TERRORISM MODELING

UNIT 1

RMS® CCRA® Training Program

CCRA
Certified Catastrophe Risk Analyst

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AGENDA

- **Unit 1: Understanding Terrorism Risk**
- Unit 2: Terrorism Modeling Overview
- Unit 3: Terrorism Hazard Module
- Unit 4: Terrorism Vulnerability Module
- Unit 5: Terrorism Financial Modeling
- Unit 6: Probabilistic Terrorism Modeling

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UNIT 1:
UNDERSTANDING
TERRORISM RISK

Learning Objectives

- Describe the key components of terrorism risk
- Understand the strategies of different terrorist organizations
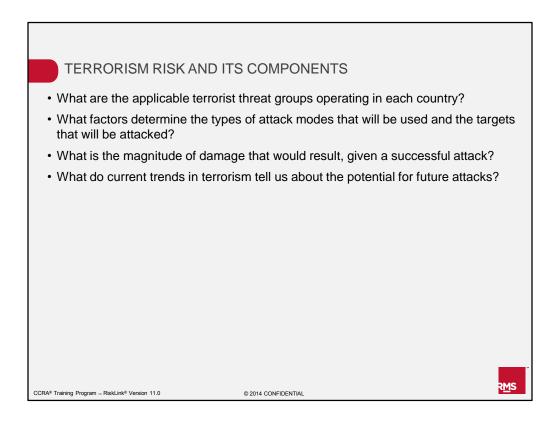- Discuss the current trends of terrorism activity

At the end of this unit you should have a good understanding of each of the five learning objectives listed on this slide.

"The calculated use of violence or the threat of violence to inculcate fear; intended to coerce or to intimidate governments or societies in the pursuit of goals that are generally political, religious, or ideological."
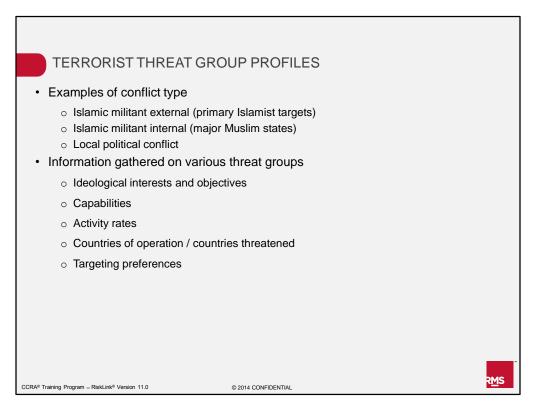
– U.S. Dept of Defense

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The U.S. Department of Defense defines terrorism as the calculated use of violence or the threat of violence to inculcate fear; intended to coerce or to intimidate governments or societies in the pursuit of goals that are generally political, religious, or ideological.

The management of terrorism risk requires an understanding of three main components: The threat to a particular target, the vulnerability of the target, and the associated loss given a successful attack. Let's begin our approach to the quantification of terrorism risk by thinking about the following key questions:

1. What are the relevant terrorist threat groups that are operating in each country?
2. What factors determine the types of attack modes that will be used and the targets that will be attacked?
3. What is the potential outcome given a successful attack?
4. What do the current trends in terrorism tell us about the potential for future attacks?

It is important to classify the types of conflict that exist in different regions to identify the terrorist threat groups that threaten each country. RMS has classified regional terrorism threat into various forms of conflict. Here we have a few examples of the main conflict types that threaten the insurance industry.

In the current environment, Islamic Militant Groups pose the largest threat and have the greatest potential to successfully carry out an attack. Because the U.S. and United Kingdom are on the front line in the war on terrorism, they are primary targets.

Major Muslim states, or territories in which Islam is the predominate religion, are at high risk to terrorist threat and have a history of Islamic militancy.

Local political conflict is a major threat to those territories which suffer from internal civil conflict, or from political conflict with neighboring states.

The profiles of international threat groups can be compiled from a variety of different data sources. RMS has worked closely with a team of world leading experts to gather information on known terrorist threat groups. Information gathered on these threat groups include:

1. Ideological interests and objectives
2. Capabilities such as number and skills of operatives, financial resources, and operational constraints
3. Activity rates of these organizations, including both known attacks and suspected attempts
4. The countries that these threat groups operate in and the countries that they threaten
5. Information on targeting preferences, such as historical attack patterns and likely future attacks

This information is essential to understand the intent and capabilities of different terrorist threat groups.

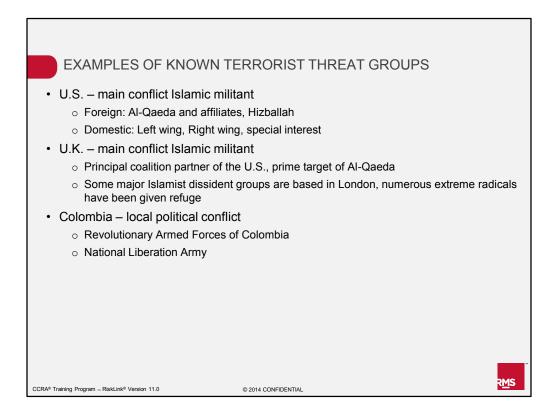### 1 - Islamic militant external (primary Islamist targets)

These are territories in the front line in the war on Islamist militants. Included in this category are countries that have sent troops to Afghanistan and Iraq or support the war on terrorism (e.g. Israel and India), as well as other allied democratic states, such as Canada.

2 - Islamic militant internal (major Muslim states)

These are the main territories in which Islam is the predominant religion, or where, as with Mindanao in the Philippines, a major sub-region has an Islamic heritage and a history of Islamist militancy.

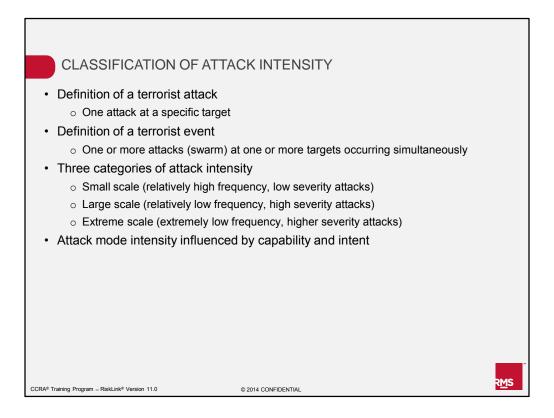### 3 - Local political conflict

These are territories which suffer from internal civil strife, or from political conflict with neighboring states. Unification or separatist movements may be active in forcing border changes. Communist or fascist extremists may be active in forcing changes in political regime.

Examples of known terrorist threat groups for a few countries are listed here, along with the main conflict type of each country. Within the U.S., Islamic militant groups are the primary threat, with Al-Qaeda and its affiliates the main source of this threat. Other foreign sources include threat groups such as Hizballah. Internal or domestic terrorist groups include right and left wing extremists and special interest groups such as extreme animal rights activists, environmental activists, and anti-abortion activists.

The United Kingdom is the principal coalition partner of the U.S. and a prime target of Al-Qaeda. Some major Islamist dissident groups are based in London. For example, the World Kashmir Freedom Movement and other extreme radical groups have been given refuge in Britain, which could lead to disruption caused by terrorism.

Other countries, such as Colombia, are threatened by local political conflict. The connection between drugs and terrorism is highlighted in Colombia, where murder, kidnapping, extortion, and hijacking are the modus operandi of the Revolutionary Armed Forces of Colombia (FARC), which is one of the best trained terrorist organizations in Latin America. The National Liberation Army (ELN), has centered its activities on the sabotage of national and foreign oil company pipelines.

- Definition of a terrorist attack
  - One attack at a specific target
- Definition of a terrorist event
  - One or more attacks (swarm) at one or more targets occurring simultaneously
- Three categories of attack intensity
  - Small scale (relatively high frequency, low severity attacks)
  - Large scale (relatively low frequency, high severity attacks)
  - Extreme scale (extremely low frequency, higher severity attacks)
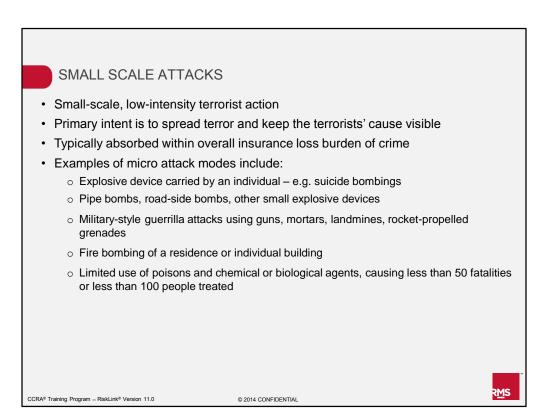- Attack mode intensity influenced by capability and intent

It is important to distinguish between a terrorist attack and a terrorist event. The definition of a terrorist attack is one attack at a specific target, such as a 2-ton bomb detonated at the Willis Tower in Chicago. A terrorist event is defined as one or more attacks (or swarm attacks) occurring at one or more targets simultaneously. This type of event is the hallmark of Al-Qaeda, demonstrated in the events of September 11, 2001.

Attack intensity can be characterized into three categories (small scale, large scale, and extreme loss events). RMS measures attack intensity by its potential to cause economic loss and human casualties. Factors that impact the intensity are the size of the attack (2-ton vs. 10-ton bomb) and the type of resulting damage, given a successful attack.
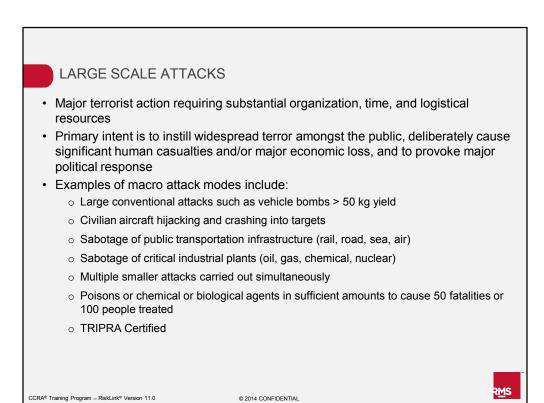
Small scale attacks can be described as relatively high frequency, low severity attacks. Large scale attacks can be described as relatively low frequency, high severity attacks. Attacks of an extreme nature, such as a large nuclear attack, experience extremely low frequency and have the potential to cause an unprecedented amount of destruction.

Attack mode intensity is directly related to the capabilities and intent of different terrorist organizations.

The primary intent of small scaled terrorist action is to spread terror and keep the terrorists' cause visible rather than inflict significant human casualty or major financial loss. These types of attack require modest preparation and organization and are typically absorbed within the insurance industry loss classification of crime.

While there are many means of attack, historical attack patterns include:

1. Small explosive devices carried by an individual, such as a suicide bomber.
2. Other small explosive devices such as pipe bombs and road-side bombs.
3. Military-style guerrilla attacks by several terrorists using guns, assault rifles, mortars, landmines, and/or rocket-propelled grenades.
4. Bombing of individual buildings or residential occupancies.
5. While micro attacks are not intended to cause large numbers of human casualties, historical evidence shows use of poisons and chemical or biological agents as a means of attack.
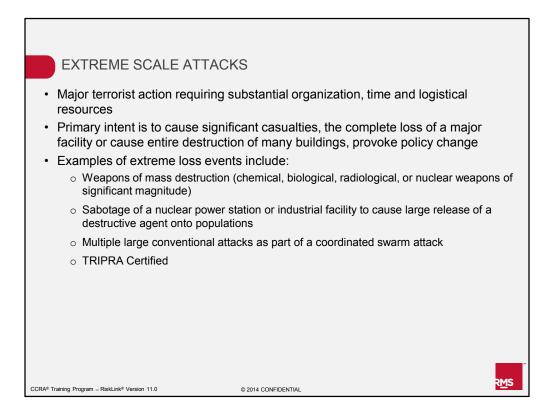
Large scale attacks are major terrorist actions requiring substantial organization, time and logistical resources for planning, weapons procurement or manufacture, operatives training, and target reconnaissance.

The primary intent of these actions is to instil widespread terror in the public. There is a deliberate aim to cause significant human casualties and/or a major economic loss. The objective of large scale attacks is to provoke a major political response.

Some examples of macro attack modes include:

1. Large conventional attacks such as vehicle bombs > 50 kg yield
2. Civilian aircraft hijacking and crashing into targets
3. Sabotage of public transportation infrastructure (rail, road, sea, air)
4. Sabotage of critical industrial plants (oil, gas, chemical, nuclear, etc.)
5. Multiple smaller attacks carried out simultaneously as part of a coordinated attack
6. Use of poisons or chemical or biological agents in amounts to cause 50 fatalities or 100 people treated

In the U.S., these types of attacks would be certified under the Terrorism Risk Insurance Program Reauthorization Act of 2007 (TRIPRA).

Similar to large scale attacks, extreme scale attacks are major terrorist actions requiring substantial organization, time, and logistical resources. Due to the extreme nature of these types of attacks, highly specialized skills and logistical resources are required.
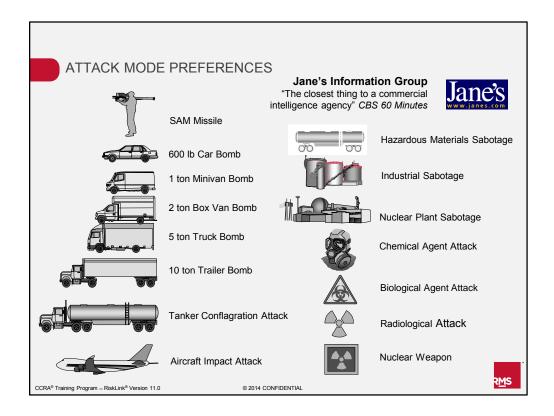
The primary intent of these actions is to cause a significant number of casualties, for instance, fatalities in the thousands, or the complete loss of a major facility or entire destruction of many buildings. The objective is to not only provoke a major political response, but also to bring about policy change.

Some examples of extreme loss attacks include:

1. Weapons of mass destruction (chemical, biological, radiological, or nuclear weapons of significant magnitude)
2. Sabotage of a nuclear power station or industrial facility which would cause a large release of a destructive agent onto the population
3. Extremely large conventional attack (massive yield truck bomb > three tons of TNT)
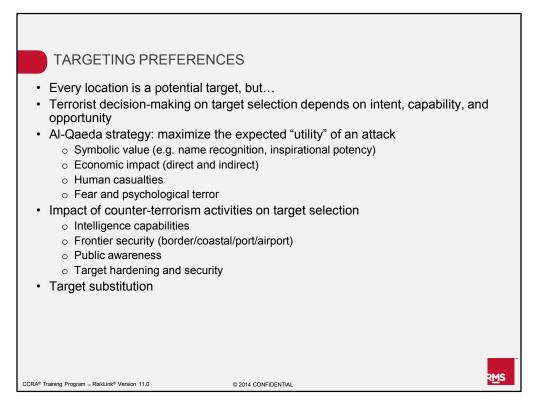
In the U.S., these types of attacks would be certified under the Terrorism Risk Insurance Program Reauthorization Act of 2007 (TRIPRA).

The RMS models are primarily concerned with large scale and extreme loss attacks due to their impact on the insurance industry
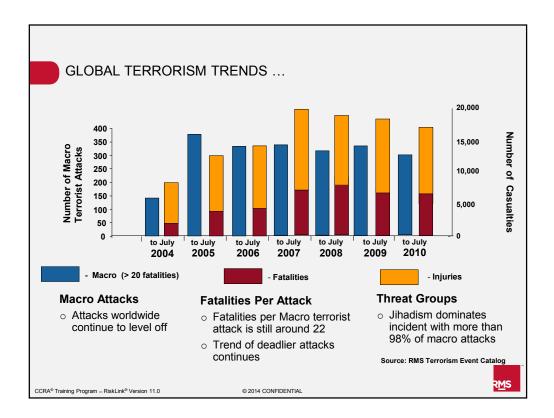
RMS has worked with Jane's Information Group to derive a list of representative attack modes for use within the RMS terrorism models. Described on the CBS program "60 Minutes" as the closest thing to a commercial intelligence agency, Jane's Information Group maintains a network of correspondents, analysts, and consultants worldwide specializing in military and security intelligence, weaponry, and public safety issues.

A logistical burden study was performed to measure the amount of effort and resources needed by a terrorist group to mount an attack, incorporating manpower, skills required, capital cost, and time. This will be discussed further in Unit 6 of this course.

- Every location is a potential target, but…
- Terrorist decision-making on target selection depends on intent, capability, and opportunity
- Al-Qaeda strategy: maximize the expected "utility" of an attack
    - Symbolic value (e.g. name recognition, inspirational potency)
    - Economic impact (direct and indirect)
    - Human casualties
    - Fear and psychological terror
- Impact of counter-terrorism activities on target selection
    - Intelligence capabilities
    - Frontier security (border/coastal/port/airport)
    - Public awareness
    - Target hardening and security
- Target substitution

There are number of factors that lead to targeting preferences. While every location is a potential target, intent, capability, and opportunity influence terrorist decision-making on target selection. While this may vary by terrorist threat group, the strategy of major terrorist organizations is to maximize the expected "utility" of an attack. For Al-Qaeda, this utility is a function of the target's symbolic value as well as the economic loss and number of casualties that could result from an attack against a particular target. Fear and psychological terror also define the expected utility of an attack. While all attacks on targets may not be large in scale, the fear and psychological terror that is produced impacts the people exposed.

The counter-terrorism environment of each country will ultimately impact the success rate of terrorist activities and influence their decision on targeting. Parameters such as defence and security infrastructure, expertise and capabilities of intelligence services, and public awareness all define a country's effectiveness to prevent future attacks. The more effective the counter-terrorism environment, the more closely potential targets can be monitored. If a target under surveillance suddenly becomes unattractive due to an increased level of security, usually another target will be selected or the attack postponed.

GLOBAL TERRORISM TRENDS …

Source: RMS Terrorism Event Catalog
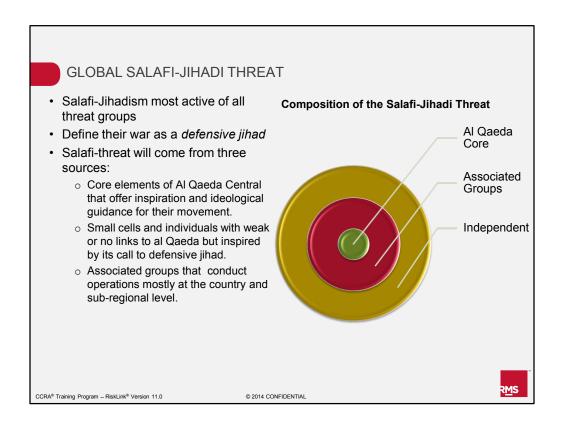
Assessing the number of terrorism incidents is a tremendous challenge, with hard data lagging actual events on the ground. However, using the RMS standardized terrorism event catalog, currently logging an average of 15 new events each day, allows us to get a good picture of how many terrorist incidents have been perpetuated.

So far this year, there has been more than 350 macro attacks globally compared to 336 in 2010, which marks a slight increase from last year. More significantly, this increase in attacks is not coming from Iraq, but rather from other jihadi groups in Afghanistan, Pakistan, and smaller threats in Somalia and Algeria.

Fatalities per macro attack have leveled down to 21 fatalities per event. The variability of the casualties produced by attacks has also decreased, thus, in a sense they are less catastrophic and have a reached a constant tempo.
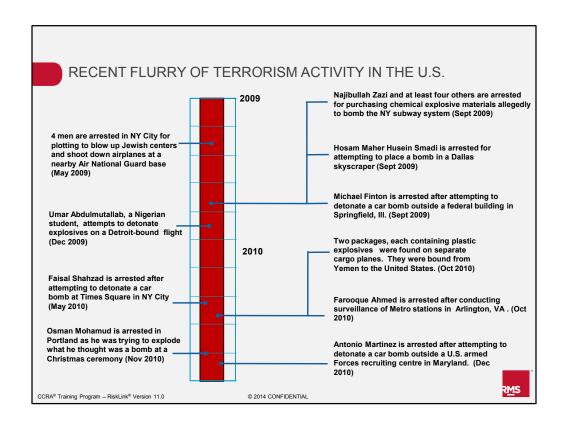
Vehicle bombs remain the weapon of choice for terrorists, used in more than 52% of macro attacks worldwide during the past year. However, terrorists continue to increase the destructiveness of these conventional weapons by better targeting and techniques, expertise which is rapidly disseminated to cells operating in many different countries. The average number of people killed per vehicle bomb worldwide has doubled since 2004. In future attacks, the expectation is that conventional weapons will continue to be used but likely in smarter ways.

GLOBAL SALAFI-JIHADI THREAT

- Salafi-Jihadism most active of all threat groups
- Define their war as a *defensive jihad*
- Salafi-threat will come from three sources:
  - Core elements of Al Qaeda Central that offer inspiration and ideological guidance for their movement.
  - Small cells and individuals with weak or no links to al Qaeda but inspired by its call to defensive jihad.
  - Associated groups that conduct operations mostly at the country and sub-regional level.

Composition of the Salafi-Jihadi Threat

Al Qaeda Core

Associated Groups

Independent

Within the Jihadi realm, the salafi-jihadi is the most active. Salafism jihadism in its essence is a revivalist Islamic movement that seeks to return to pure and authentic Islam, as practiced by the Prophet and his companions. These Salafists advocate a violent response to those people who they perceive to stand against them to recreate the true Islamic community and way of life.

Framing it is as a defensive jihad to protect Muslim populations, this narrative continues to resonate with the salafi-jihadi community to take up arms to fight for their cause.
There are three sources of this threat. Core elements of Al Qaeda Central offer inspiration and ideological guidance for the jihadi movement. There are also associated groups that conduct jihad operations mostly at the country and sub-regional level. Finally, there are small cells and individuals with weak or no links to al Qaeda but who are inspired by its call to defend jihad

The most active are now the associate groups. The Christmas Day 2009 failed bombing attempt re-affirms our finding that the jihadi movement is increasingly defined by regional affiliates rather than al Qaeda's core leadership in Afghanistan and Pakistan. Where one might have previously assumed that sophisticated attacks on U.S. soil were within al Qaeda central's exclusive control, the Christmas Day attack, which does not appear to have been connected to al Qaeda central, provides fairly substantial evidence to the contrary. This raises the possibility that despite U.S. military pressure having weakened and constrained senior al Qaeda figures, the threat of significant attacks planned and conducted independent of their leadership remains, and could be growing. Recent developments also underscore the fact that ungoverned and poorly governed areas in countries such as Yemen and Somalia pose a danger not only as launching pads from which local extremists can conduct attacks, but also as recruiting and training grounds where foreigners are being radicalized and deployed to conduct attacks abroad.

RECENT FLURRY OF TERRORISM ACTIVITY IN THE U.S.

2009

4 men are arrested in NY City for plotting to blow up Jewish centers and shoot down airplanes at a nearby Air National Guard base (May 2009)

Umar Abdulmutallab, a Nigerian student, attempts to detonate explosives on a Detroit-bound flight (Dec 2009)

2010

Faisal Shahzad is arrested after attempting to detonate a car bomb at Times Square in NY City (May 2010)

Osman Mohamud is arrested in Portland as he was trying to explode what he thought was a bomb at a Christmas ceremony (Nov 2010)

Najibullah Zazi and at least four others are arrested for purchasing chemical explosive materials allegedly to bomb the NY subway system (Sept 2009)

Hosam Maher Husein Smadi is arrested for attempting to place a bomb in a Dallas skyscraper (Sept 2009)

Michael Finton is arrested after attempting to detonate a car bomb outside a federal building in Springfield, Ill. (Sept 2009)

Two packages, each containing plastic explosives were found on separate cargo planes. They were bound from Yemen to the United States. (Oct 2010)

Farooque Ahmed is arrested after conducting surveillance of Metro stations in Arlington, VA . (Oct 2010)

Antonio Martinez is arrested after attempting to detonate a car bomb outside a U.S. armed Forces recruiting centre in Maryland. (Dec 2010)

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This slide shows recent terrorism activity in the U.S during 2009 and 2010. Many of these events represent terrorist attacks that were disrupted in the midst of preparation.

COUNTER TERRORISM SECURITY TRENDS IN U.S.

- **State "Fusion" Intelligence Centers** – To make fusion centers a key priority and to better coordinate DHS resources to enhance integration of these centers.
- **CBRN Protection –** Domestic Nuclear Detection Office trained more than 3,600 officers in CBRN detection, and began demonstrating the Cargo Advanced Automated Radiography System, which aims to detect special nuclear materials and shielding material in cargo at ports of entry.
- **Cyber Terrorism Protection –** DHS opened the new National Cyber-security and Communications Integration Center. It is a coordinated watch and warning center that will improve national efforts to address threats and incidents affecting the nation's critical information technology and cyber infrastructure.
- **Countering Violent Extremism –** Establishing a section in the State Department responsible for creating CVE programs based on robust qualitative and quantitative assessments of the environment.

State and Local Fusion Center Program -- a key provision of the 9/11 Commission Implementation Act -- a success in the last three years

A truck passes through a radiation portal monitor at the port of Newark, New Jersey

The Department of Homeland Security (DHS) continues to search for organization coherence and assimilation of its core management functions. Most homeland security analysts will argue that the DHS has been successful in constraining the ability of al-Qaeda to attack the U.S. homeland and have led terrorist groups to perceive the U.S. as a harder target to strike than on 9/11.

CONVENTIONAL ATTACK LIKELIHOOD

- Conventional explosives have so far remained the weapon of choice with smaller bombs or IEDs the likelier attach mode
- Such weapons can cause significant numbers of casualties if detonated at the correct time and place
- Failed attack on Northwest Airlines also shows that jihadi groups have not given up on their efforts to damage the aviation industry
- Commercial airliners continue to be a key target for terrorist groups. Even with increased security measures it has not been possible to stop Al Qaeda from attempting repeated attacks.
- Sending parcel bombs has demonstrated an extraordinary sense of innovation and adaptation to security measures

Time Square Bomb Plot

Christmas Day Airliner Bomb Attempt
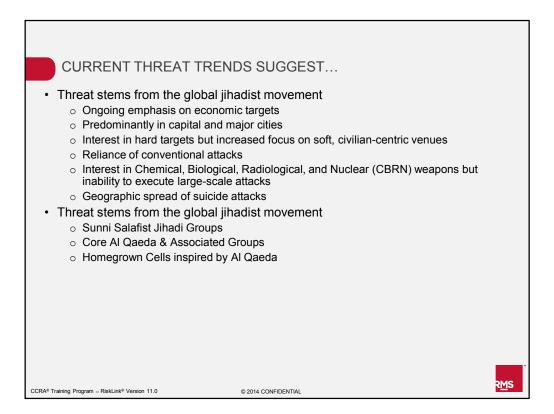
Yemen Printer Parcel Bomb Plot

The most likely attack mode continues to be conventional explosives, primarily small bombs and IEDs. These types of weapons can cause significant casualties when detonated at the right time and place. Jihadi groups have not given up their efforts to damage the aviation industry, as was seen with the failed attack on a Northwest Airlines (now Delta Airlines) flight in 2009. Other groups continue to target commercial airliners, even with increased security measures.

CBRN LIKELIHOOD

Chemical   Biological   Radiological   Nuclear

- Al Qaeda has long expressed interest in CBRN weapons
  - "It is our religious duty to acquire nuclear and chemical weapons to terrorize the enemies of Allah" – Osama bin Laden, 1998
  - Saudi Cleric Shaykh Nasir Bin Hamd Al-Fahd attempt to religiously legitimize the use of WMDs
- Revelations post-9/11 provide evidence that Al Qaeda has sought to
  - Establish links with Pakistani nuclear scientists
  - Obtain nuclear materials from various sources
- Al-Qaeda have yet to translate its interest to capabilities
- Disaggregated state of "Al-Qaeda central" would preclude its ability to manufacture CBRN weapons for large-scale attacks in the short to medium term
- Likelihood of an attempted attack using CBRN agents remains the same

Crude chemical weapon dispersal device

Jihadist chatter shows continued interest in CBRN

Likelihood of an attempted attack using CBRN agents is at 5.5%, which is a 0.5% increase from last year, and reflects a long term view of threat, with smaller scale CBRN attacks much more likely.

The CBRN threat we face today from al Qaeda is thus two-pronged: attacks using nonconventional weapons that are meant to kill and injure en masse alongside less lethal attacks, conceived more for their destabilizing psychological repercussions than for their killing potential. In this respect, it should be stressed that a limited terrorist attack involving a deliberately small scale non-conventional chemical, biological, or radiological weapon could have disproportionately enormous consequences, generating unprecedented fear and alarm and thus serving the terrorists' purpose(s) just as well as a larger weapon or more ambitious attack with massive casualties could.
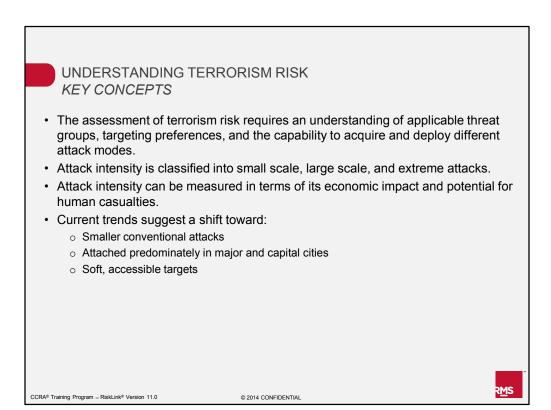
Among the CBRN weapons that a terrorist could launch in the United States, a radiological weapon, or "dirty bomb," is the most likely. The logic behind this argument is three-fold. First, radiological materials are readily available, and relatively easy to obtain. Second, the weapon could be transported by terrorists to the intended target. Third, the required skills needed to manufacture such a bomb are minor, compared to other unconventional weapons.

Current threats suggest that groups are targeting high-casualty, economically-important targets predominantly in capital and major cities. Mostly conservative in their actions, they focus on conventional attacks. However, the intentions of using CBRN weapons are still there.

Suicide strikes across Europe, Asia ,and the Middle East have increased across the board. There has been an increase in the number of suicide macro attacks globally. Moreover, suicide attacks have broken the gender barrier. There is an increase in female suicide bombers, particularly in Iraq.

Terror threat clearly comes from the salafist jihadist groups such as Al Qaeda. Al Qaeda in Iraq has also shown capabilities to attack the U.S. In addition, as seen from plots in the U.K in 2007, the threat from locally inspired homegrown terror cells has increased, particularly in Western Europe.

UNDERSTANDING TERRORISM RISK
KEY CONCEPTS

- The assessment of terrorism risk requires an understanding of applicable threat groups, targeting preferences, and the capability to acquire and deploy different attack modes.
- Attack intensity is classified into small scale, large scale, and extreme attacks.
- Attack intensity can be measured in terms of its economic impact and potential for human casualties.
- Current trends suggest a shift toward:
  - Smaller conventional attacks
  - Attached predominately in major and capital cities
  - Soft, accessible targets

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This slide summarizes the key points from Unit 1. If any of these points are unclear, please revisit the associated slides within the unit.