

**DEFENSE THREAT REDUCTION AGENCY**



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# *Nuclear Detection and Attribution*

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# *Agenda: Two DTRA Programs*

- Unconventional Nuclear Warfare Defense (UNWD)
  - detection and defense against unconventional nuclear threats
- Domestic Nuclear Event Attribution (DNEA)
  - post-detonation technical nuclear forensics



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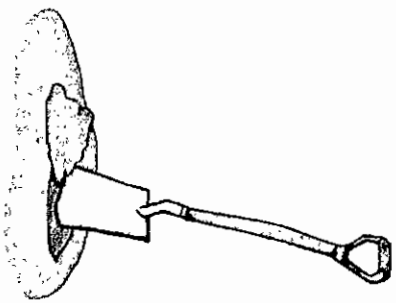
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***Domestic Nuclear Event Attribution  
(DNEA)***

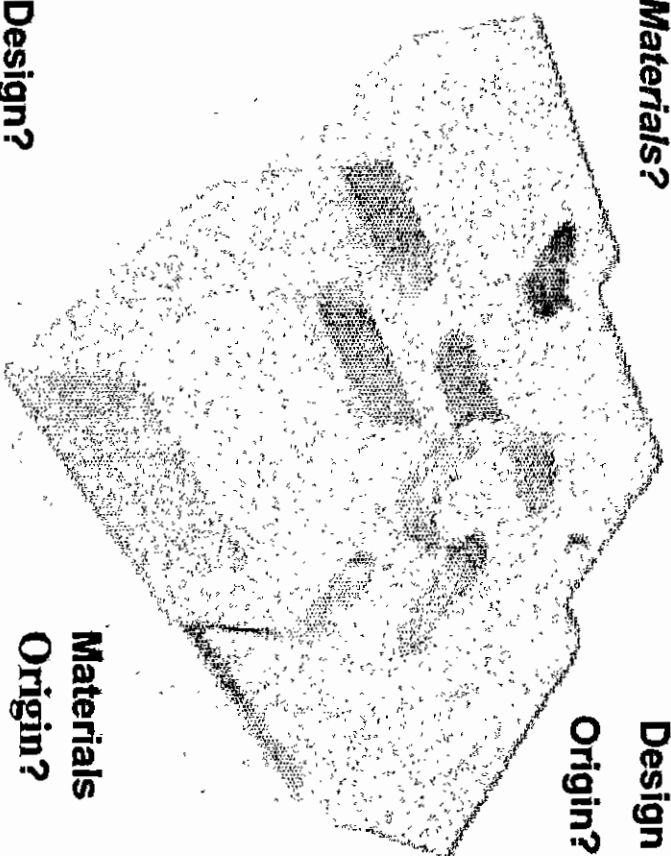
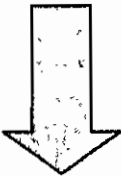


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**Attribution questions  
for a nuclear or radiological attack:**



**Starting with  
Post-Det "dirt"**



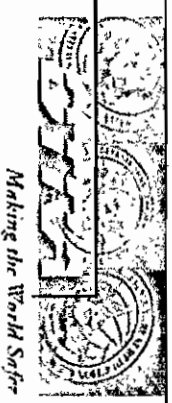
**Materials?**

**Design  
Origin?**

**Design?**

**Materials  
Origin?**

**Technical nuclear forensic answers as part of national  
attribution effort including intelligence & law enforcement.**



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# ***DNEA Overview & Background - - Timeline***

- Pre - 2000: National labs' radiochemistry and nuclear forensics capabilities focused on nuclear testing and treaty monitoring
- 2000: DTRA initiated DNEA – to integrate agency capabilities; to improve, exercise, and 'operationalize' technical forensic capabilities
- 2001: Defense Science Board Task Force report released
- Sept 11, 2001: Attacks focused attention on domestic event
- Sept 2002: NSPD – need 'accurate and rapid attribution'
- DNEA has achieved an integrated operational attribution capability





DNE



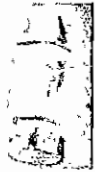
Report



Collect Samples



( $\alpha$ )



Periodic Table of Elements

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
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( $\gamma$ )

*An integrated operational capability*

Intel.

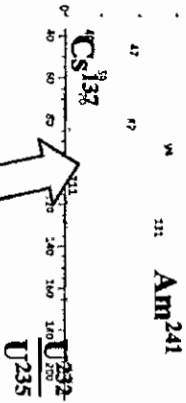
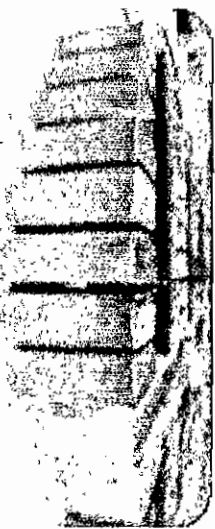
tech.

law enf.

Fuse Data

Assay -- Characterize Debris

Evaluation, Interpretation



$$R^{137\text{m}} = \left[ 1 + \cos p (2c^2 + E - v)^2 \cos p \right]^{1/2} x$$

$$\left[ \frac{v + 2\cos p (2c^2 + E - v)^4 \cos p + \cos p (v - 2c^2)(2c^2 + E - v)^4 \cos p}{x} \right]$$



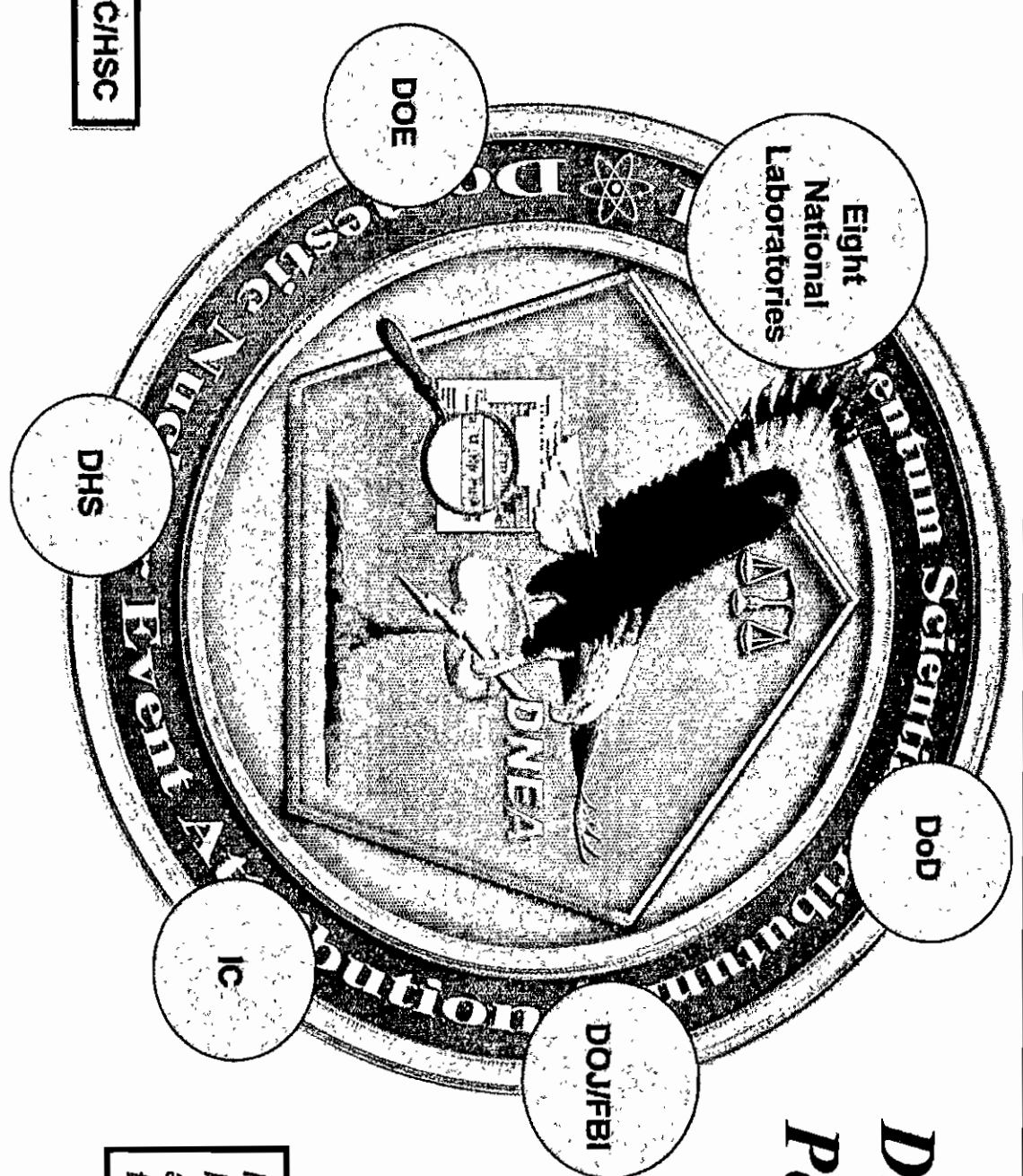
# ***DNEA Accomplishments***

- Provided fast and accurate technical conclusions through debris collection, analysis, data evaluation and modeling
- Developed and exercised robot technologies to collect debris samples in high radiation fields
- Developed and exercised a set of integrated technical attribution activities in an end-to-end operational process that focused on speed and accuracy
- Invested in enhancements to national laboratories that streamlined debris analysis processes and met law enforcement evidentiary requirements
- Coordinated with multiple U.S. government agencies to facilitate data exchange
- Implemented an exercise and evaluation program to ensure quality in laboratory results and maintain operational readiness
- Trained a team of qualified scientists



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**DTRA is managing DNEA with support from a wide range of federal organizations**



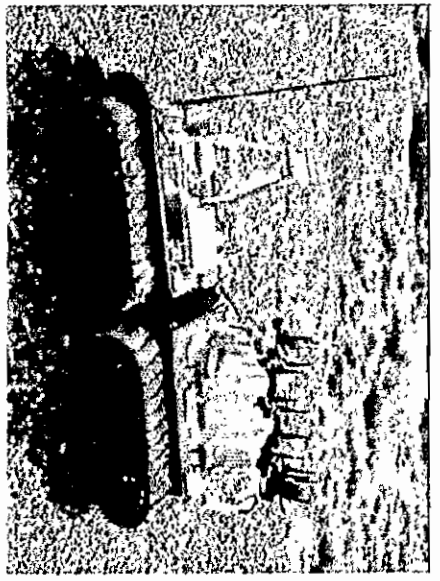
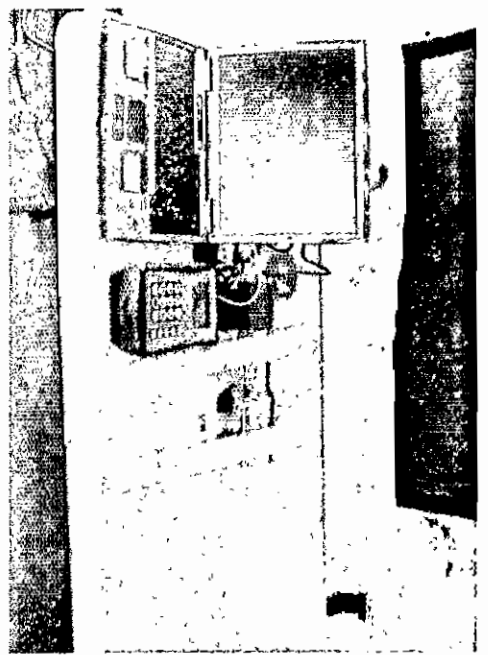
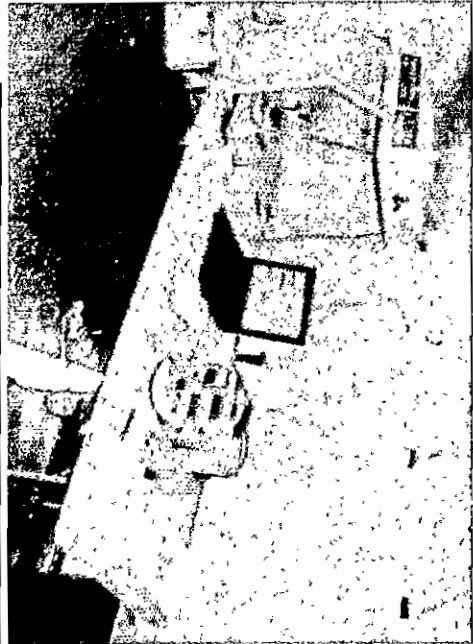
# **DNEA Participants**

**It is critical to maintain high-level coordination and an integrated, singular focus.**





# Questions?



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# DNEA Process Diagram



Notification

Deploy

Sample  
Collection

Activate

Lab  
Analysis

Samples

Additional  
Diagnostics

Data  
Evaluation

Data  
Transfer

IC

LE

All-Source  
Information  
Fusion

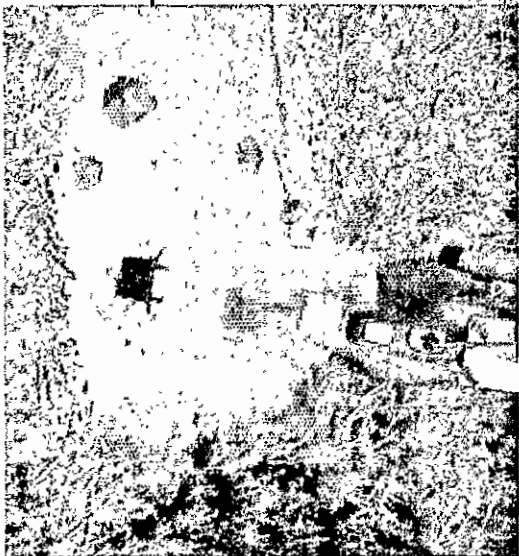
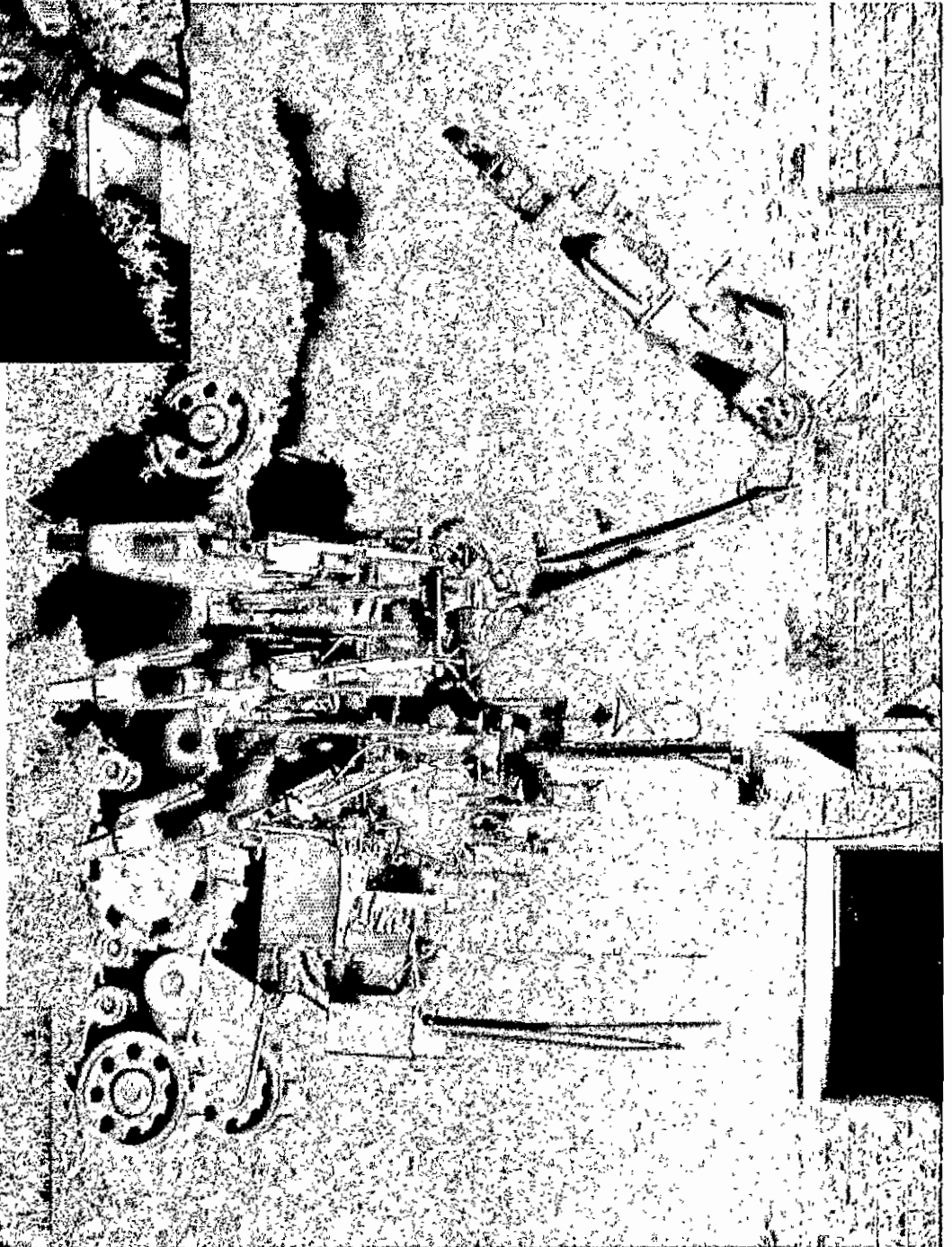
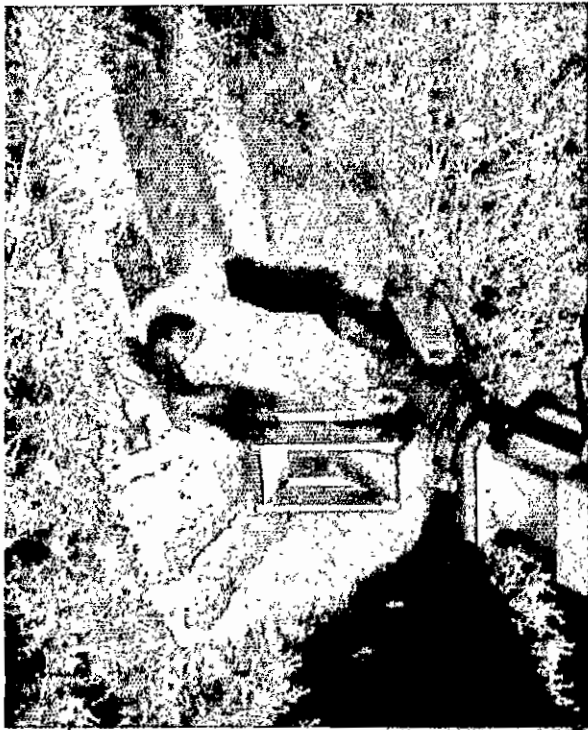
Technical  
Contributions

Attribution

National Security  
Actions and/or  
Prosecution



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*Deployable Field Lab –  
for on-scene initial radiochemistry analysis*



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