Crime Prevention Through Environment Design (CPTED) for Sports Venues

Distinction, Dollars and Delivering the Guest Experience

Jay King, PSP, CPP
Life Safety and Security Sub-Market Leader
CHA Consulting, Inc.
jgking@chacompanies.com

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Presenter Biography

Jay King has 21+ years experience in security program management; including security system evaluation and design. His work for small to large size engineering and logistics firms involved security project management Department of Justice and Department of Defense client organizations. He provides security program management, crime prevention and physical security infrastructure alternatives which balance risk mitigation with clients’ unique operational requirements.

Jay currently supports CHA Consulting’s Sports Market within the Campus and Institutional Group.

CHA is a Corporate Member of NCS4, and Jay is a member of NCS4’s Safety and Security Design Advisory Committee.
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CPTED for Sports Venues

Definitions – *Distinctions among security concepts*

- Physical Security
- Deterrence
- Force Protection
- CPTED

*Do not expect of CPTED what it cannot deliver.*
Physical Security

“That part of security concerned with physical measures designed to safeguard personnel; to prevent unauthorized access to equipment, installations, material, and documents; and to safeguard them against espionage, sabotage, damage, and theft.”

Operational Terms and Graphics

FM 1-02 (FM 101-5-1)
MCRP 5-12A

- Emphasis on physical measures; exclusive of actions involving policy or personnel actions.
- Key words: safeguard, prevent
- Key word missing: deter
Deterrence

“The prevention from action by fear of the consequences. Deterrence is a state of mind brought about by the existence of a credible threat of unacceptable counteraction.”

Operational Terms and Graphics

 FM 1-02 (FM 101-5-1)
MCRP 5-12A

• Emphasis on influencing perception and associated behavioral responses.
Designing the four Ds of Physical Security
Crime Prevention Through Environmental Design (CPTED)

- Perimeter barriers (sensored)
- Access control
- Intrusion detection (alarms)
- Surveillance (VSS) (analytics)
- Duress Annunciation

- Perimeter barriers (unsensored)
- Defense in depth
- Asset compartmentalization
- Target hardening

- Mass Notification
- Response force deployment
- Vehicle denial barriers, stand-off distance
Force Protection

Actions taken to prevent or mitigate hostile actions against Department of Defense personnel (to include family members), resources, facilities, and critical information. These actions conserve the force’s fighting potential so it can be applied at a decisive time and place and incorporates the coordinated and synchronized offensive and defensive measures to enable the effective employment of the joint force while degrading opportunities for the enemy. Force protection does not include actions to defeat the enemy or protect against accidents, weather, or disease. Also called FP.

- Emphasis on protecting people, and infrastructure that supports mission.
- Emphasis on adversaries to the force, and its mission; adversary motivations not necessarily criminal.
Crime Prevention Through Environmental Design

“CPTED is based on the theory that the proper design and effective use of the built environment can lead to a reduction in the incidence and fear of crime and in an improvement in the quality of life.”

*Crime Prevention Through Environmental Design*
Virginia Safe by Design Committee / Henrico County Police

Emphasis on *influencing* perception and associated behavioral responses.
The Four Principles* of CPTED are:

• Natural surveillance
• Natural access control
• Territorial reinforcement
• Maintenance and management

* Also often referred to as CPTED Strategies.
CPTED - Natural Surveillance

The placement of physical features, activities and people in such a way as to **maximize visibility**.

This strategy utilizes design features to increase the visibility of a property or building. Keep intruders under observation thereby making them less likely to commit offenses. Greater visibility makes legitimate users feel safer.

- Use open style designs that maximize visibility.
- Illuminate building entrances, pedestrian paths and parking areas.
- Watch for landscaping and lighting conflicts.
- Orient building entrances toward high-traffic (pedestrian & vehicle) areas.
- Use internal and external windows, as well as activity areas, to increase passive surveillance.
CPTED - Natural Access Control

The physical guidance of people coming and going from a space by the judicial placement of entrances, exits, fencing, landscaping and lighting.

This strategy aims to decrease the opportunity for criminal activity by denying access to crime targets and creating the perception of risk in offenders.

- Clearly mark public entrances with architectural features, landscaping, signs.
- Use signage, plants and fencing to control and direct pedestrian movement.
- Minimize or eliminate openings in recessed and below grade areas, or in areas with limited visibility.
- Bolster natural strategies with exterior and interior target hardening measures.
CPTED - Territorial reinforcement

The use of physical attributes that express ownership such as fencing, pavement treatments, signage and landscaping.

This strategy aims to extend a sphere of influence over a property whereby the owners, employees, members and users will take a greater interest in the events occurring in their environment:

• Define property lines with fencing, plantings or elevation changes.
• Use signs to specify approved or prohibited behaviors.
• Design prominent building entrances.
• Create a unique environment / a ‘sense of place’ through the use of pavement treatments, artwork, lighting and architectural designs.

Crime Prevention Through Environmental Design
Virginia Safe by Design Committee / Henrico County Police
CPTED - Maintenance and Management *

Maintenance allows for the continued use of a space for its intended purpose. Serves as an additional expression of ownership.

_Crime Prevention Through Environmental Design_
Virginia Safe by Design Committee / Henrico County Police

Maintenance and management need to be considered at the design stage, as the selection of materials and finishes will impact on the types of maintenance regimes that can be sustained over time. For example, plant material should be selected for its size at maturity to avoid blocking of sight lines.

_Crime Prevention Through Environmental Design Guidebook_
National Crime Prevention Council, Singapore

* Sometimes referred to as a CPTED enabler or supporting strategy
### CPTED - Supporting Strategies

<table>
<thead>
<tr>
<th>Activity Support</th>
<th>Encourages interaction, furthers natural surveillance by putting activities and people in places to offer ‘eyes on the street’.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>All recommendations must be viewed in relation to how the built or natural environment is used. What cultural definitions are brought to the space? If it is not clear how a space should be used, it may not function well or the intended users may bypass security measures.</td>
</tr>
<tr>
<td>Design Conflict</td>
<td>Occurs when two incompatible activities are located next to one another and are forced to compete for the same space.</td>
</tr>
<tr>
<td>Unassigned Space</td>
<td>Occurs when a site is built with spaces that have no assigned purpose and no one to exercise control over them. Such space lacks environmental cues that suggest how the space is to be used or who should control it.</td>
</tr>
<tr>
<td>Crime Generators</td>
<td>Locations that have a propensity to generate crime in the surrounding area.</td>
</tr>
</tbody>
</table>
| Target Hardening | A basic tool for providing safety and security. It involves making targets resistant to criminal attack through the installation of locks, alarms or lighting. [The Physical security design process answers the questions: What target?, and How hard?]

Crime Prevention Through Environmental Design
Virginia Safe by Design Committee / Henrico County Police
CPTED for Sports Venues

The Limits of Deterrence

Avoid expecting of CPTED what can only be provided by physical security.

CPTED can support a physical protection system, but not replace it.

Deterrence is Relative
CPTED for Sports Venues – The Limits of Deterrence

CPTED – *Deterrence is Relative*

- “Maximize visibility”
- “Guidance”
- “Express ownership”

These are ways to explain *deterrence*.

They are not *quantifiable* measures of:

- Probability of *detection*,
- Adversary *delay*, or
- Probability of interruption (*denial*).
Deterrence is relative to the motivation of the adversary.

Detection, Delay, and Denial are quantifiable, and their contributions to physical protection system (PPS) effectiveness are measurable.

- **PPS Measure**: Chain link fence, wire outriggers
- **Delay**: 7-15 seconds

Video: Sandia National Laboratories
CPTED – *Deterrence is Relative*

In the *execution phase* of an intrusion or attack (“actions on the objective”), *video surveillance* will deter only the person planning to escape unobserved.

**Video surveillance *can***:

- When paired with an intrusion alarm, help assess or qualify alarms
- With analytics, aid *detection*
- Post-local incident, aid investigation

**By itself, video surveillance *cannot***:

- Deter an intruder who has no intent to escape
- Delay an intruder
- Disrupt/Deny an intrusion
CPTED for Sports Venues – The Limits of Deterrence

Adversary Task Timeline

\[ \begin{align*}
T_0 &= \text{First alarm occurs} \\
T_A &= \text{The time at which the alarm is assessed to be valid} \\
T_I &= \text{The time at which the response force interrupts adversary actions} \\
T_C &= \text{Adversary task completion time}
\end{align*} \]

*Deterrence* happens here. It is not quantifiable in the timeline.
CPTED for Sports Venues – The Limits of Deterrence

**Adversary Task Timeline** – *protected asset in safe*

*Design Basis Threat:* One to two intruders, unarmed, with hand-carried equipment ("common hand tools, drills, punches hammers, and pressure applying devices")

- **Movement inside room to safe (10 seconds)**
- **Time to defeat safe (15 minutes)**
- **Alarm assessed (90 Seconds)**
- **Response and Disruption (10 Minutes)**

- **Adversary time to complete task:** 15:10 Min.
- **Response time:** 11:30 Min.
- **Outcome:** Attack fails

10 Jan 2017
Terrorist Attack Planning Cycle

Period when a criminal seeks to avoid detection and interruption.

Period when a Terrorist (suicide) seeks to avoid detection and interruption.

Deterrence

Detection

Though not quantifiable when measuring physical protection system (PPS) effectiveness; deterrence can influence a significant portion of the adversary planning cycle.

CPTED’s impact helps shape perception and influence behavior; how much influence remains relative.

Adapted from U.S. Army Provost Marshal General, Antiterrorism Branch
CPTED for Sports Venues

CPTED enabling Physical Security and Force Protection

• Temper and Intent
• Canalization
• Identification through video surveillance
• Wayfinding
• Pre-operational surveillance
CPTED Enables: Temper and Intent decisions

• Temper and intent can be evaluated by observing a person’s actions and equipment.*

• CPTED provides a contrasting background (“context”) which supports better temper and intent decisions.

Skateboarding is welcome; but not here. Probably not a ticket holder.

* Gray Belt Instructor Manual, Martial Arts Center of Excellence, US Marine Corps
CPTED Enables: canalization of access attempts towards intended entrances

- Authorized users understand expected entrance.
- Movement and actions of unauthorized users are more exposed.
- Unauthorized access attempts are harder for an intruder to excuse.
CPTED Enables: Improved identification through electronic surveillance

- The visitor’s gaze is directed towards this wayfinding signage or display screen...
- ...and the video surveillance.

Camera housing as a design element.
CPTED Enables: Improved circulation control through wayfinding

• Wayfinding for venue activities supports territorial enforcement.

• Wayfinding expresses the “ground rules for proper or legitimate usage of a space and is critical for achieving compliance and reducing facilitators of crime and terror.”*

• Merging event branding and wayfinding facilitates access and circulation control for multiple simultaneous events.

• Wayfinding helps *assigned space* and creates *context*; making more obvious instances when venue users are out of place.

CPTED Enables: Increased likelihood of detecting pre-operational surveillance

Activity support/context. If you want to surveil a target from this seating area; you need to be a parent, and your pre-adolescent children need to be with you. You will otherwise be asked to leave, and/or be reported to the police.
CPTED for Sports Venues

Non-Traditional *Natural Surveillance* and *Activity Support*

- Millennials
- Markets
- Gardens
- Boondocking
- Drones
Ticket Purchases and Millennials

“If we expect [Millennials] to just go to a game, sit down and watch, we’re really missing the boat...

“...our task as an industry is to create additional ways and forums to allow this audience increased social engagement.”

Dave Butler, CEO, Paciolan; California-based ticketing company
Markets and Millennials

National Association of Collegiate Directors of Athletics

The Five Keys to Reaching and Engaging Millennial Fans:

I. Deliver More Unique Online and Offline Experiences
II. Deliver More Digital Integration Into Live Events
III. Deliver More Personalized Storytelling Opportunities Across More Platforms
IV. Deliver More Music and Entertainment
V. Deliver More Locally Relevant Value

• 10 Millennial Grocery Shopping Trends:

(6) Willingness to seek out and pay more for the food that they want—especially locally grown and organic food. [Understanding Millennial Grocery Shoppers’ Behavior; Journal of the Academy of Nutrition and Dietetics (2015)]

• Millennials regard farmers markets as more of a social event than a shopping event. [How farmers markets are evolving to be less about the farmers; Katherine Martinko (2016)]
CPTED for Sports Venues

Non-Traditional *Natural Surveillance* and *Activity Support*

- Millennials
- Markets
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- Drones
BYU LaVell Edwards Stadium – Farmers Market

• Empty parking lot is a hive of activity on non-game days.
• Students can purchase locally grown food, and enjoy cooking demonstrations.
• Vendors are screened; must complete a six page application and liability waiver.
• Vendor fees cover clean-up costs
CPTED for Sports Venues - Non-Traditional Natural Surveillance and Activity Support

Aloha Stadium – Swap Meet and Marketplace

• Open since 1979, market has grown to surround entire stadium. Open three days weekly; regarded as a tourist destination.

• Significant revenue source; > $6M annually (2010)  
  [Hawai‘i State Auditor Report 12-02 (March 2012)]

• Stability in vendor population:
  “Over half the vendors have been doing business here longer than eight years with well over 30 vendors who have been here for over 18 years.”

• Chief reason Millennials cite for not visiting farmers’ markets (inconvenience, lack of transportation) is overcome by offering shuttle service to the market.

• The security challenge is not reduced (theft, trademark infringement are issues); however, annual (2010) stadium security budget is < 6% of market revenues.

• Third-party management firm hires off-duty HPD Officers to patrol market areas.
Non-Traditional *Natural Surveillance* and *Activity Support*

- Millennials
- Markets
- Gardens
- Boondocking
- Drones
Gardening and Millennials

“In 2008, 8 million Millennials were food gardeners. In 2013, the number had increased 63%, to 13 million. And they spent 89% more on food gardening in 2013 than in 2008, according to the National Gardening Association.

“The increase in Millennials has meant an increase in urban gardening, too, since Millennials move to and live in cities in greater numbers than previous generation at that age. Urban area gardening has grown by 29% in that same five-year period.”
Gardens in Professional Sports

- Roof top gardens. Available produce is used by venue food services (shortest possible “farm to table” experience).
- Enhanced guest experience.
- Introduces many urban spectators to agriculture concepts; intensive and organic farming methods.
- Curated and cultivated by venue food services staff, or university/extension personnel.
- Limited scale, relative to total food service patrons.
- Venue garden; not a community garden. Intentionally limited community engagement/involvement.
- Excellent design concept, but limited impact on CPTED goals given rooftop location.
CPTED for Sports Venues - Non-Traditional Natural Surveillance and Activity Support

Garden Opportunities at Ground Level (Collegiate or Community Sports Venues)

• Peripheral or proximate areas of venue property where there is no activity, or surveillance.

• These areas are underutilized, cost money to maintain, generate no revenue, and may attract crime.

• How does leaving these areas empty and unsupervised impact your venue’s exposure to premises liability?

• “Unassigned Space”

  Occurs when a site is built with spaces that have no assigned purpose and no one to exercise control over them. Such space lacks environmental cues that suggest how the space is to be used or who should control it.
Randall’s Island Park, New York
Randall’s Island Park, New York

Urban Farm, near Fields 60, 63 and 70. Note the small greenhouse for seed starting. Background: Hell’s Gate Bridge, over the East River

Community agriculture near public athletic fields; Field 63 is a Baseball Field. MLB Season April - October; seed starting (broccoli, tomatoes) in New York begins in late March; final harvest (kale), is in mid-November. *Natural Surveillance* and *Activity Support* occurs before and beyond the sport season.
Sole Food Urban Farm, Vancouver

- Revenue generating. 50,000 lbs (25 tons) of food grown annually (4 locations, ~ 5 acres combined); sold to community restaurants and families as farm shares.

- Provides “meaningful training and employment to people with challenges like mental illness and addiction, but also to do something on a scale that was truly agricultural.”

- Hoop houses enable extended growing period; multi-season, near continuous activity

- Plans to create North America’s largest urban orchard. Expansion investment is crowd sourced.

- Vacant parking area (former gas station site), near waterfront at stadium’s periphery is now a community resource; providing activity support and natural surveillance for a once blighted area.
Non-Traditional *Natural Surveillance* and *Activity Support*

- Millennials
- Markets
- Gardens
- Boondocking
- Drones
Recreational Vehicles – “Asphalt Boondocking” – Walmart Parking Areas

- Many Walmart stores allow overnight parking of recreational vehicles (RV) in rear, unoccupied areas of their parking lots.
- This arrangement between RVers and Walmart is not official, but it appears to be long standing and symbiotic.
  - RVers are able to temporarily locate in safer, well lighted areas; within walking distance to shopping, groceries, and restroom facilities.
  - Walmart gains *natural surveillance* and *activity support* in less surveilled or supervised areas of its properties. RVers also patronize Walmart stores (revenue generating).
  - RV parking locations usually offer line of sight observation to/from entrances, and avenues of approach.
Recreational Vehicles – Sports Venues

- RVs accommodated on/around game days.
- Usually revenue generating; ticket holders or parking fees.
- RVs typically confined to RV lots; further from the venue.
- RVs often discouraged on non-game days
- RV parking areas are not specifically located to provide observation of protected areas, or planned in order to achieve more continuous natural surveillance and activity support outer perimeter areas.
- RVers generally not engaged for participation in “see something, say something” programs.
Recreational Vehicles – Sports Venues

- RVs accommodated in auxiliary/annex parking area on non-race days as well.
- Line of sight to venue, and venue entrances.
- Adequate stand-off distance. RV parking occurs sufficiently outside the blast radius anything that the RV might contain.
- Parking area patrolled by venue security.
Non-Traditional *Natural Surveillance* and *Activity Support*

- Millennials
- Markets
- Gardens
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- Drones
Unmanned Aerial Systems (UAS)

- Concerns regarding UAS use on *game day* are fairly uniformly shared by sports venue security directors.
- A regulatory *framework* at the Federal level is in place, and the same is evolving comparatively fast in many local jurisdictions.
- Response to game day incidents has tended to follow a law enforcement approach: detection, investigation, prosecution.
- The topic of response to *non-game day* UAS activity has not been as thoroughly examined.
- The type of engagement that occurs with UAS hobbyists and research communities, may influence game day incidents rates.

*Moving Target, Understanding the latest FAA drone regulations*, by Emily Attwood, Game Day Security, 2016, NCS4
**CPTED for Sports Venues - Non-Traditional Natural Surveillance and Activity Support**

**Lenn Park - Culpeper, Virginia**

- **Sports Events**
- **Cultural Events, Concerts**
- **Unmanned Aerial Systems**

Lenn Diagram

![Lenn Diagram](image)
Lenn Park, Culpeper, Virginia – Unmanned Aerial Systems

- Lenn Park is home to the *Culpeper Model Barnstormers Club* (CMB), an Academy of Model Aeronautics (AMA) affiliated club (#4894).


- “Airpark” section is located in a more remote area of the park (previously *unassigned space*); location promotes *activity support* and *natural surveillance* in a more secluded public area.

- Designated CMB Airpark area enables club member users to deconflict airspace from sports field areas, and sports event times.
Lenn Park, Culpeper, Virginia – Unmanned Aerial Systems

- CMB Club is largely self managing; UAS operators must be members of CMB Club and AMA.
- Member contact information is available to CMB Club Officers, AMA managers.
- Club bi-laws, handbook and operating guidelines prescribe how and when “Lenn Airpark” may be used.
- AMA provides guidelines for safely operating within the airspace; “See and Avoid” Guidelines.
- The venue is available for new UAS operators to practice techniques under the influence and oversight of more experienced, vetted operators; reducing the local UAS operator community’s over all accident rate.
Cars and **Unmanned Aerial Systems** - Spectrum of problem operators.

- **Cars on the road**
  - Immature or inexperienced novices
  - Experienced, conscientious drivers
  - Bad actors: impaired, angry drivers
  - **Not the main problem**
  - The main problem

- **UAS overhead**
  - Immature or inexperienced novices
  - Experienced, conscientious hobbyists and researchers
  - Bad actors: criminals, terrorists
  - **Not the main problem**
  - The main problem

- Your venue’s large, empty parking areas are extremely inviting to UAS operators; especially in more urban areas.
- The motoring public and many young drivers are safer owing to the availability or large, empty parking areas in which to practice their skill.
- If you engage them, the experienced, conscientious operators can monitor and train the novices; and possibly provide you early warning concerning the bad actors.
Unmanned Aerial Systems – *Notional Incident Scenario Response*

**Notional Scenario**: Unauthorized overflight of sports venue results in UAS crash; spectator injuries.

These are the post incident resources potentially available for a venue or community with something like “Lenn Airpark”:

- Many/most serious UAS owners, operators within a jurisdiction/region are known in advance to UAS club managers (and/or venue operators/security directors).

- With the appropriate request/agreement, member contact information can be available to investigators, allowing officials to quickly rule out those who are not culpable; conserving time and investigative resources.

- Good and bad actors may frequent the same online and offline forums concerning UAS technology and techniques. If the UAS club is included in “see something, say something” program outreach, suspicious discussion threads or elicitation attempts may be reported earlier; allowing pre-emptive inquiry.

- Potential access to recorded video data, or active feeds of venue/park areas where there is no existing surveillance cameras.
Unmanned Aerial Systems - *Responses*:

1. *Engineering Response*, augmented/supported by venue policies and screening procedures.

2. *Technology Response* which enables disruption of *in progress* UAS activity.

3. *Protective Intelligence Response* which seeks to anticipate, identify and investigate unauthorized UAS activity.

Having all three response capabilities is *preferable*; however, for most sports venues, having less than all three is actually *achievable* (in the near term).

If no UAS activity is authorized at or near your venue *at all times* (“zero tolerance”); and UAS operator communities or groups are engaged only reactively: (1) important information sources (2) and opportunities for *Activity Support* and *Natural Surveillance* may be missed.
Unmanned Aerial Systems – *Responses*:

2. *Technology Response* which enables disruption of *in progress* UAS activity.

If your venue has the resources to bolster your procedure and policy mitigations with engineering constraints and technology responses to UAS; are you “red teaming” the continuum of your response actions?

Who is your red team?

Would you wait until game day to evaluate the effectiveness of any other security technology investment?
Unmanned Aerial Systems - *Is the advance of UAS technology something you can resist?*

Illustrations of *The Flying Machine*, written by Ray Bradbury. Does a disruptive technology negate a security infrastructure investment?

If the answer to the above question is *no*, will market advantages tend to accrue to venues which are the earliest UAS adopters and innovators?

Will venue security directors gain more through UAS denial strategies, or through *constructive* adoption of UAS technologies, and engagement with operator communities?
Unmanned Aerial Systems - *Is the advance of UAS technology something you can resist?*

**Guest Experience**

“Taco copter”

Beverage delivery drone, golf venue

Drone race (*empty stadium*)

Drone racing (*filling stadiums?*)

Other possible UAS technology responses:

4. *Augmenting the guest experience; revenue generation*
Have we always waited in line at the concession stand because the *queue* represents the optimum means of acquiring refreshments?

Or, have we been waiting in line because heretofore we lacked the option of being able to:

1. download an app,
2. order a beverage via our smart phones,
3. and, have a quad rotor deliver the beverage right to our seats in the stands; and thereby, not miss a moment of the game?

We aren’t there *yet*; but the age of this happening has already dawned.
CPTED for Sports Venues - Non-Traditional Natural Surveillance and Activity Support

Unmanned Aerial Systems - *Is the advance of UAS technology something you can resist?*

Emergency Response

Other possible UAS technology responses:

5. *Emergency Response enhancement*

- Fire services, aid to evacuation
- Defibrillator delivery drone
- Police drone

![Firehouse Technology Drone UAS Nav Light Kit](image)

![Police drone](image)

![Defibrillator delivery drone](image)
CPTED for Sports Venues

Non-Traditional *Natural Surveillance* and *Activity Support*

- Millennials
- Markets
- Gardens
- Boondocking
- Drones

Design and Engineering Considerations
## Design and Engineering Considerations for *Natural Surveillance and Activity Support*

<table>
<thead>
<tr>
<th></th>
<th>Intentional Site Planning</th>
<th>Lighting</th>
<th>Utilities (power)</th>
<th>Amenities (restrooms)</th>
<th>Trash Disposal</th>
<th>Covered Area / Pavilion (Temporary or Permanent)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Farmers Markets</strong></td>
<td>X</td>
<td>X</td>
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<td><strong>Gardens</strong></td>
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<td><strong>RVs</strong></td>
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</table>

**Active Security Program Engagement; e.g., “see something, say something”**

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### Which Department Pays (operations phase)?

<table>
<thead>
<tr>
<th></th>
<th>Stadium Operations / Facilities</th>
<th>Sales and Marketing</th>
<th>Community Engagement</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers Markets</td>
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- If sustained through vendor fees/investment; may be eventually be revenue neutral, or even *generating*. 

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**CPTED for Sports Venues - Non-Traditional Natural Surveillance and Activity Support**

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63
Nudging CPTED from Deterrence into the Detection Column

- Scenario
- Exercise Data
- Quantifying Natural Surveillance

See something, Say something...sometimes.
CPTED Scenario – Suspicious Package

Existing conditions:

- Side entrance of sports venue lacks adequate video surveillance, analytics.
- Side entrance is within view of parking area, and an interior concession area.
- How do we estimate probability of detection for a suspicious package left in this area?

Exercise Design (Mini-Drill)

- Re-emphasize the “see something, saying something” procedures in your security awareness program.
- Develop exercise plan, communicate drill intentions to control center/dispatch, locate exercise controller near drill location.
- Place an inert “suspicious package” near the side entrance.
- Record whether it was observed and reported (“first alarm”), the time it takes for it to be reported (by anyone), and how long it takes for security officers to respond.
- Repeat this drill process on ~ five different dates.
CPTED Scenario – Suspicious Package

Exercise Design (Mini-Drill) (continued)

Event days are busy, food service workers are not focusing on the entryway at all times; it is likely that it will *not* be reported every iteration. Assume that only 2 of 5 drills yield a “see something, say something”-type report (sense, assess, transmit).

Probability of an Event = \frac{\text{Number of Successful Outcomes}}{\text{Number of Possible Outcomes}}

Pro tip: *Confidence Level*

Adjust for small sample size with *many* repeated iterations, or run a Monte Carlo/probability simulation.
CPTED Scenario – Suspicious Package

*Existing Conditions*

- Probability of bag being Discovered = 0.40000 = \( \frac{2}{5} \)
  Number of time security is alerted suspicious package Exercises Conducted

*Adjust for number of home games*
  (observers will not always be present)

- Probability of an event scheduled on a given day = 0.109589041 = \( \frac{40}{365} \)
  Number of Events in at Venue in a year
  Number of Days in a year

- Probability that suspicious package detection occurs (any day) (Joint Probability) \([p(A \text{ and } B)]\) = 4.4% 

  a) Planned Home Games (Basketball) 10
  b) Planned Home Games (Hockey) 10
  c) Current/planned cultural events (concerts, etc.) 20

  Total Events (currently) 40

\[
\text{Probability of an Event} = \frac{\text{Number of Successful Outcomes}}{\text{Number of Possible Outcomes}}
\]
CPTED for Sports Venues – Nudging CPTED from *Deterrence* into the *Detection* Column

**CPTED Scenario – Suspicious Package**

*With programmed Activity Support, Improved Natural Surveillance*

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Probability of bag being Discovered

\[
\text{Probability of \text{bag being Discovered}} = \frac{2}{5} \quad \text{Number of time security is alerted suspicious package Exercises Conducted}
\]

Adjust for number of home games

(obeservers will not always be present)

Probability of an event scheduled on a given day

\[
\text{Probability of an event scheduled on a given day} = \frac{222}{365} \quad \text{Number of Events in at Venue in a year Number of Days in a year}
\]

Probability that suspicious package detection occurs (any day) (Joint Probability) \( p(A \text{ and } B)\)

*24.3%*

\[
\begin{align*}
\text{a) Planned Home Games (Basketball)} & : 10 \\
\text{b) Planned Home Games (Hockey)} & : 10 \\
\text{c) Current/planned cultural events (concerts, etc.)} & : 20 \\
\text{Total Events (currently)} & : 40
\end{align*}
\]

Programming in additional Activity Support

\[
\begin{align*}
\text{d) Farmers markets (bi-weekly)} & : 26 \\
\text{e) Garden club or urban farm occupies unassigned space (assume visits \sim \text{twice weekly, three seasons)}} & : 78 \\
\text{f) Also allow RVs on non-game days, in specific areas (assume 2-3 RVs visit weekly)} & : 52 \\
\text{g) Allow UAS club in unassigned space (bi-weekly meetings)} & : 26
\end{align*}
\]

Other activities programmed for unassigned space:

Sports and non-sports events: 182

---

**Probability of an Event**

\[
\text{Probability of an Event} = \frac{\text{Number of Successful Outcomes}}{\text{Number of Possible Outcomes}}
\]
CPTED Scenario – Suspicious Package

*With programmed Activity Support, Improved Natural Surveillance*

- **24.3%** probability of detection is **still low**; it *does not* eliminate the need for additional physical protection system investments (as funds are available).
- However, it is something; and it is **measurable**.
- It can now be included as part of cumulative probability in a security system effectiveness equation.
- The Security Director used CPTED concepts to improve probability of detection by **19.9%** [a 452% increase (percentage change)], for a vulnerable location (single pathway) of this sports venue.
- This improvement was achieved using mostly the budgets of *other* departments.

“You can't manage what you don’t measure.”

- Peter Drucker
CPTED for Sports Venues

Including CPTED Goals Early in the Planning and Design Process

“If you can’t be on time, be early.”

Architects, Engineers and Security Directors
Architects, Engineers and Security Directors

“Your security system is not in harmony with our design concept.”

Translation:

“Where were you during the Programming Phase?”
Architects, Engineers and Security Directors

Physical Protection System (PPS) / CPTED Planning, Procurement and Design Process

• Most security directors will have few opportunities in their careers to be involved in major capital design projects.

• Understanding the process, and being involved in it early will help you influence design outcomes in ways that support your security program as much as possible.

• Issues resulting from a Security Director’s failure to be effectively involved will take many years, and a significant amount of your security budget to overcome.

• CPTED in particular concerns the organization of space, and the location/orientation of whole facilities. It is more than the installation of equipment. Early involvement is critical.

• You are your venue’s resident security advisor; your perspective and advocacy is essential.
Ability of security director to influence a Sports Venue Design Project

- **High**
- **Negligible**

**Initiation**
**Closure**

Work completed over project life cycle
CPTED for Sports Venues - Including CPTED Goals Early in the Planning and Design Process

Physical Protection System (PPS) / CPTED Planning, Procurement and Design Process

Penn State Project Delivery Process, Penn State Office of Physical Plant
CPTED for Sports Venues

Process-Driven System Design
Integrated security design process

Adapted from: Security Planning and Design, A Guide for Architects and Building Design Professionals (Fig. 6.1) edited by Joseph A. Demkin, AIA; The American Institute for Architects / John Wiley & Sons, Inc., 2004
CPTED for Sports Venues

The Design and Review Planning

Adapted from: 21st Century Security and CPTED, Designing for Critical Infrastructure Protection and Crime Prevention, 2nd Edition, (Fig. 4.2) edited by Randall I. Atlas, Ph.D., CRC Press, 2013

CPTED for Sports Venues

Physical Protection System (PPS) / CPTED Planning, Procurement and Design Process

Assessment Phase
- Consensus Achieved for Expansion Project
  - Criticality Assessment
    - Threat Assessment
      - Vulnerability Assessment
        - Risk Analysis
          - Design Basis Threat

Architect Selection
- Scope of Work for RFQ
  - RFQ Published
    - Bidder Conference
      - Question Period
        - Solicitation Review
          - Presentation, Negotiation
            - Architect Selected

Programming Phase
- Develop Owners Needs Lists
  - Design Standards Identified
    - PS / CPTED Design Standards Identified
      - Hardware & Software Engineering
        - Personnel Requirements
          - Operational Requirements
            - Support / Service Requirements
              - Installation Requirements

Schematic Design Phase (10-30%)
- Execute Programming Requirements
  - Develop Basis of Design Narrative
    - Identify Vendor Compatible w/ Design Narrative
      - Determine Inspection Criteria

Design Development Phase (60%)
- Design Documents
  - Site
    - Civil
      - Structural
        - Architectural
          - Mechanical Electrical, Plumbing
            - Physical Protection Systems (PPS)

Final Drawings (95%)
- Owner Review
  - Specifications
    - Final Inspection Criteria
      - Acceptance Testing Process Determined

General Contractor Selection
- Scope of Work for RFP
  - RFP Published
    - Bidder Conference
      - Question Period
        - Solicitation, Bid Review
          - Presentation, Negotiation
            - General Contractor Selected

Construction Phase (PPS System)
- Construction Administration
  - Prepare Facilities
    - Shop drawing Review / Approvals
      - Acquire Hardware, Software
        - Test System
          - Construction Progress Meetings

Operations Phase
- System Operation and Support
  - Establish Self-Sufficiency

Critical Path Flow Chart

Traditional Design/Bid/Build Process

10 Jan 2017
CPTED for Sports Venues

Physical Protection System (PPS) / CPTED Planning, Procurement and Design Process - The Security Director’s Role

**Assessment Phase**
- Consensus Achieved for Expansion Project
- Criticality Assessment
- Threat Assessment
- Vulnerability Assessment
- Risk Analysis
- Design Basis Threat

**Architect Selection**
- Scope of Work
- RFQ Published
- Bidder Conference
- Question Period
- Solicitation Review
- Presentation, Negotiation
- Architect Selected

**Programming Phase**
- Develop Owners Needs Lists
- Design Standards Identified
- PS/CPTED Design Standards Identified
- Hardware & Software Engineering
- Personnel Requirements
- Operational Requirements
- Support / Service Requirements
- Installation Requirements
- Budget Identified

**Schematic Design Phase**
- Execute Programming Requirements
- Develop Basis of Design Narrative
- Identify Vendor Compatible w/ Design Narrative
- Determine Inspection Criteria

**Design Development Phase**
- Design Documents
- Site
- Specifications
- Acceptance Testing Process Determined

**Final Drawings**
- Final Inspection Criteria
- Structural
- Architectural
- Mechanical Electrical, Plumbing
- Physical Protection Systems (PPS)

**General Contractor Selection**
- Review and Comment Period
- On Board Review
- On Board Review
- Review and Comment Period
- On Board Review
- On Board Review

**Construction Phase**
- Construction Administration
- Prepare Facilities
- Bidder Conference
- Question Period
- Solicitation, Bid Review
- Presentation, Negotiation
- General Contractor Selected

**Operations Phase**
- System Operation and Support
- Test System
- Construction Progress Meetings

= Opportunity for security director involvement

Traditional **Design/Bid/Build Process**

10 Jan 2017
Planning, Procurement and Design Phases

- Assessment Phase
  - Consensus for Expansion Project
- Architect Selection (RFQ)
- Programming Phase
- Schematic Design Phase (10-30%)
- Design Development Phase (60%)
- Final Design Phase (95%)
- General Contractor Selection (RFP)
- Construction Phase
- Operations Phase

The Security Director’s Role:
Planning, Procurement and Design Phases
The Security Director’s Role – Sports Venue Design Project

Consensus Achieved for Venue Design Project

- Chamber of Commerce and City Council want to host future championship, and like tournaments.
- Trend in increased ticket revenue, regional population growth.
- Related junior sports leagues in surrounding communities, schools are expanding.
- Venue owners make expansion project part of mid or near term business goals.
- Capital improvement planning initiated; funding sources sought.
**The Security Director’s Role – Sports Venue Design Project**

**Assessment Phase**

- Assessment methodology should be formal, repeatable, and an industry recognized/accepted methodology.
- Main purpose *in the design process* is to **justify requirements**.
- Should include:
  - “Design Basis Threat”
    - *What are you designing your defense against?*
  - Distinguish between venue, jurisdiction, and national state responsibilities for risk mitigation.
- **Mitigation Recommendations**
- Assessment process is a security program requirement that is *independent* of the expansion project
- If your venue/site has no assessment record, include it in the RFQ (AIA Document B209™–2007)
CPTED for Sports Venues - Including CPTED Goals Early in the Planning and Design Process

Physical Protection System (PPS) / CPTED Planning, Procurement and Design Process

The Security Director’s Role – Sports Venue Design Project

 Architect Selection

• Security Director should assist with SOW development; provide suggested language and editing assistance to procurement staff.
• CPTED and Physical Security should be included in technical/specific requirements section; does not need to be too specific for RFQ.
• Coordination with security director in the design process can be directed in technical/specific requirements section.
• Ensure that CPTED and Physical Security are accounted for in the proposal evaluation criteria matrix.
• Be part of the solicitation review panel; attend bidders conference.
• The goal of the RFQ process is to determine Architect qualifications.
• How thoroughly have offerors accounted for the RFQ’s CPTED and physical security emphasis in their proposals?
The Security Director’s Role – Sports Venue Design Project

Programming Phase

- Architect compiles list of owner requirements
- Design standards to be used are determined; CPTED and physical security design standards are also determined.
- If your industry or league does not have its own CPTED and physical security design standards; you can cites the most applicable sections of other industry standards.
- Specific device numbers, placement and manufacturers are acceptable, but not essential at this point; instead **clearly define** what you want systems and device types achieve, and in what areas of the facility you want them to achieve these ends. Your risk assessment documents *why* you want achieve these things.
- A working project budget is usually determined by this phase; ensure your security goals are accounted for (and fit within this budget). Take advantage of 3rd party estimators if available.
The Security Director’s Role – Sports Venue Design Project

Schematic Design Phase (10-30%)

- Architect develops a narrative which documents how the design will meet the Owner’s list of requirements.
- Preliminary list of service, equipment providers is developed of firms that can help fulfill owner’s design requirements as articulated in the narrative.
- Design inspection criteria determined.
- Site surveys completed.
- Initial site and facility drawings completed.
- Security Director’s liaison with architect, designers is via Owner’s Representative.
The Security Director’s Role – Sports Venue Design Project

Design Development Phase (60%)

- Engineering disciplines complete design submittals; including physical security engineering.
- Security Director can provide input concerning design document review periods, via Owner’s Representative.
CPTED for Sports Venues - *Including CPTED Goals Early in the Planning and Design Process*

**Physical Protection System (PPS) / CPTED Planning, Procurement and Design Process**

**The Security Director’s Role – Sports Venue Design Project**

**Final Drawings (95%)**

- Final pre-construction design review.
- Design documents evaluated according to agreed criteria.
- Physical security specifications are developed for selected systems and equipment. Range of device types, manufacturers, quantities and placement will be known at this point.
- Ensure that any equipment matrix corresponds with design submittals.
- Acceptance testing criteria develop for inclusion in RFP.
The Security Director’s Role – Sports Venue Design Project

General Contractor Selection

- Security Director should assist with SOW development; provide suggested language and editing assistance to procurement staff.
- CPTED and Physical Security may be addressed in their own annex. Technical requirements are specific; may include system/equipment matrix, and summary testing criteria (or associated references will be stated).
- Coordination with security director in the construction process can be directed in technical/specific requirements section.
- Ensure that CPTED and Physical Security are accounted for in the proposal evaluation criteria matrix.
- Be part of the solicitation review panel; attend bidders conference.
- Provide contract review input.
CPTED for Sports Venues - Including CPTED Goals Early in the Planning and Design Process

Physical Protection System (PPS) / CPTED Planning, Procurement and Design Process

The Security Director’s Role – Sports Venue Design Project

Construction Phase

- Final Review / Approval of shop drawings
- As Built, point-to-point drawings completed
- Account for construction/installation impact on normal operations, and associated downtime of any existing systems.
- Develop commissioning plan. *Will a third party tester be used?*
- Coordinate Site Acceptance Test; and Operational Reliability Test and Assessment. Verify test failures have been remediated.
- Coordinate initial system support and sustainment; operator training schedule.
- Warranty requirements should be ≥ 12 months.
CPTED for Sports Venues - Including CPTED Goals Early in the Planning and Design Process

Physical Protection System (PPS) / CPTED Planning, Procurement and Design Process

The Security Director’s Role – Sports Venue Design Project

Operations Phase

- Ensure that your security program policy framework, response criteria, and security designs remain in alignment.
- Coordinate CPTED-related site maintenance, schedule.
- Your next system upgrade is ~ 5 years away, begin planning and budgeting for this now.
- Continue exercise and assessment cycle; ensure that design and technology requirements keep pace with changing operating requirements or emergent threats. Record alarm to interruption response times.
- Track system effectiveness metrics in order to determine or demonstrate return on security investment over time.
CPTED for Sports Venues

Presentation Summary

• Definitions
• The Limits of Deterrence
• CPTED enabling Physical Security and Force Protection
• Non-Traditional Natural Surveillance and Activity Support
• Nudging CPTED from Deterrence into the Detection Column
• Including CPTED Goals Early in the Planning and Design Process

Jay King, PSP, CPP
Life Safety and Security Sub-Market Leader
CHA Consulting, Inc.
jgking@chacompanies.com