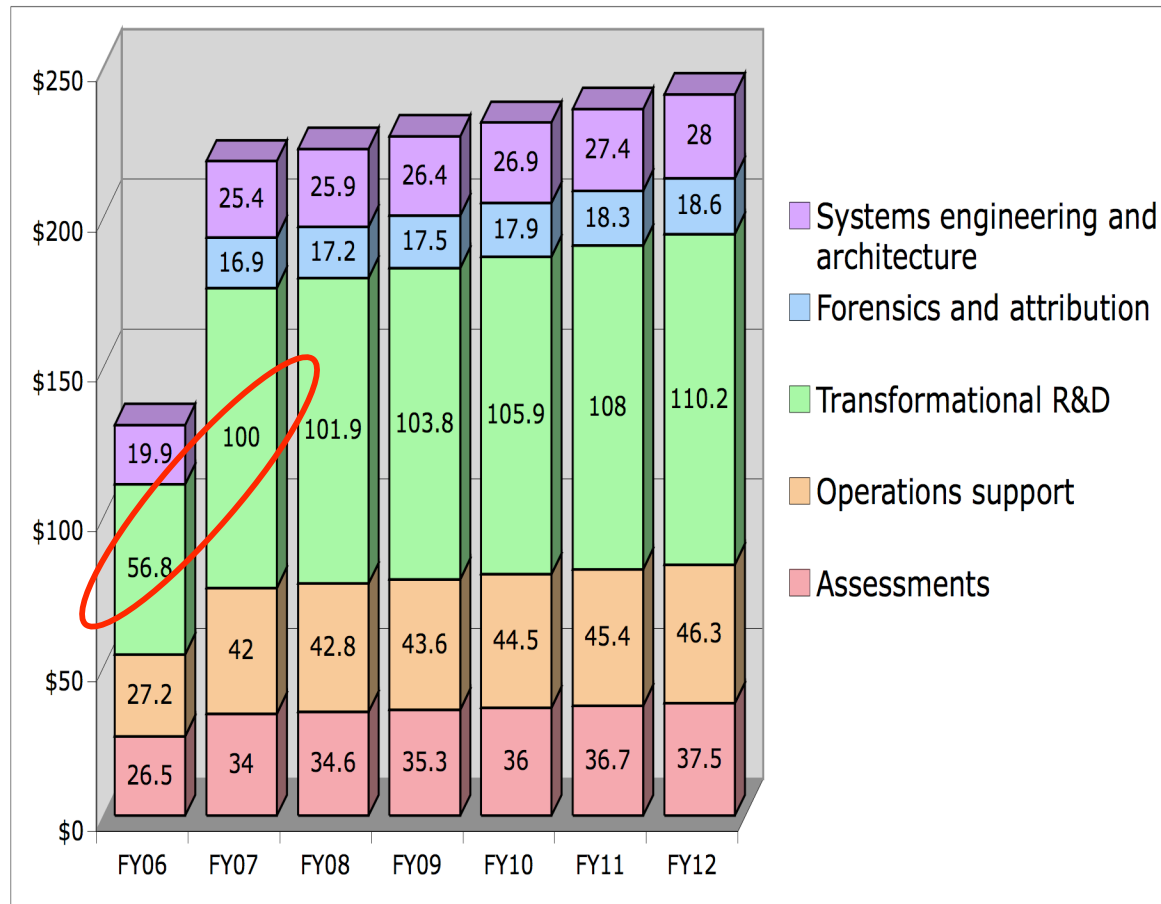
- Related science

Numerous publications on detection techniques feature nuclear physics and simulations techniques



- Hundreds to thousands of hits depending on search parameters
- My non-scientific analysis of main topics re nuclear data and simulations
 - Delayed γ and n from fission after pulsed interrogation w/ n and γ
 - Delayed γ and n from scattering and capture after pulsed interrogation w/ n
 - Prompt γ from nuclear resonance fluorescence
- The most widely-cited product in this area from USNDP:
 - Nuclear Wallet Cards

Funding has taken off and looks to stabilize



DHS Domestic Nuclear
Detection Office
2006 funding plans

Actual FY07: \$75M

Near-term growth more likely to commercialize recent R&D projects rather than expand basic research

LLNL is planning on increasing nuclear science staff to support growing homeland security arena



- Some growth will be offset by reductions in other areas and other realities
- 30% growth already seen at LLNL in the 2 years since this projection

	International Programs	Triage and Emergency Response	NA-22	DHS	DHS	Total
Estimated 2005 workforce	5	6	8	21		47
Permanent Staff						
Experimental Nuclear Physics	1	4	3	13		21
Theoretical Nuclear Physics	0	2	0	4		6
Nuclear Chemistry	3		0		7	10
Temporary Staff						
Experimental Nuclear Physics	0		1			1
Theoretical Nuclear Physics	0		0	1		1
Nuclear Chemistry	1		0			1
Post-Docs						
Experimental Nuclear Physics	0		4	3		7
Theoretical Nuclear Physics	0		0			0
Nuclear Chemistry	0		0			0
Estimated workforce needs for next 5 years:	6	8	22	40		83
Permanent Staff						
Experimental Nuclear Physics	1	6	8	20		35
Theoretical Nuclear Physics	0	2	0	6		8
Nuclear Chemistry	2		0		5	7
Temporary Staff						
Experimental Nuclear Physics	1		4			5
Theoretical Nuclear Physics	0		0			0
Nuclear Chemistry	1		0			1
Post-Docs						
Experimental Nuclear Physics	0		10	10		20
Theoretical Nuclear Physics	0		0	4		4
Nuclear Chemistry	1		0		2	3

In the long term, our guess is that homeland security efforts mature in some similar ways to reactors



- Simulation codes which can optimize detection systems will be very useful for engineering and developing new products
This will drive the development of new simulation capability and probably new codes
- Unclear how long it takes for this industry to mature
- Unclear whether or not there will be an enduring need for simulation capability like with reactors, e.g. balancing fuel rods
- Seems clear to me that CSEWG has defined itself in the past as supporting these simulation communities in the past and will do so in the future