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# Sensors, Search & Seizure

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## The threat and promise of technology:

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“The gravest danger our Nation faces lies at the crossroads of radicalism and technology...We are menaced less by fleets and armies than by catastrophic technologies in the hands of the embittered few.” -- The National Security Strategy of the United States of America Sept 2002

“In the war on terrorism, America’s vast science and technology base provides a key advantage...the United States will press this advantage through a national research and development enterprise for homeland security similar in emphasis and focus to that which has supported the national security community for more than fifty years.”

Chertoff said the department would look to use technology to detect explosives and biological, chemical or radioactive material on rail, subway and bus systems.

“In the application of a Constitution, our contemplation cannot be only of what has been, but of what may be. The progress of science in furnishing the government with means of espionage is not likely to stop with wire taping. Ways may be some day be developed by which the government , without removing papers from secret drawers, can reproduce them in court, and by which it will be enabled to expose to the jury the most intimate occurrences of the home. Advances in the psychic and related sciences may bring means of exploring unexpressed beliefs, thoughts and emotions. Can it be that the constitution affords no protection against such invasions of individual security?”

Brandeis dissenting opinion in *Olmstead-1928* (M. Jocher Illinois Law Journal)



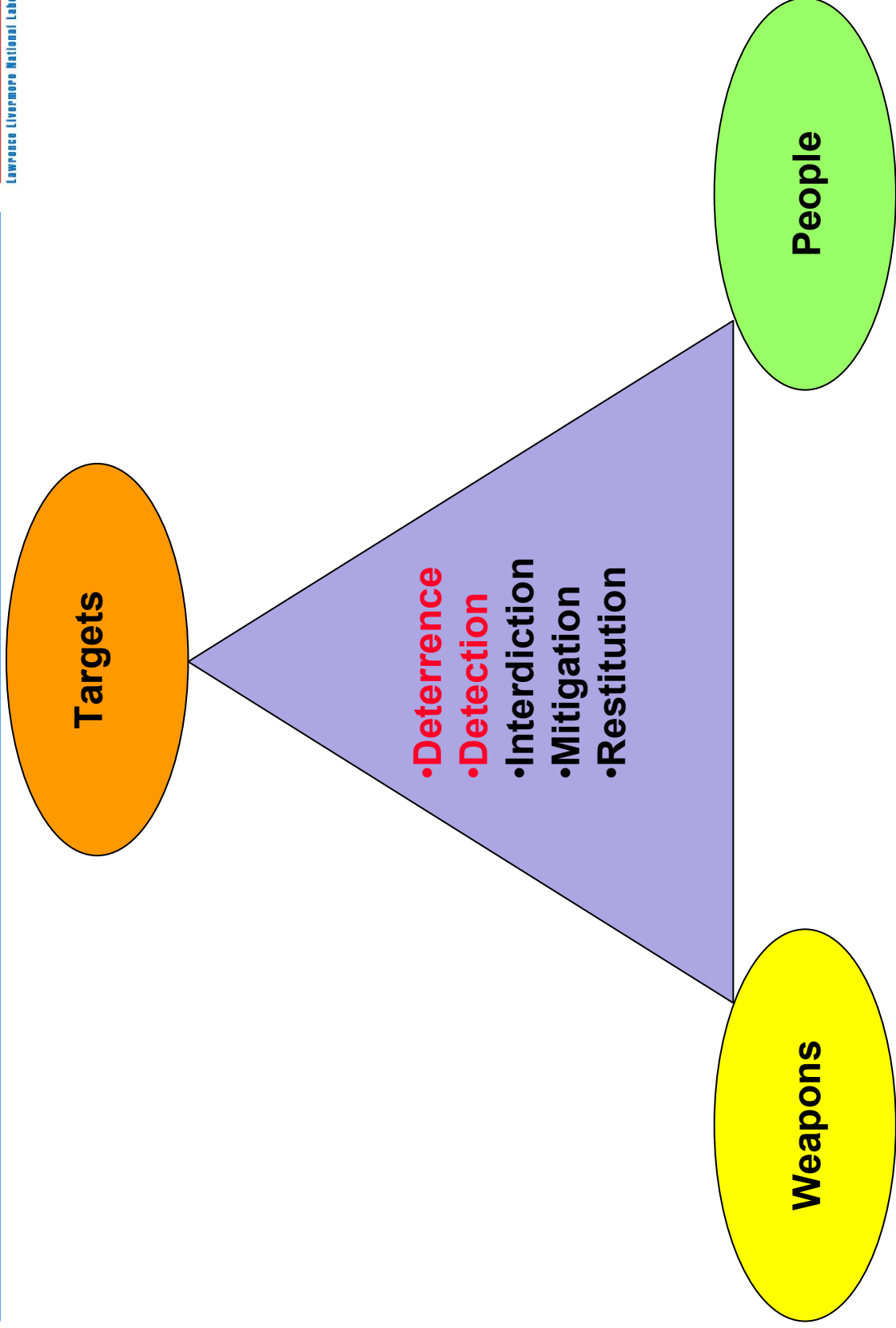
## **During the next 40 minutes:**

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- **What's the challenge in protecting the Nation from terrorists?**
- **How can technology help?**
- **In a broad sense what does the current law have to say about the technology's use?**
  - **Caveat: I'm not an attorney; My interest is a result of**
    - **A) My tenure as DOJ Chief Science Advisor**
    - **B) My current job- use advanced technology to protect the homeland**
  - **Examine Supreme Court cases as a physicist, e.g. looking for some basic principles,**
  - **Share that information with you**
- **Encourage you to follow up on your own**

## There are three elements to a terrorist attack

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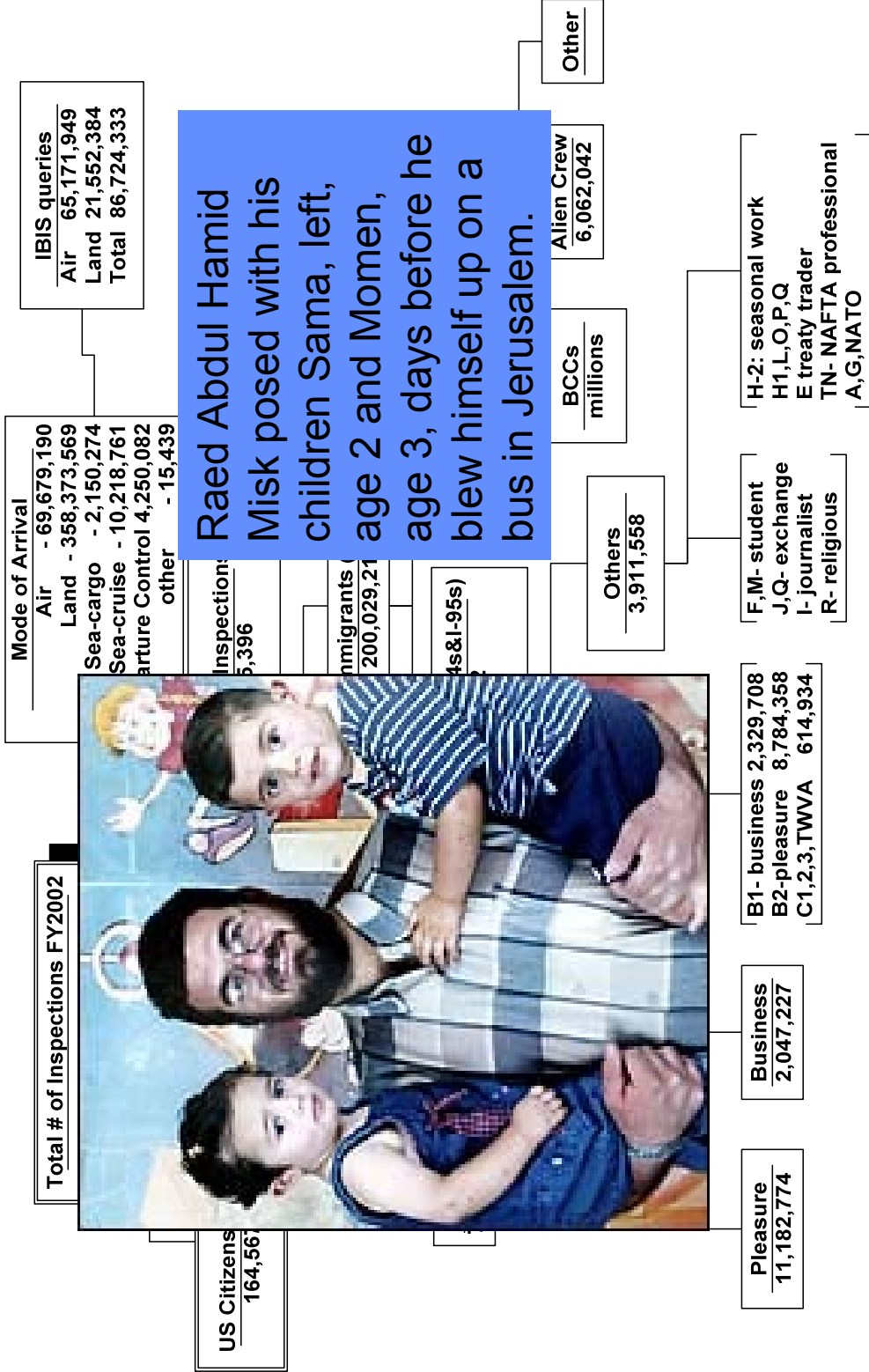


## **Recognize the problem:**

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- **There are too many targets to protect one by one:**
  - **15000 chemical facilities with TICS at level of concern**
  - **100+ Nuclear Power Reactors**
  - **75,000 Dams, 7700 “major dams”, 17 over 3 million acre**
  - **Over 420 malls of one million square feet**
  - **Airports, airplanes, high-rise offices and dwellings..**
  - **Stadiums**
  - **Mass transit**

# One individual among hundreds of millions could be a terrorist



Prosnitz 1/18/02

# What materials are we trying to find? Nuclear

## A Typical Capsule:

10 Ci Cs-137

1/2 inch diameter

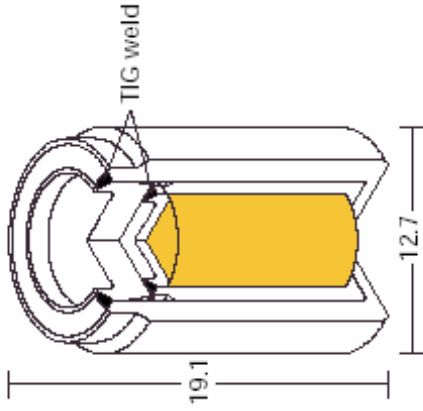
3/4 inch long

Ceramic matrix

Welded double SS

Tested to 25,000 psi

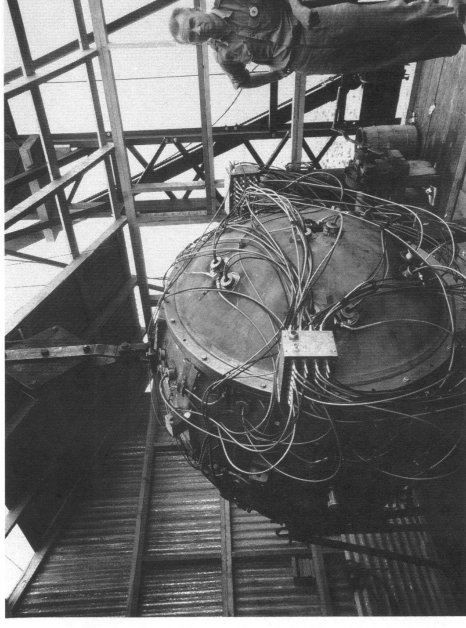
**X.38/4**



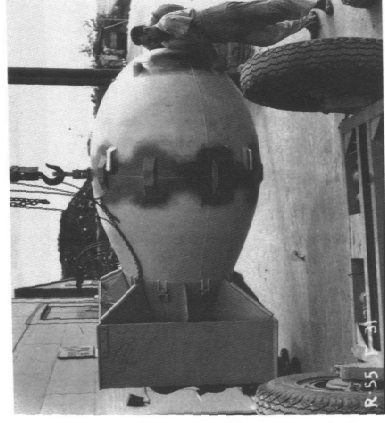
**Typical large cesium source**

**9000 Ci Cs-137**

**3 tons**



*The completely assembled Trinity bomb in its tower sled, with physicist Norris Bradbury, July 15, 1945. Note redundant detonator arrays. Courtesy of Los Alamos National Laboratory.*



*On Tinian in the Marianas creeps prepared the unique new weapons for delivery on Japan. Here, the Fat Man plutonium bomb destined for Nagasaki. Courtesy of National Archives.*

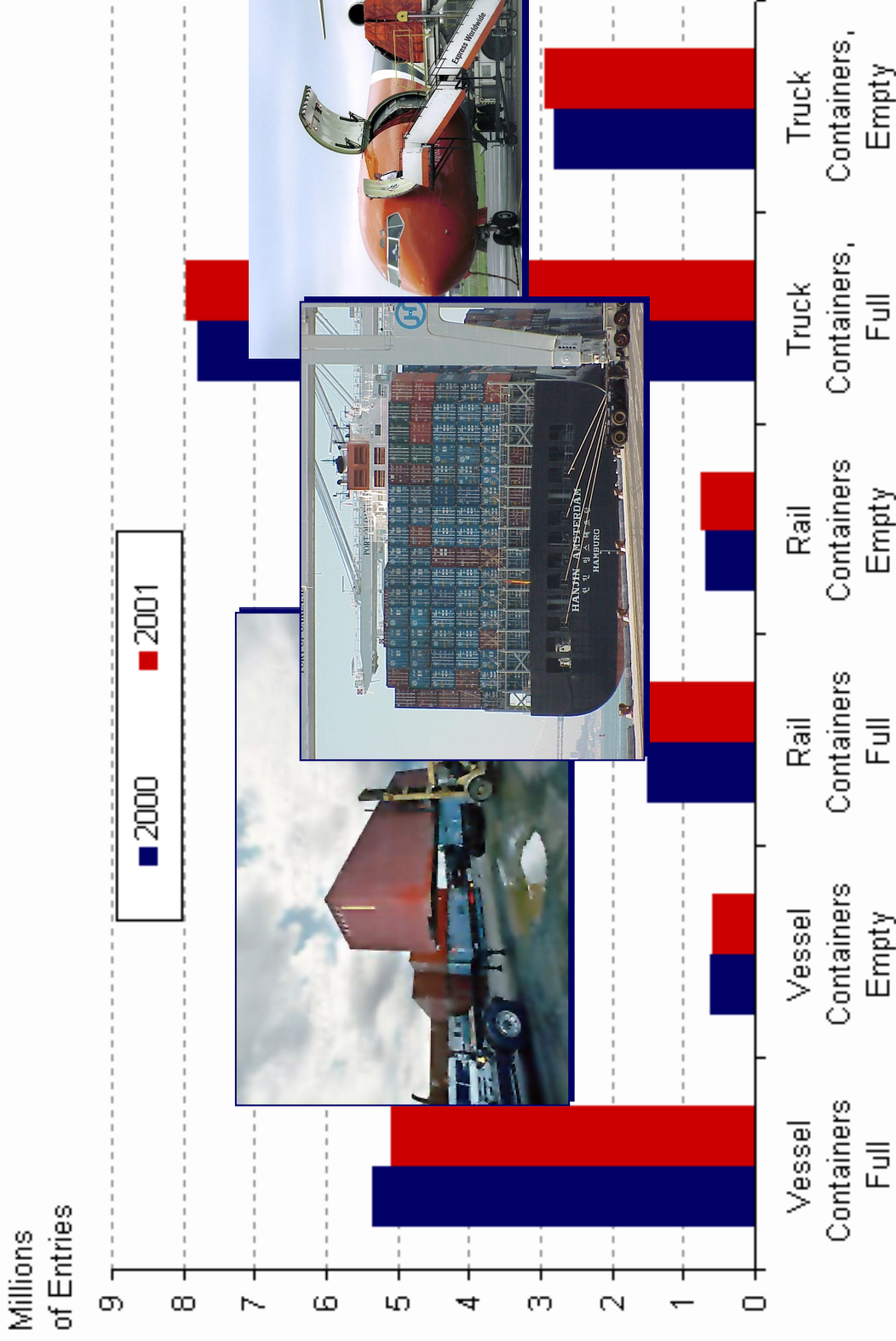


# What materials are we trying to find? Biological





# Over 16 million containers cross the border each year- can we find WMD fast with acceptable error rates



# Nuclear detection technologies have been developed for specific environments and applications



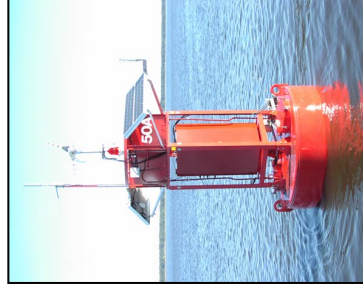
## Portable



## Land Rail



## Sea



Floating NaI radiation detector at Kings Bay, Georgia

## Air



Denver airport FedEx screening

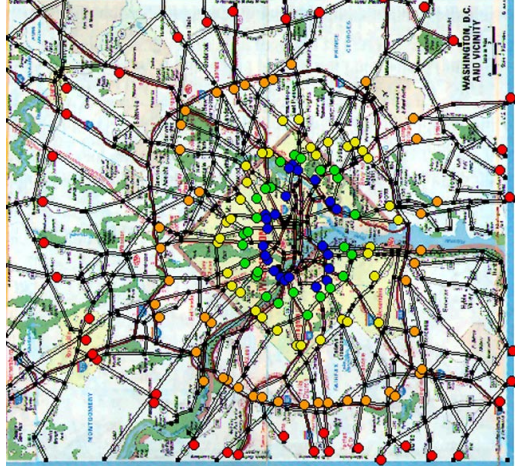


**DTS is a radiation detector network designed to provide “actionable” information**



## **Mobile**

- **System consists of multiple radiation sensors, and video cameras linked to a command console via a wireless network**
- **Most recently demonstrated at Fort Leonard Wood with DTRA sponsorship**



**Picture of mobile unit**



# Biological and chemical sensors are also in the field



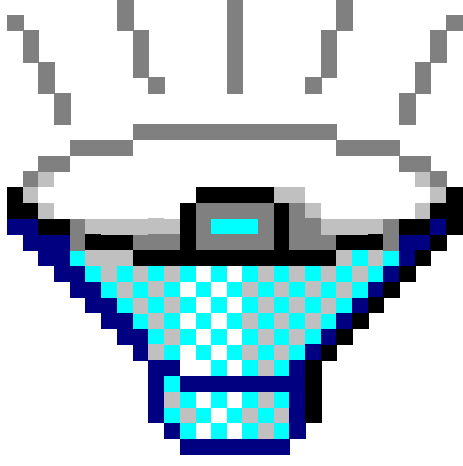
**Last, but certainly not least:**

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**“The question we confront today is what limits there are upon this power of technology to shrink the realm of guaranteed privacy”**

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***Kyllo v. United States , 533 U.S. 27, 34 (2001)***





## The Fourth Amendment:

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- “The right of the people to be secure in their persons, house, papers, and effects, against **unreasonable** searches and seizures shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.”

## The Supreme Court has ruled on the use of infrared imaging systems

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- Indications of abnormal levels of heat emanating from Kyllo's residence were obtained with a thermal imager. This information was used to obtain a search warrant and ultimately convict Danny Lee Kyllo for growing marijuana. Kyllo contested the conviction on the basis that observing his residence with a thermal imager without a warrant was a violation of his fourth amendment rights.





## What did the court decide pre 9-11?

- “Where, as here, the Government uses a device that is not in general public use, to explore details of a **private home** that would previously have been unknowable without physical intrusion, the surveillance is a Fourth Amendment “search,” and is presumptively unreasonable without a warrant.”
- US supreme court through ruling against IR sensing without a search warrant decided 6/11/2001
- Most CONOPS (concept of operations) require detectors be used without warrants or prior consent
- WMD sensors use technology not in general public use
- Sensors may reveal “intimate” information

**The dissent can often be prescient:**

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**“Nevertheless, the use of such a device [sense enhancing] would be unconstitutional under the Court’s rule, as would be the use of other new devices that might detect the odor of deadly bacteria or chemicals for making a new type of explosive.”**

**“ ...public officials should not have to avert their senses or their equipment from detecting emissions in the public domain such as excessive heat, traces of smoke, suspicious odors, odorless gases, or radioactive emissions, any of which could identify hazards to the community.”**

**Justice Stevens dissenting in *Kyllo***

**When deciding if the constitutional prohibition against unreasonable searches and seizures has been violated, three broad questions must be considered:**

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- **Does the projected use of the sensor constitute a search regulated by the fourth amendment?**
- **Does the sensor use require an attendant seizure?**
- **If the search use and/or seizure covered by the Fourth Amendment is it unreasonable?**



# What is a regulated search?



## Until the later part of the 19<sup>th</sup> century a search required physical trespass **Olmstead 1928**

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“The reasonable view is that one who installs in his house a telephone instrument with connecting wires intends to project his voice to those quite outside, and that the wires beyond his house and messages while passing over them are not within the protection of the Fourth Amendment.

**Here, those who intercepted the projected voices were not in the house of either party to the conversation.”**

**Olmstead- 1928**

**No physical trespass, no problem**

## **1967 *Katz v. United States* – “The trespass doctrine is no longer controlling”**

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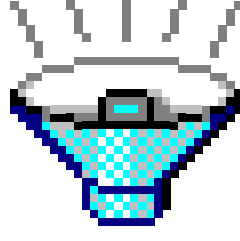
- “Fourth Amendment protects people, rather than places, its reach cannot turn on the the presence or absence of a physical intrusion into any enclosure”
- Would seem to sweep remote sensing up into regulated territory
- Key determining statement in Justice Harlan’s concurring opinion
  - A fourth amendment search is one that “violates an individual’s “actual (subjective) expectation of privacy and ...that the expectation be one that society is prepared to recognize as “reasonable”””

# What constitutes a reasonable expectation of privacy?

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- Some of the Factors considered:
  - Location- home vs. car
  - Activity revealed
  - Have proactive measures been taken to protect privacy
  - Material being searched for
  - Technology used to conduct the search
- All effect searching for WMD

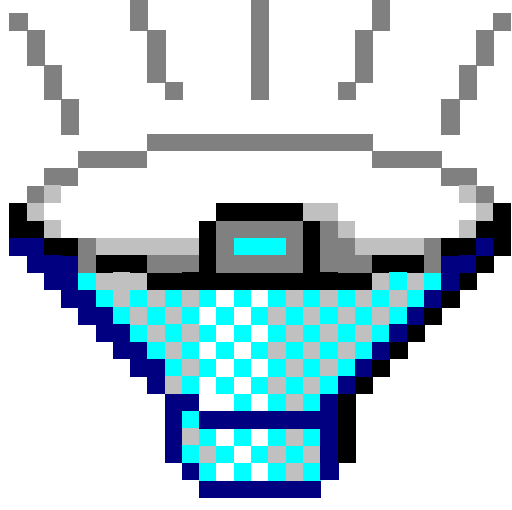


## However, a search may not be a regulated search if all it reveals is contraband

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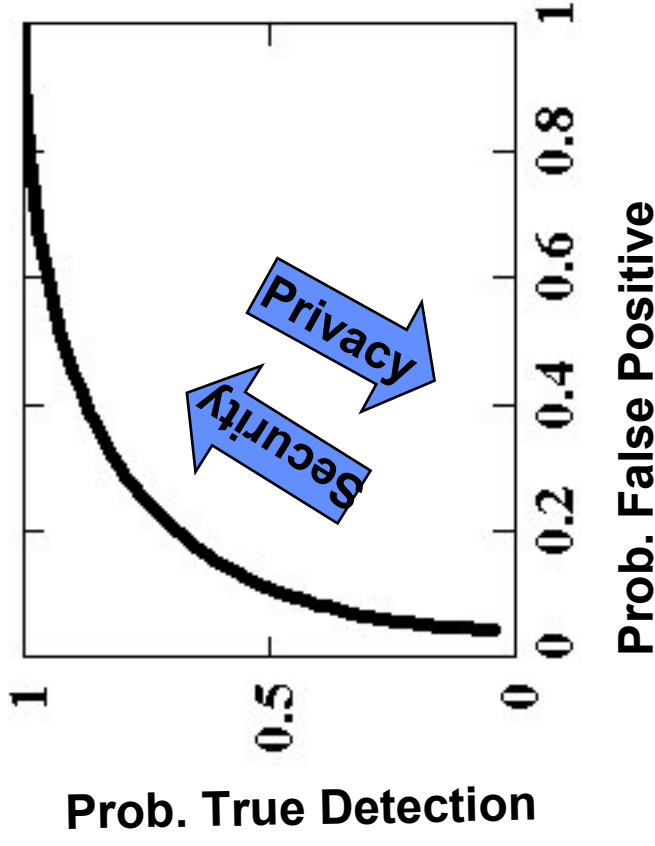


- “the sniff discloses *only* [emphasis added] the presence or absence of narcotics, a contraband item... Therefore, we conclude that the particular course of investigation ... - exposure of respondent's luggage, which was located in a public place, to a trained canine - did not constitute a "search" within the meaning of the Fourth Amendment.”
- *Illinois v. Caballes*
- *Smith v. State of Texas*
- How good does the dog have to be



## What errors are tolerable?

- **Scalia- the search is unreasonable if 99 times applies for once narcotics**
- **Souter- The Place decision that dogs do not err is untenable**



**Justice Stevens (Kyllo dissent)- “even the perfectly discriminating mechanical sensor would be prohibited”**

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**Bioaerosol Mass Spectrometry System has dual use for bioaerosols of national security and public health concern. Near future prototypes will be even more compact and rugged.**





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# Is it a seizure?



## **Seizure occurs:**

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- **“When there is government termination of freedom of movement through means intentionally applied”**
- **Police stop and ask you for ID**
- **Traffic stop seizes you and your vehicle, even if only momentarily**
- **Luggage examination is a seizure- primary, secondary and tertiary inspections are seizures**



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# Was the search or seizure reasonable?

# The constitution only forbids unreasonable searches and seizures-

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- **Two broad categories of reasonable warrantless search:**
  - **Circumstances demand immediate action**
    - **Crime committed or about to be committed**
    - **“Terry stops”**
    - **Reasonable articulable suspicion**
    - **Question: how can technology be used to determine probably cause for a true search?**
  - **Routine, suspicionless seizures: customs stops at the border, DUI stops etc.**

## Three considerations for reasonableness when there is no articulable suspicion – e.g. suspicionless stops

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- “[1] ...weighing of the gravity of the public concerns served by the seizure,
  - Imminent danger
- [2] the degree to which the seizure advances the public interest
  - effectiveness
- [3] and the severity of the interference with, individual liberty”[\[1\]](#)
  - Don’t harass, delay or scare the citizens
- [\[1\]](#) *Brown v. Texas*, 443 U. S. 47, 51 (1979)

## **Public concern, compelling government interest:**

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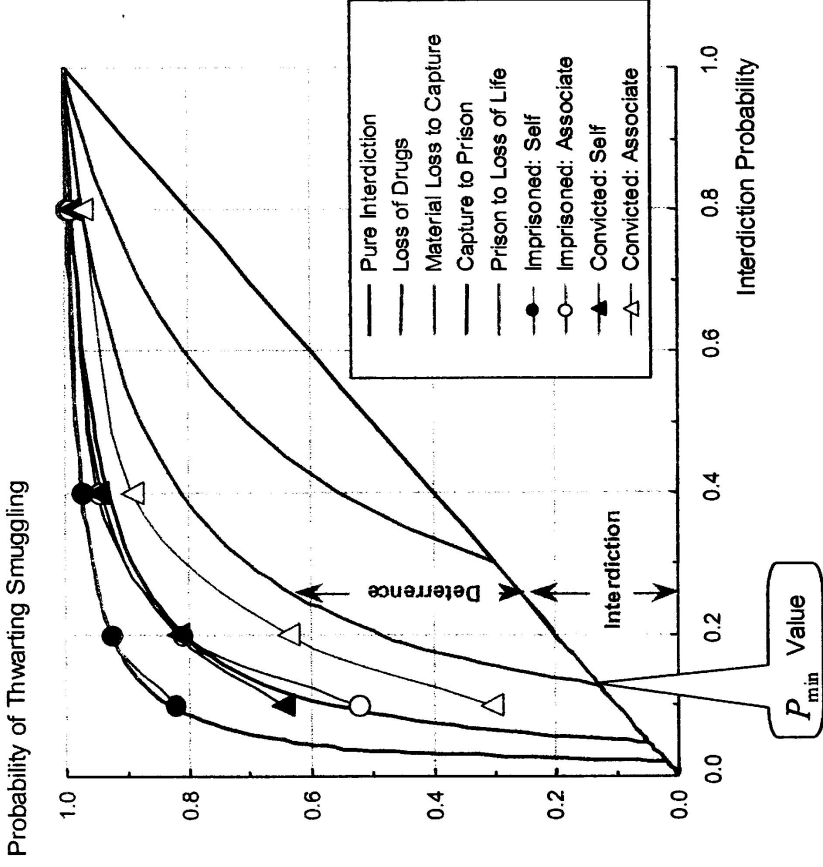
- **Must not be for general law enforcement;**
- **Border searches ok**
- **Sobriety roadblock ok**
- **Narcotics checks not ok**
- **Credible tip that car loaded with dynamite going downtown ok :**  
**“Constitution is not a suicide pact”**
- **Yellow alert- not ok-**

# Effectiveness: How do you measure deterrence?



- Airline
- Border
- Highways

“When the Government’s interest lies in **detering** highly hazardous conduct, a low incidence of such conduct, far from impugning the validity of the scheme for implementing this interest, is more logically viewed as a hallmark of success.”







## **Intrusiveness:**

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- **Seizures must not be excessively long**
- **Searches not reveal intimate details**
- **Extent of physical intrusion**

**When might sense-enhancing detectors be used without a warrant to develop probable cause for a full search and seizure?**

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- **Specificity**
- **Performance**
- **The sensors must be quick**
- **There must be a case for effectiveness**



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**Developers should not try to anticipate future court decisions, but by being cognizant of the traditional constitutional limits on the use of their systems and by being proactive in the design and deployment of WMD detectors, a successful balance between liberty and security can be achieved.**

# Exercise for the reader

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## Research and Development led to America's 20th century growth

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- “Science, by itself, provides no panacea for individual, social, and economic ills. It can be effective in the national welfare only as a member of a team, whether the conditions be peace or war. But without scientific progress no amount of achievement in other directions can insure our health, prosperity, and security as a nation in the modern world.” Vannevar Bush - 1945