

# Crime Prevention Through Environment Design (CPTED) for Sports Venues

*Distinction, Dollars and Delivering the Guest Experience*



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## Presenter Biography



Jay King, PSP, CPP  
CHA Consulting, Inc.

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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## Table of Contents



- Definitions
- The Limits of Deterrence
- CPTED enabling Physical Security and Force Protection
- *Non-Traditional* Natural Surveillance and Activity Support
- Nudging CPTED from Deterrence to Detection
- Including CPTED Goals Early in the Planning and Design Process
- Summary/Questions

## Definitions – *Distinctions among security concepts*

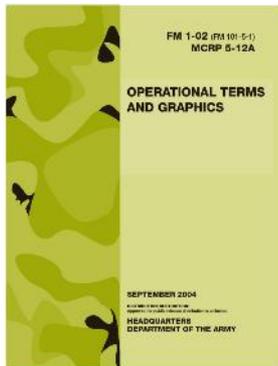
- Physical Security
- Deterrence
- Force Protection
- CPTED



***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)

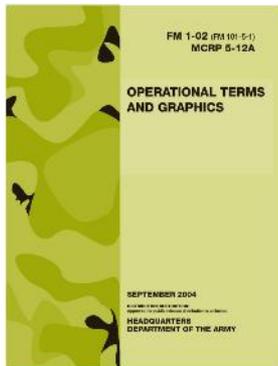
MCRP 5-12A

- 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*

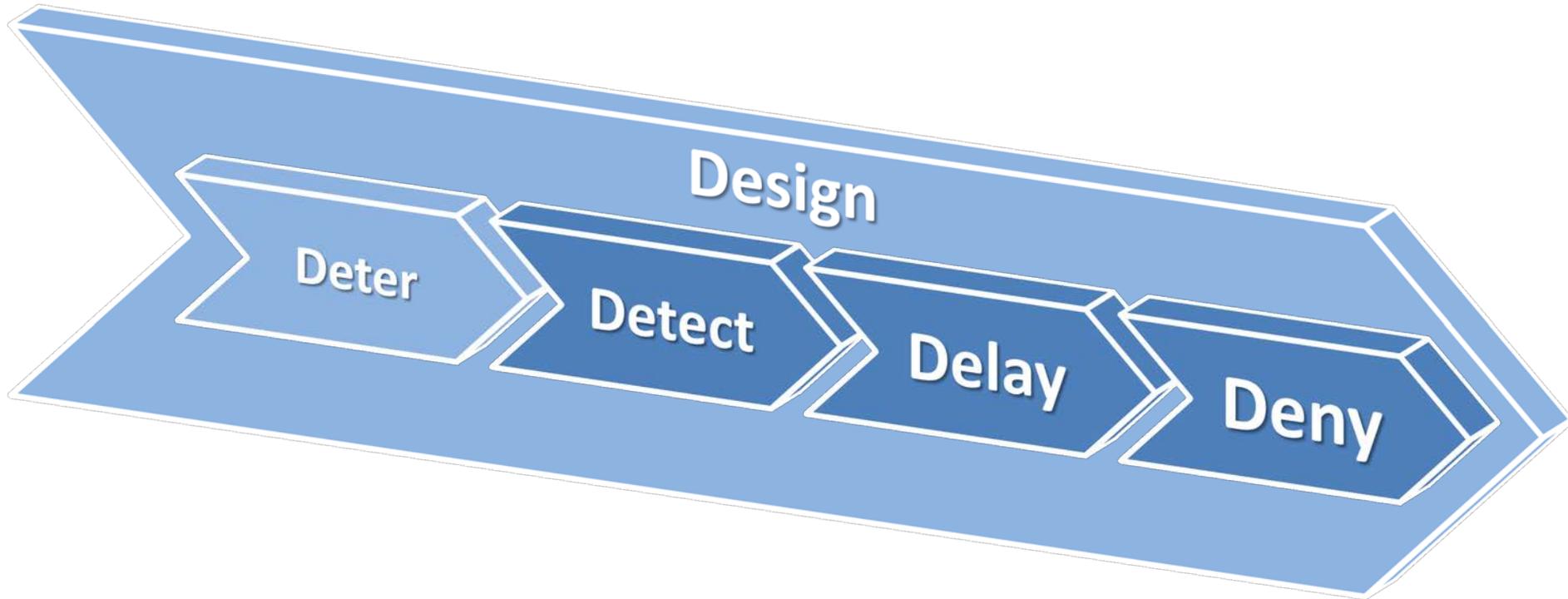
FM 1-02 (FM 101-5-1)

MCRP 5-12A

- Emphasis on *influencing* perception and associated behavioral responses.



# Designing the four Ds of Physical Security



Center for Development of Security Excellence (CDSE), Defense Security Service (DSS)



**D  
E  
S  
I  
G  
N**



• 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*.

*Operational Terms and Graphics*  
FM 1-02 (FM 101-5-1)  
MCRP 5-12A



## Crime Prevention Through Environmental Design



Saint Peter's University, New Jersey

“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.



## Crime Prevention Through Environmental Design

The Four Principles\* of CPTED are:

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

*Crime Prevention Through Environmental Design Guidebook*  
National Crime Prevention Council, Singapore

\* 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**.



Albany Convention Center, New York

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.

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



### CPTED - Natural Access Control

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



Randolph-Macon College, Virginia

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.

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





## CPTED - Maintenance and Management \*



SUNY New Platz, New York

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*

<b>Activity Support</b>	Encourages interaction, furthers natural surveillance by putting activities and people in places to offer ‘eyes on the street’.
<b>Context</b>	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.
<b>Design Conflict</b>	Occurs when two incompatible activities are located next to one another and are forced to compete for the same space.
<b>Unassigned Space</b>	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.
<b>Crime Generators</b>	Locations that have a propensity to generate crime in the surrounding area.
<b>Target Hardening</b>	A basic tool for providing safety and security. It involves making targets resistant to criminal attack through the installation of locks, alarms or lighting. <small>[The <i>Physical security</i> design process answers the questions: What <i>target?</i>, and How <i>hard?</i>]</small>

## 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 – *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**).

## CPTED – *Deterrence is Relative*

*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*



Plans to escape.



No plans to escape.

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**:

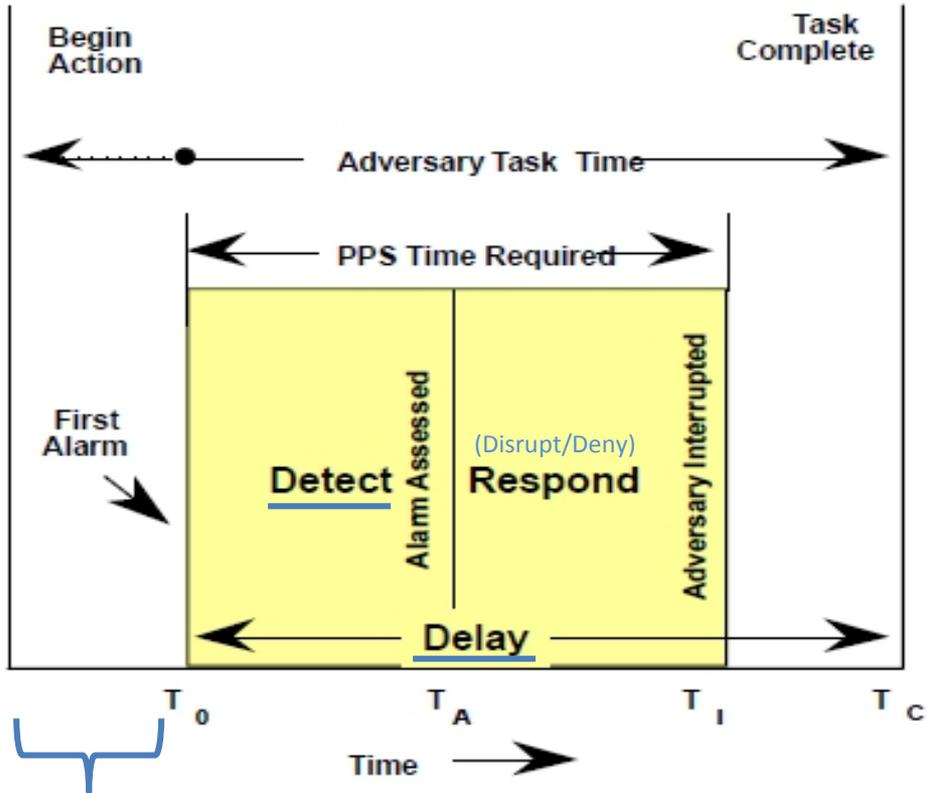
- When paired with an intrusion alarm, help assess or qualify alarms
- With analytics, aid **detection**
- Post-local incident, aid investigation

By itself, video surveillance **cannot**:

- Deter an intruder who has no intent to escape
- Delay an intruder
- Disrupt/Deny an intrusion



### Adversary Task Timeline



Prevent undesired event

$T_0$  = First alarm occurs

$T_A$  = The time at which the alarm is assessed to be valid

$T_I$  = The time at which the response force interrupts adversary actions

$T_C$  = Adversary task completion time

**Deterrence** happens here. It is not quantifiable in the timeline.



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

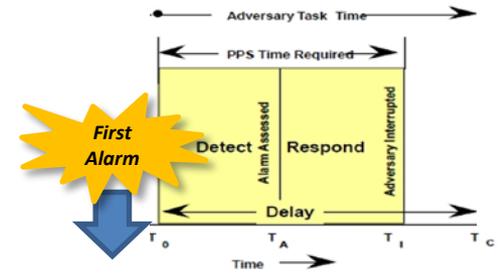
*Design Basis Threat:* One to two intruders, unarmed, with hand-carried equipment (“common hand tools, drills, punches hammers, and pressure applying devices”)



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



# Terrorist Attack Planning Cycle

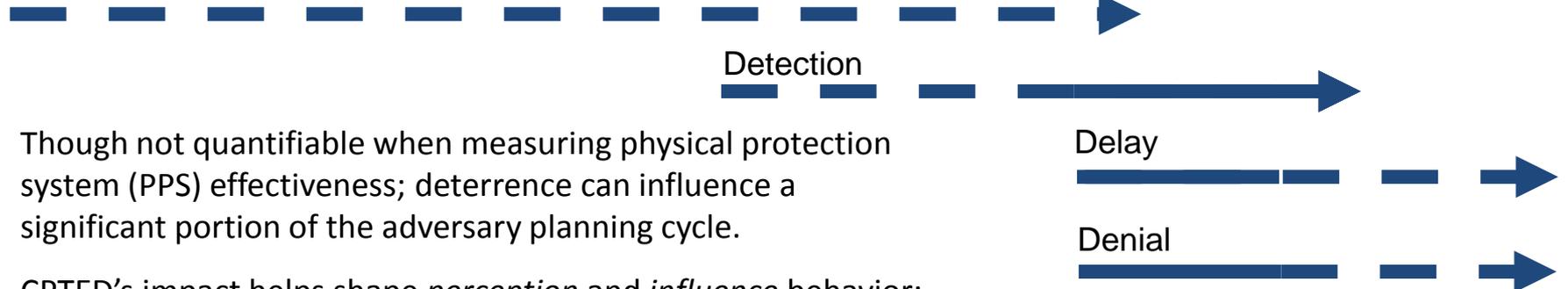


Period when a *criminal* seeks to avoid detection and interruption.



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

## Deterrence



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 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.



Henrico County Challenger Field, Virginia

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.

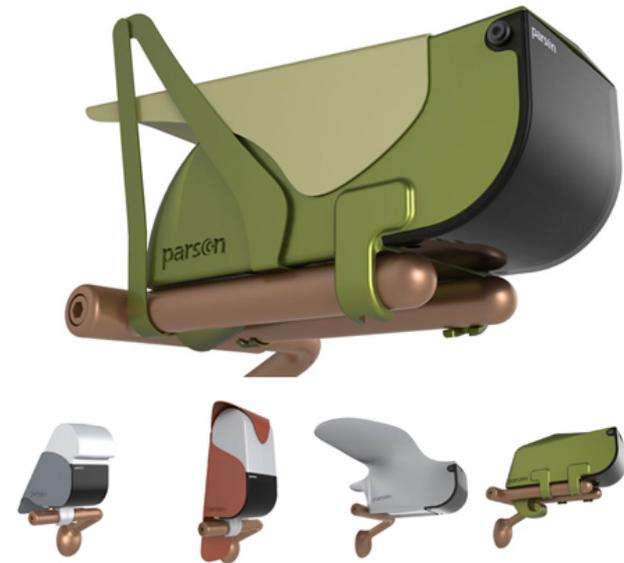
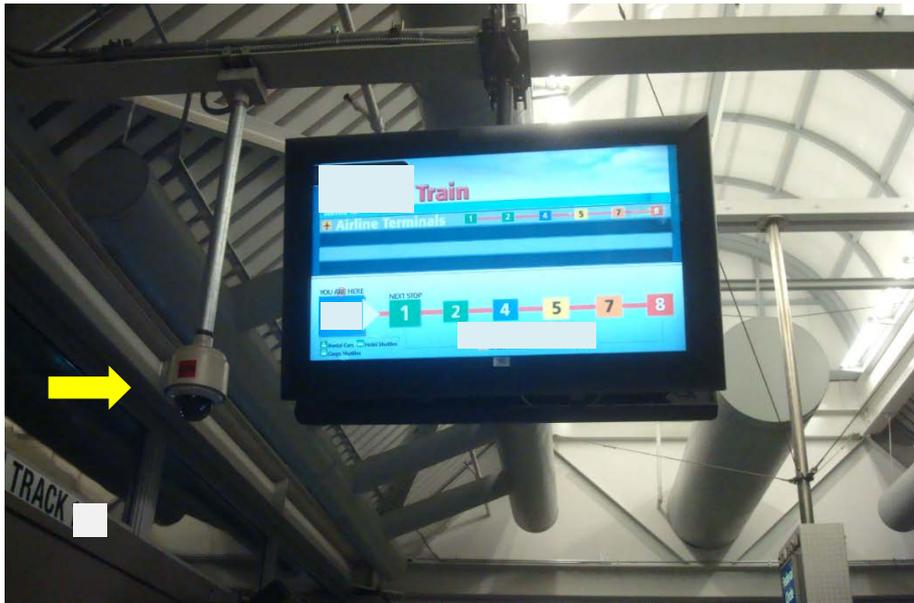


Savannah Cultural Arts Center, Georgia



## 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.

\* 21<sup>st</sup> Century Security and CPTED, Designing for Critical Infrastructure Protection and Crime Prevention, 2<sup>nd</sup> Edition, edited by Randall I. Atlas, Ph.D., CRC Press, 2013



### **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.



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

- Millennials
- Markets
- Gardens
- Boondocking
- Drones



## Ticket Purchases and Millennials



The screenshot shows the top of a SportsBusiness Daily article. The header includes the logo for Street & Smith's SportsBusiness Daily | Global | Journal. Below the header is a navigation bar with links for Daily, Global, Journal, Resource Guide Live, Conferences & Events, and Advertise. The article title is "Millennials put ticket strategies to test" and the byline is "By Eric Fisher, Staff Writer". The article text discusses how teams and leagues use non-traditional tactics to target younger consumers, mentioning Amy Howe, Ticketmaster's new chief operating officer, and her perspective on the millennial audience's needs and engagement.

“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 **NCADA Report: *Reaching and Engaging Millennial Fans (2015)***

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 social event than a shopping event. [*How farmers markets are evolving to be less about the farmers; Katherine Martinko (2016)*]

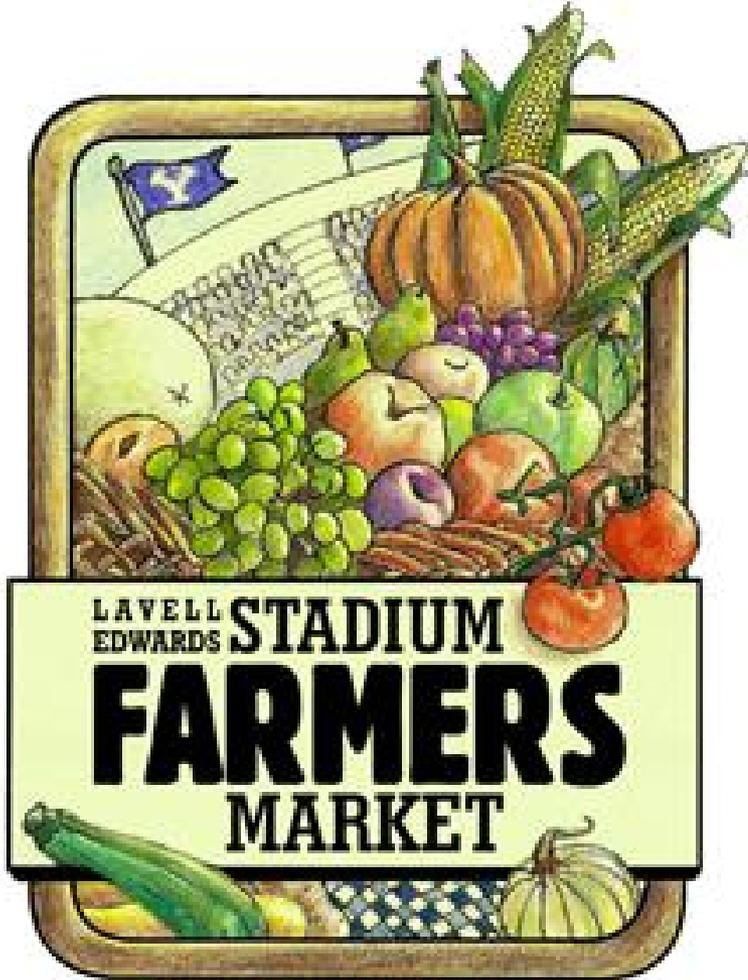


## Non-Traditional *Natural Surveillance* and *Activity Support*

- Millennials
- **Markets**
- Gardens
- Boondocking
- 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

## 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)<sup>(ibid)</sup> 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



**THE CBRIEF** *Want to understand Millennials? We'll make you smarter, faster.*

HOME

### Millennials Bring Gardening to Their Cities

Environment Today

November 20, 2015

Share: [f](#) [t](#) [in](#) [g+](#)



The established truth about Millennials is that they are urbanites. They want to live in dense neighborhoods and big cities, to be a part of the bustle and among the buildings. But along with all that, Millennials are also looking for their patches of green.

Many Millennials want to get their hands dirty with a plot of land and a bundle of seeds. Just because they're in the

“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



Fenway Park



Levi's Stadium



AT&T Park

- 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.

## 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



Formerly empty parking lot adjacent to B.C. Place Stadium



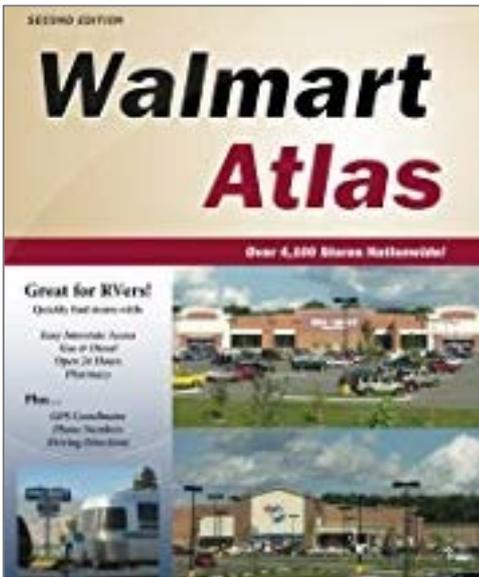
- Revenue generating. 50,000 lbs (25 tons) of food grown annually (4 locations, ~ 5 acres combined); sold to community restaurants and families as farm shares.
- Provides “meaningful training and *employment* to people with challenges like **mental illness** and **addiction**, but also to do something 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



Beaver Stadium



Buffalo Bills Stadium



- 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



Dover International Speedway

- 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.

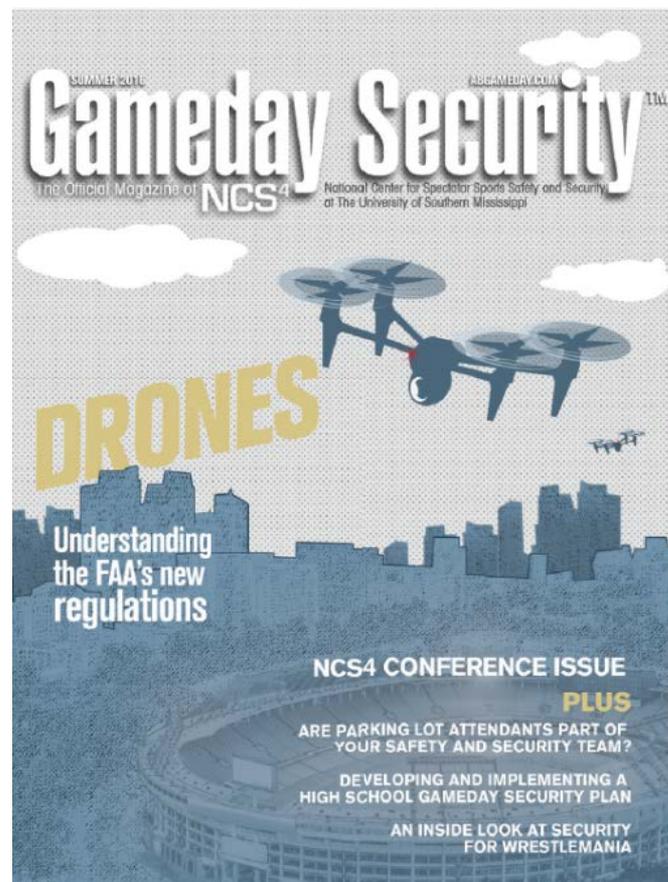
## Non-Traditional *Natural Surveillance* and *Activity Support*

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## 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

### Lenn Park - Culpeper, Virginia



• Sports Events



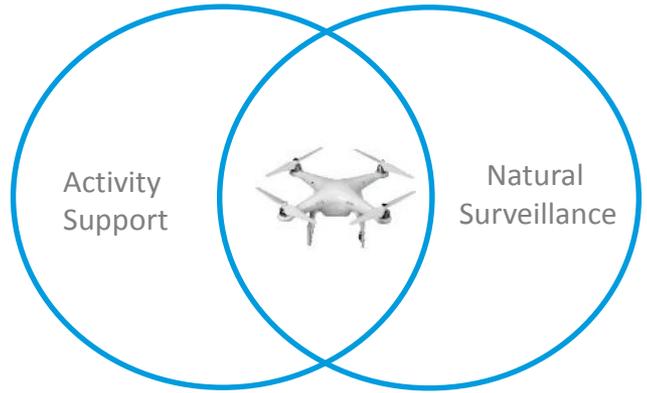
• Cultural Events, Concerts



• Unmanned Aerial Systems



Lenn Diagram



## Lenn Park, Culpeper, Virginia – Unmanned Aerial Systems

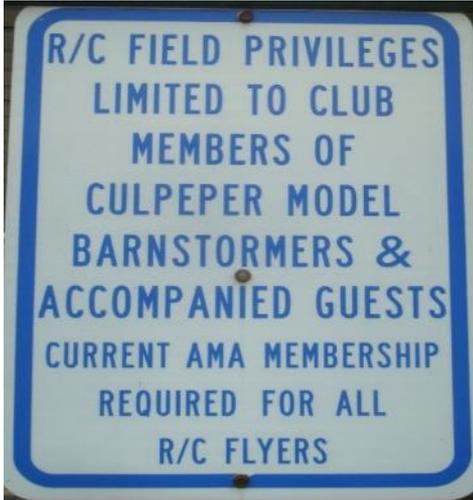


- Lenn Park is home to the *Culpeper Model Barnstormers Club (CMB)*, an Academy of Model Aeronautics (AMA) affiliated club (#4894).
- Hosted “Drone Day Open House” in Spring 2016
- “Airpark” section is located in a more remote area of the park (previously *unassigned space*); location promotes *activity 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.

Unmanned Aerial Systems



### Lenn Park, Culpeper, Virginia – Unmanned Aerial Systems



**Culpeper Model Barnstormers, Inc.**  
(AMA 44994)  
cmbclubre.com

**2017 MEMBERSHIP APPLICATION**

Please print your name on all information.

First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_ Preferred First Name: \_\_\_\_\_  
 Street Address: \_\_\_\_\_ Year of Birth: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Spouse's name: \_\_\_\_\_  
 Zip Code: \_\_\_\_\_ (please include your 4 number zip extension)  
 Phone Number: (\_\_\_\_) \_\_\_\_\_ AMA #: \_\_\_\_\_ Expiration Date: M \_\_\_\_ Y \_\_\_\_  
 E-mail Address: \_\_\_\_\_ AMA Membership Class: \_\_\_\_\_

Are You an AMA Designate?  
 Control Device? \_\_\_\_\_ Leader Member? Education? \_\_\_\_\_ Flight? \_\_\_\_\_ Admin? \_\_\_\_\_ Science? \_\_\_\_\_ Industry? \_\_\_\_\_

I have read and understood the Culpeper Model Barnstormers' Bylaws and Members Handbook. I have read and understood the AMA safety code. I will maintain my membership in the AMA. As a Culpeper Model Barnstormers club member, I will only use Narrow Band (Gold sticks) if prior to 1993 manufacturer Radio Equipment (except 27 and 53 MHz) operation and/or Special Spectrum equipment.

Signature: \_\_\_\_\_

**2017 DUES & FEES** (1 January through 31 December 2017)

Initiation Fee - \$40.00 (one time fee for new members over 20yrs old)	_____	\$40.00
Annual Regular Member Dues - \$30.00* (MEMBER 65 years old during the year)	_____	
Annual Senior Member Dues - \$25.00* (65 yrs & older for the entire year)	_____	
Annual Junior Member Dues - \$15.00* (under 20 years old during the year)	_____	
Total Amount Enclosed (Make checks payable to CMB Inc.)	_____	

\* All dues are 1/2 after July 1 (except the initiation fee)

Send your completed CMB membership application along with dues and fees (check payable to CMB Inc.) to:  
 Nic Darbus, CMB Treasurer  
 6684 Carleton Walk  
 Broad Run, VA 20137-1919

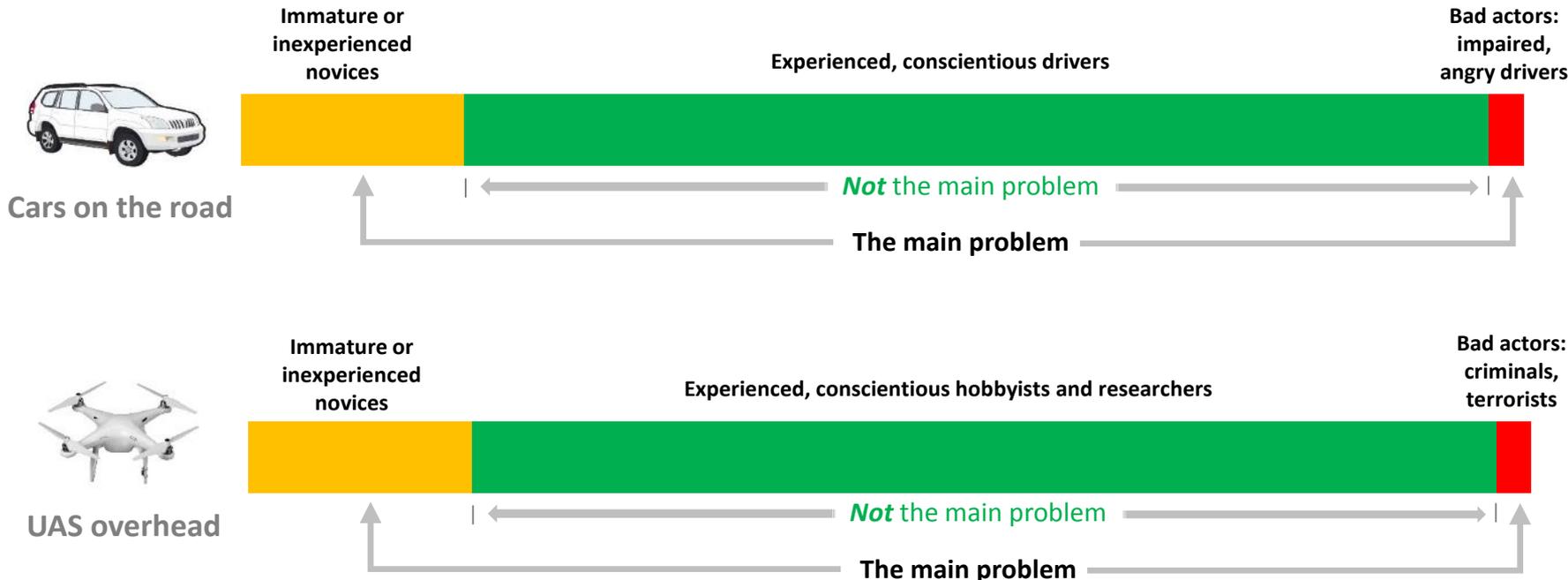
If you have any questions about this form or the club, please contact: Nic Darbus at (540) 349-2733

- 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.

Unmanned Aerial Systems



### Cars and Unmanned Aerial Systems - Spectrum of problem operators.



- 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:*



Engineering Response



Technology Response



Protective Intelligence Response

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:**



Technology Response

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

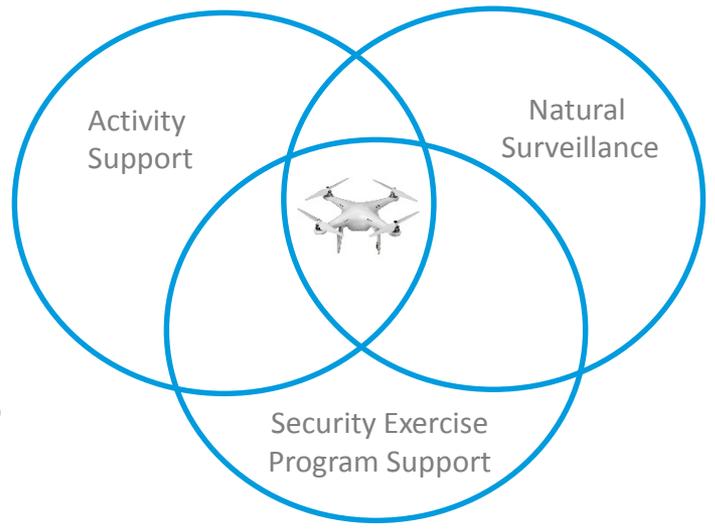
If your venue has the resources to bolster your procedure and policy mitigations with engineering constraints and technology responses to UAS; are you “red teaming” the continuum of your response actions?



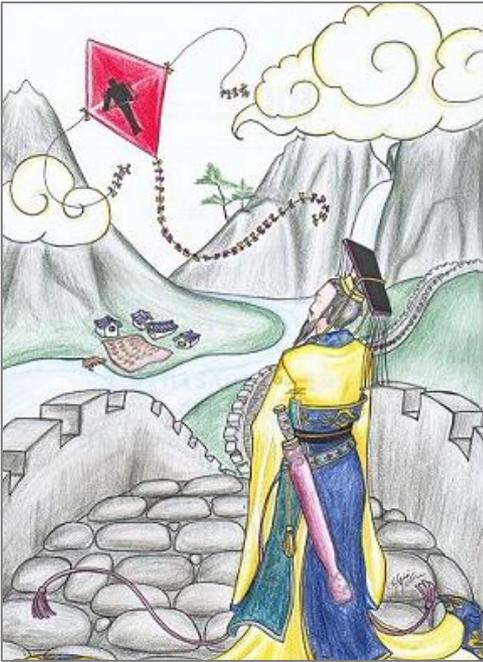
Red Team?

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"



Drone race (empty stadium)



Drone racing (filling stadiums?)



Beverage delivery drone, golf venue

Other possible UAS technology responses:

4. *Augmenting the guest experience; revenue generation*



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

### Guest Experience



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?

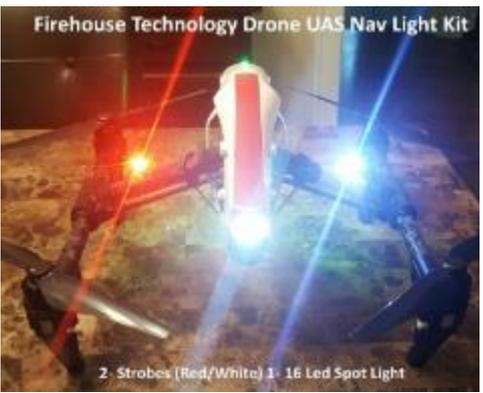


We aren't there *yet*; but the age of this happening has already dawned.



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

## Emergency Response



Fire services, aid to evacuation



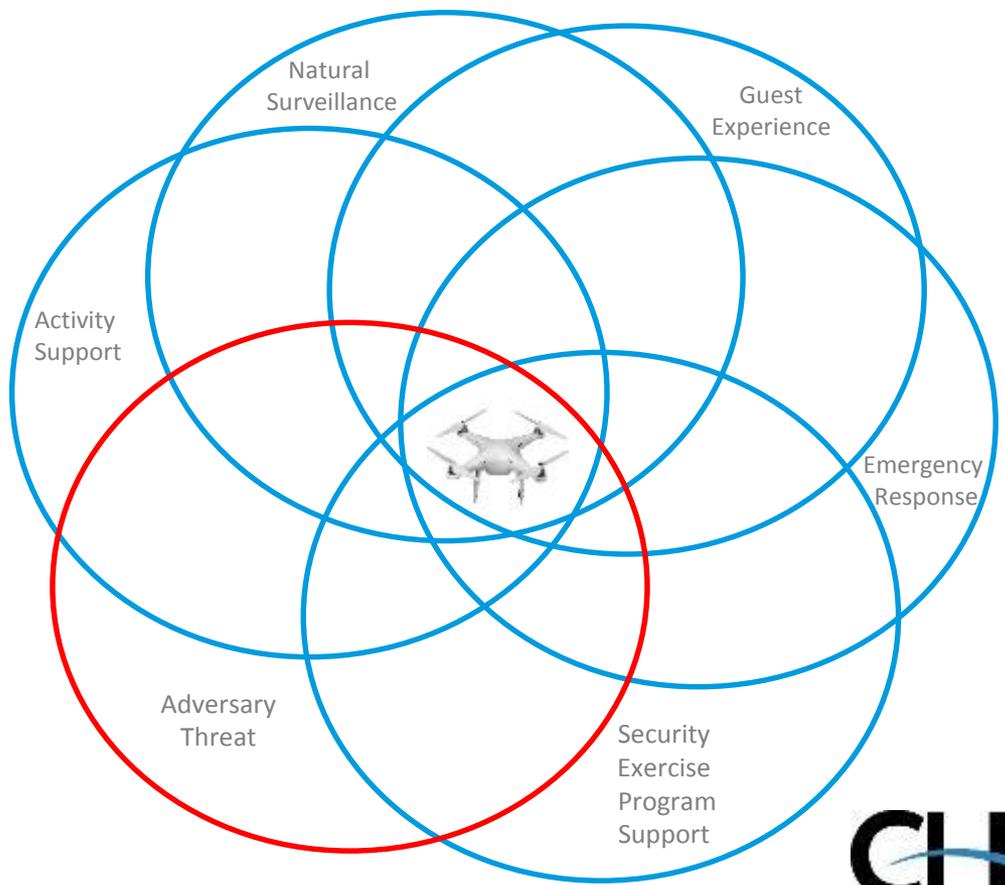
Defibrillator delivery drone



Police drone

Other possible UAS technology responses:

### 5. *Emergency Response enhancement*



## 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***

	Intentional Site Planning	Lighting	Utilities (power)	Amenities (restrooms)	Trash Disposal	Covered Area / Pavilion (Temporary or Permanent)	Active Security Program Engagement; e.g. , "see something, say something"
Farmers Markets	X	X	X	X	X	X	X
Gardens	X	X	X	X	X		X
RVs	X	X		X	X		X
UAS	X			X	X	X	X



**Which Department Pays (operations phase)?**

	Stadium Operations / Facilities	Sales and Marketing	Community Engagement	Security	Club , Vendor or Visitor
<b>Farmers Markets</b>	\$\$	\$		\$	\$\$\$
<b>Gardens</b>			\$\$	\$	\$\$
<b>RVs</b>	\$			\$	\$
<b>UAS</b>	\$		\$	\$	\$\$

- If sustained through vendor fees/investment; may be eventually be revenue neutral, or even *generating*.



## 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).

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

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 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**

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*



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 = 0.608219178 =  $\frac{222}{365}$  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 and B)] = 24.3%

- a) Planned Home Games (Basketball) 10
- b) Planned Home Games (Hockey) 10
- c) Current/planned cultural events (concerts, etc.) 20
- Total Events (currently) 40**

- Programming in additional Activity Support**
- d) Farmers markets (bi-weekly) 26
  - e) Garden club or urban farm occupies unassigned space 78  
(assume visits ~ twice weekly, three seasons)
  - f) Also allow RVs on non-game days, in specific areas 52  
(assume 2-3 RVs visit weekly)
  - g) Allow UAS club in unassigned space (bi-weekly meetings) 26
  - Other activities programmed for unassigned space: 182
  - Sports and non-sports events: 222

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*

Which Department Pays (operations phase)?

	Stadium Operations / Facilities	Sales and Marketing	Community Engagement	Security	Club, Vendor or Visitor
Farmers Markets	\$\$	\$		\$	\$\$\$
Gardens			\$\$	\$	\$\$
RVs	\$			\$	\$
UAS	\$		\$	\$	\$\$

- **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



## 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?”**

*The Fountainhead*, directed by King Vidor, Warner Bros.



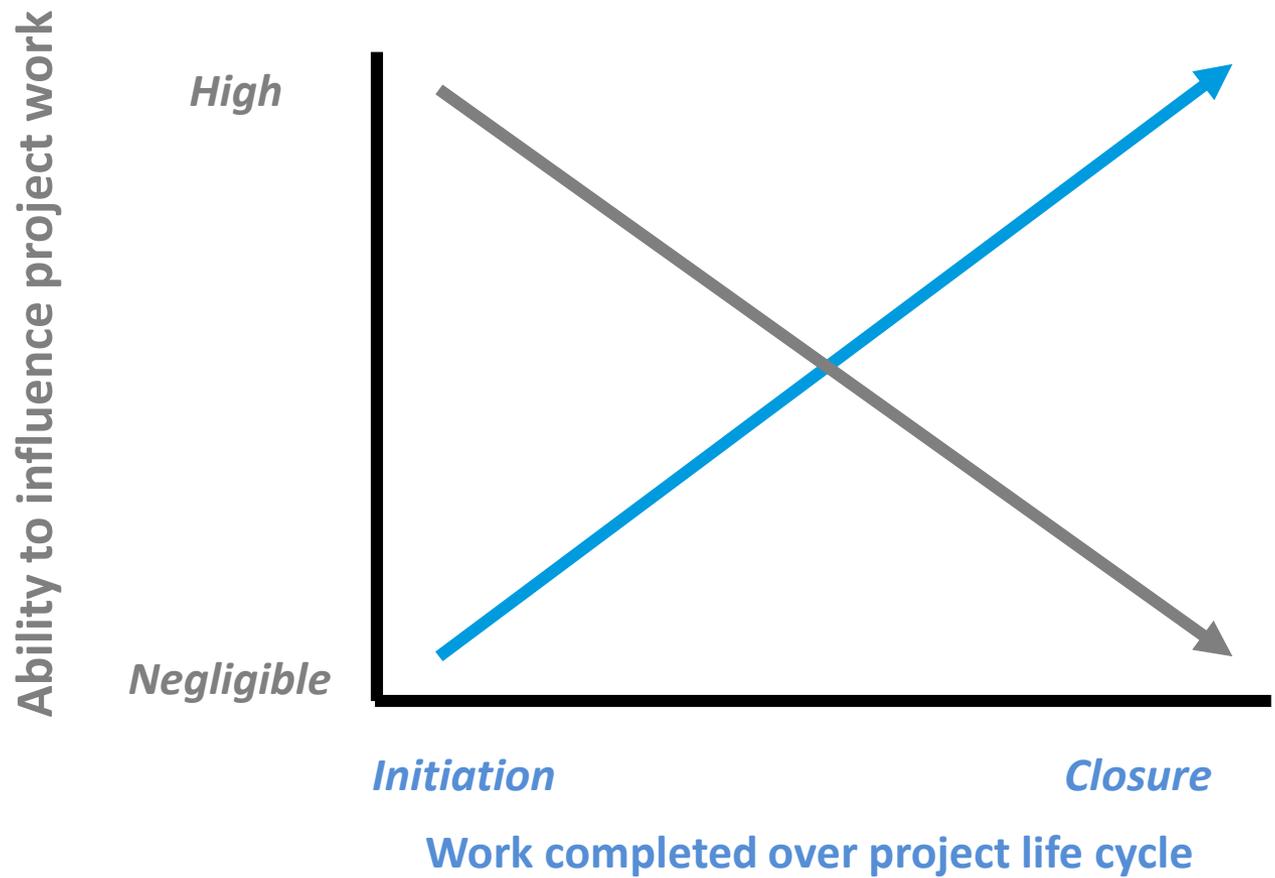
## Architects, Engineers and Security Directors

### 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.**

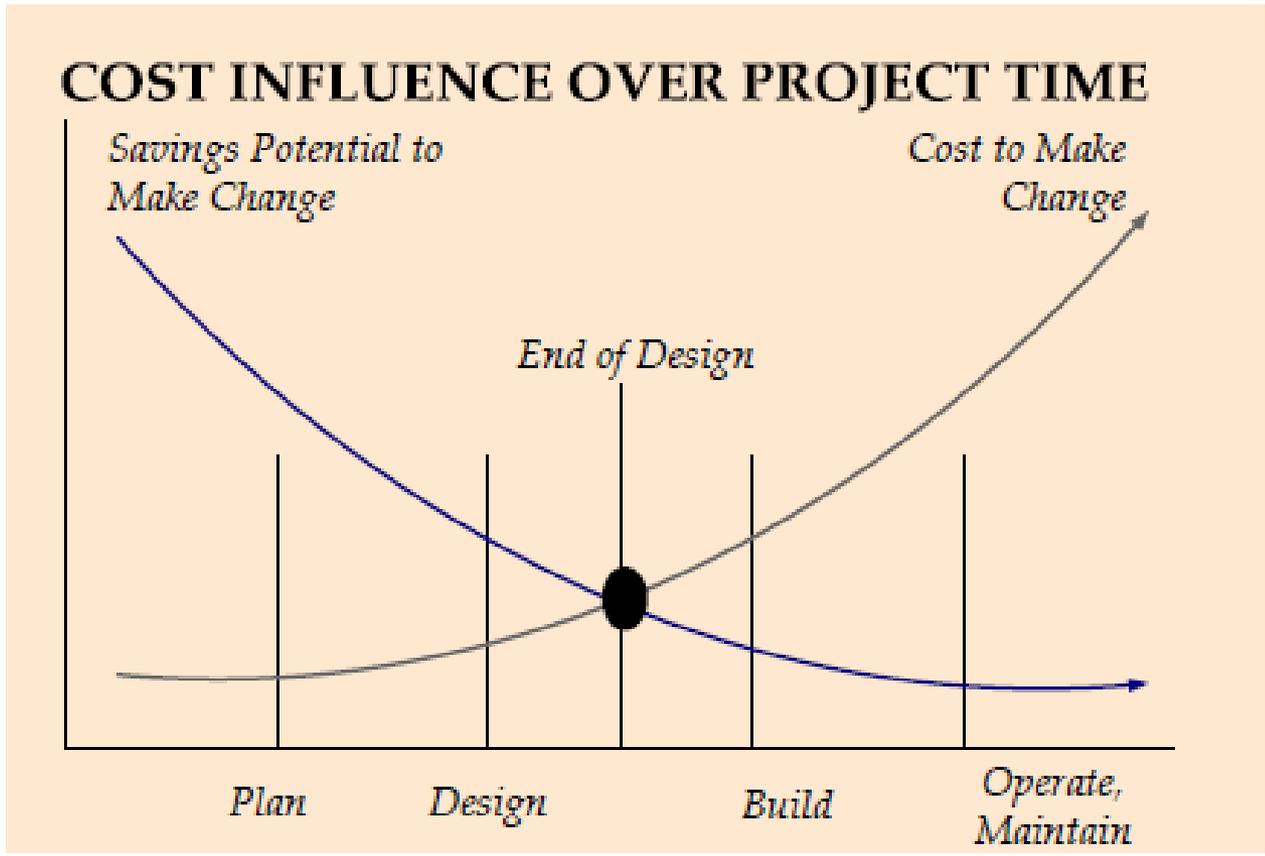


### Ability of security director to influence a Sports Venue Design Project



# CPTED for Sports Venues - Including CPTED Goals Early in the Planning and Design Process

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



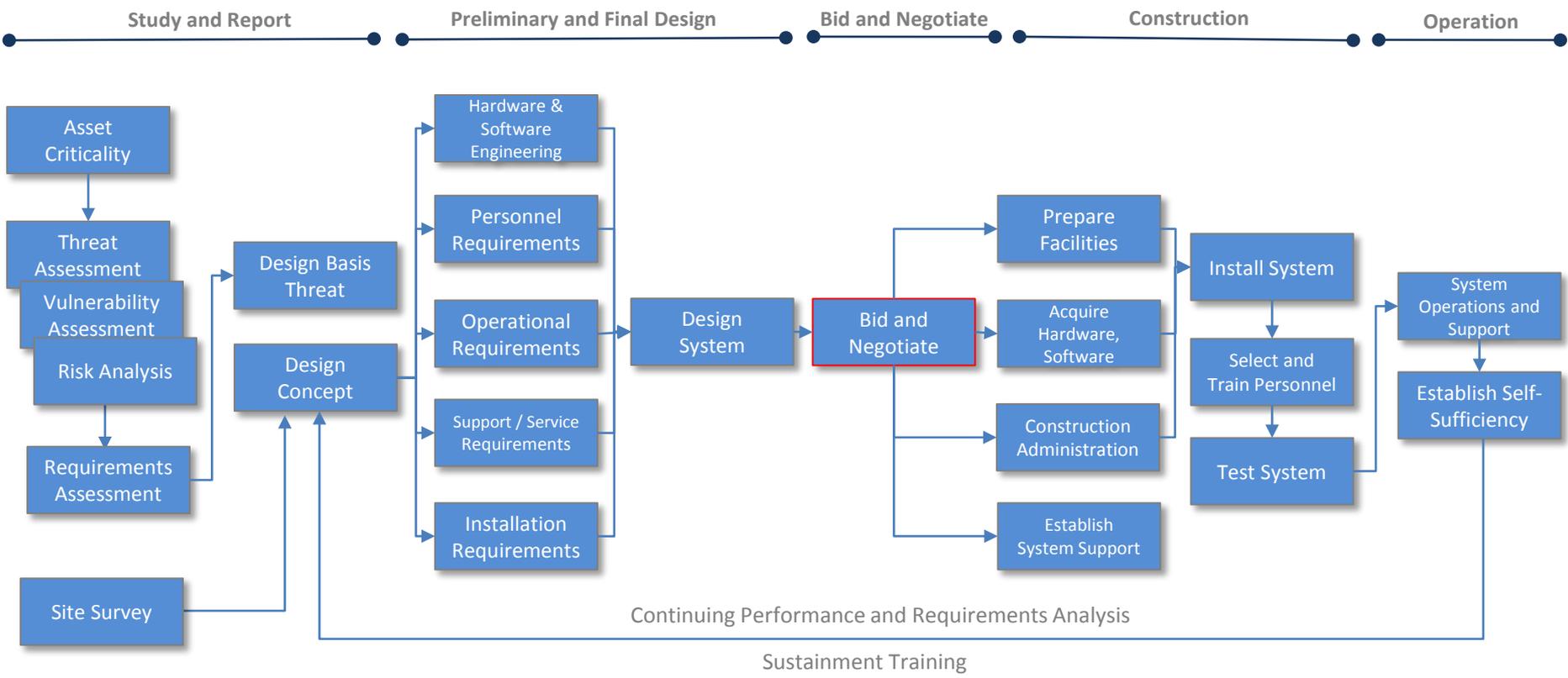
*Penn State Project Delivery Process, Penn State Office of Physical Plant*



# CPTED for Sports Venues

## Process-Driven System Design Integrated security design process

AIA – Emphasis on Assessment through Construction Phases;  
procurement process abbreviated



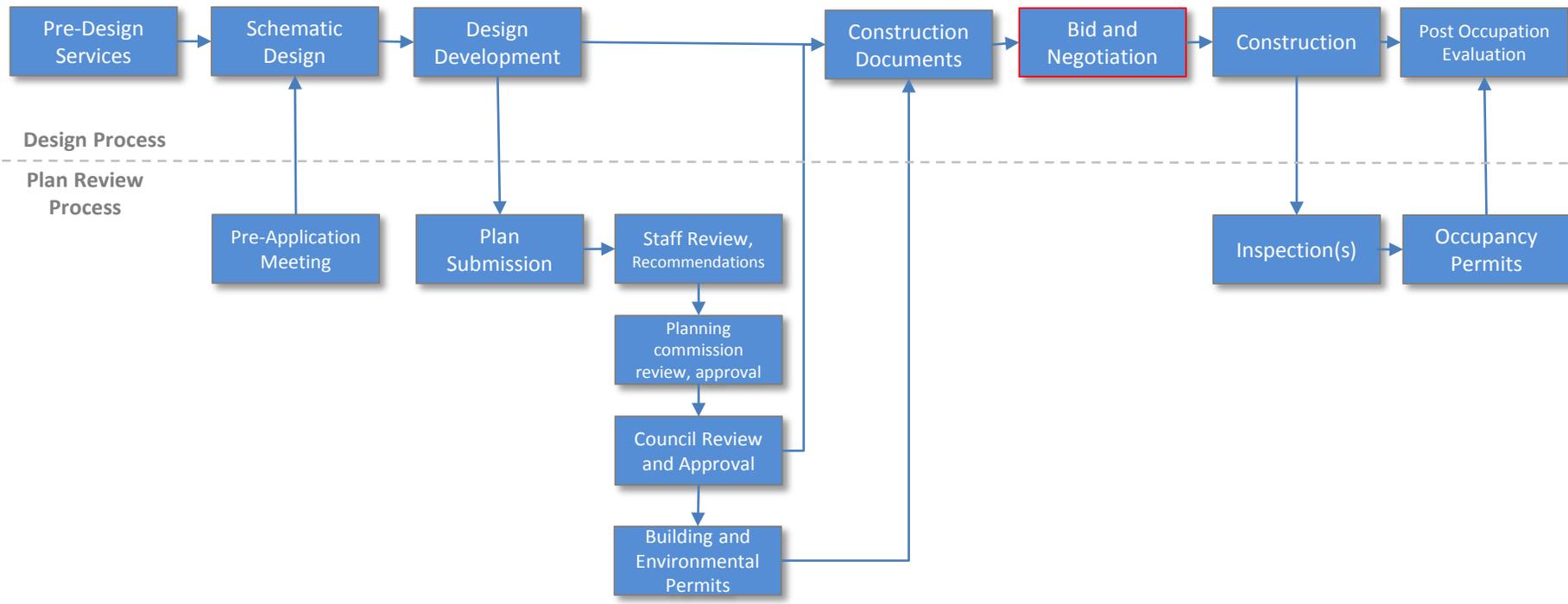
Adapted from: *Security Planning and Design, A Guide for Architects and Building Design Professionals* (Fig. 6.1) edited by Joseph A. Demkin, AIA; The American Institute for Architects / John Wiley & Sons, Inc., 2004



# CPTED for Sports Venues

## The Design and Review Planning

R.I. Atlas - Emphasis on Planning, Permitting and Design;  
Assessment, Procurement and Construction phases abbreviated.

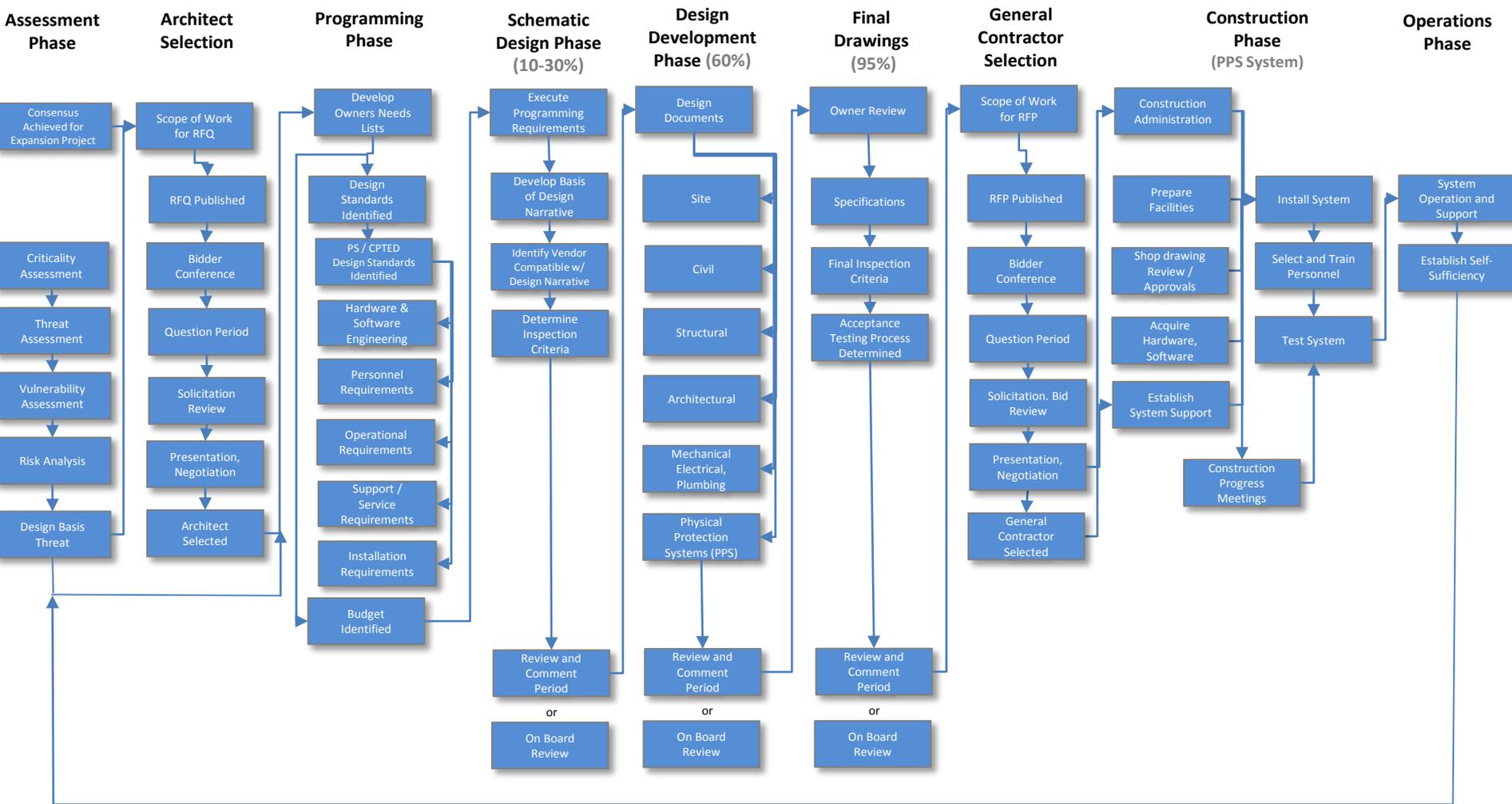


Adapted from: *21<sup>st</sup> Century Security and CPTED, Designing for Critical Infrastructure Protection and Crime Prevention, 2<sup>nd</sup> Edition*, (Fig. 4.2) edited by Randall I. Atlas, Ph.D., CRC Press, 2013



# CPTED for Sports Venues

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

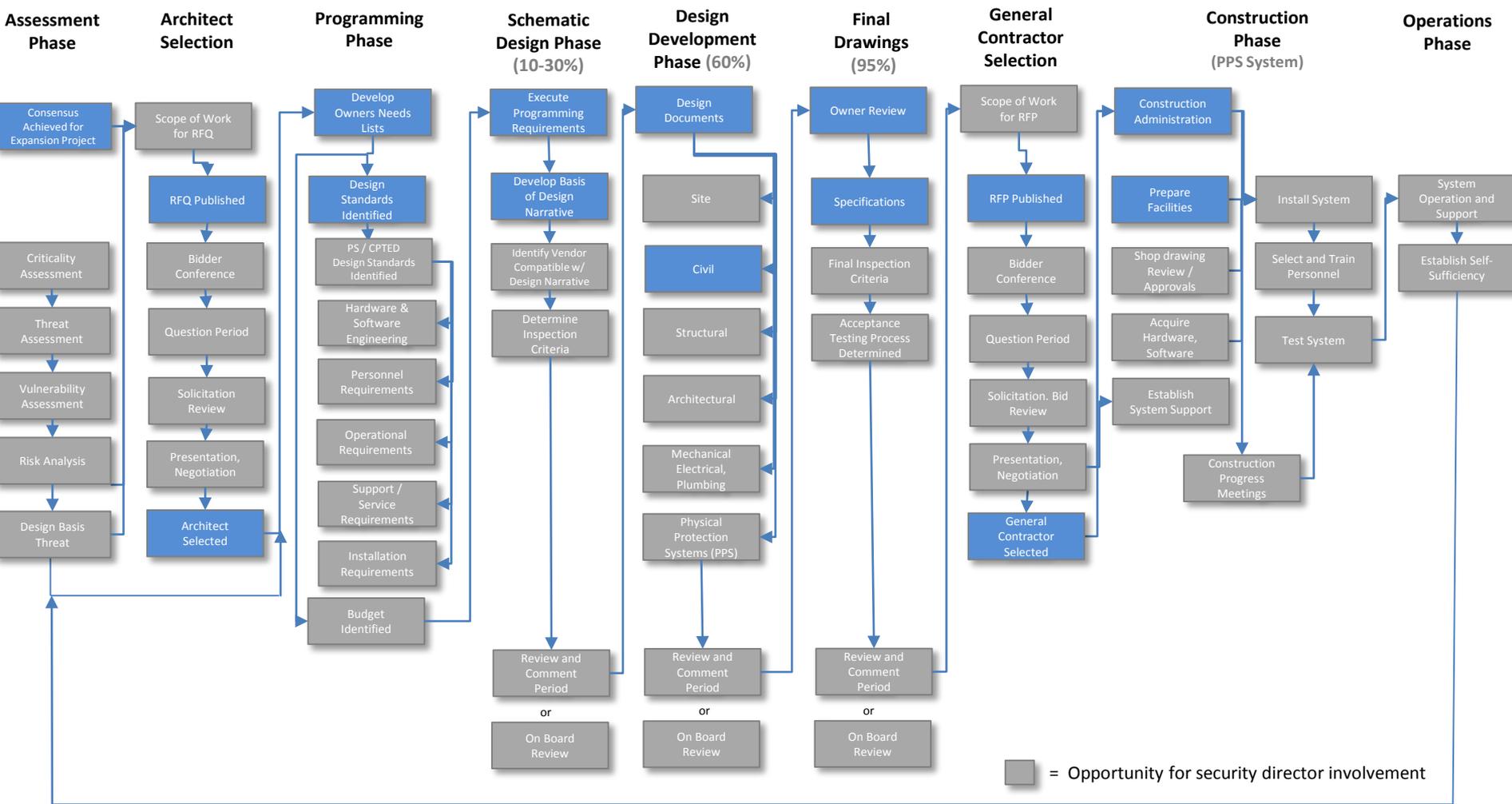


Traditional *Design/Bid/Build* Process



# CPTED for Sports Venues

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



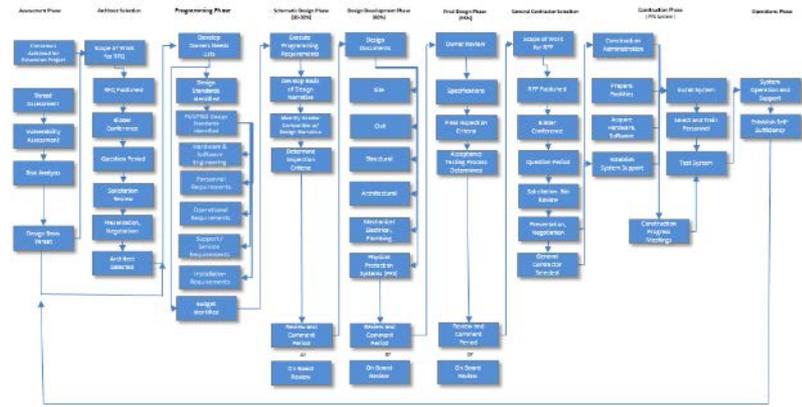
Traditional *Design/Bid/Build* Process



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

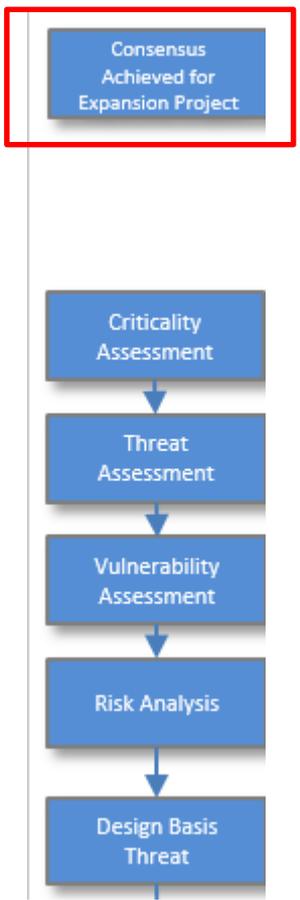
**The Security Director's Role:**  
 Planning, Procurement and Design Phases



### The Security Director's Role – Sports Venue Design Project



### Consensus Achieved for Venue Design Project



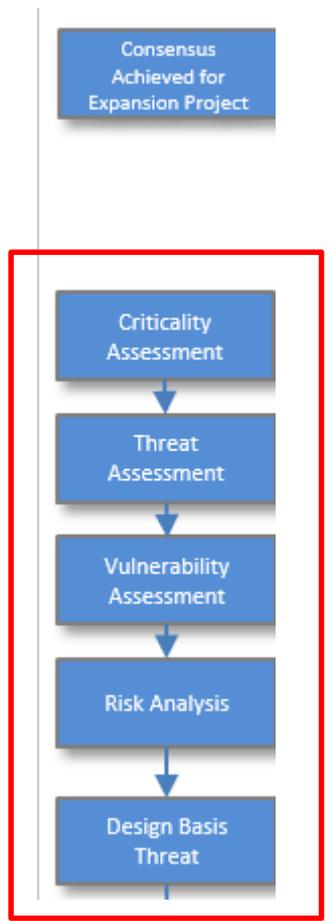
- Chamber of Commerce and City Council want to host future championship, and like tournaments.
- Trend in increased ticket revenue, regional population growth.
- Related junior sports leagues in surrounding communities, schools are expanding.
- Venue owners make expansion project part of mid or near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





### The Security Director's Role – Sports Venue Design Project

#### Assessment Phase



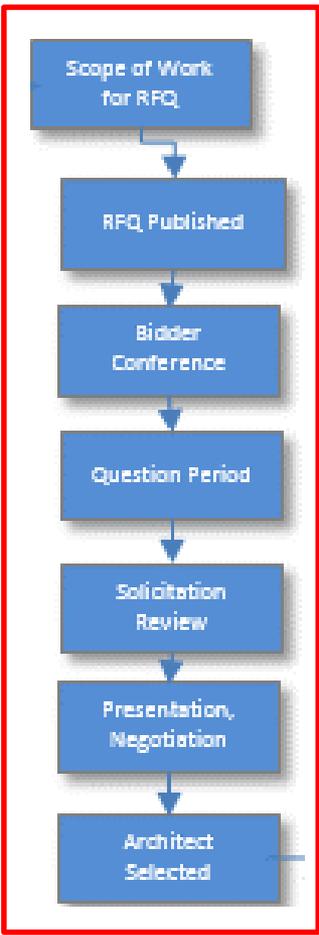
- Assessment methodology should be formal, repeatable, and an industry recognized/accepted methodology.
- Main purpose *in the design process* is to **justify requirements**.
- Should include:
  - “Design Basis Threat”
    - *What are you designing your defense against?*
    - Distinguish between venue, jurisdiction, and nation 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)



### The Security Director's Role – Sports Venue Design Project



#### Architect Selection



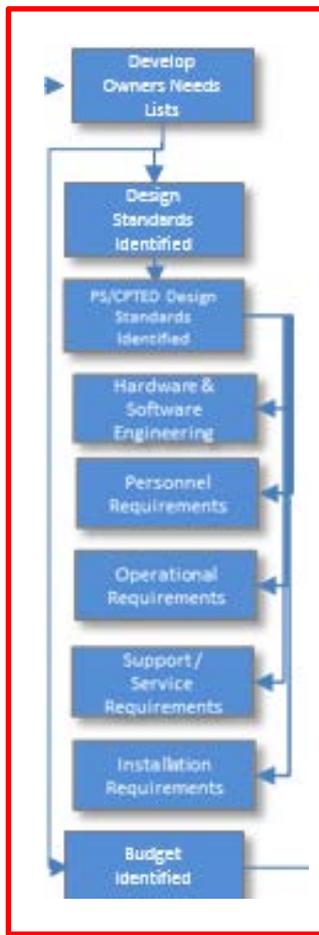
- Security Director should assist with SOW development; provide suggested language and editing assistance to procurement staff.
- CPTED and Physical Security should be included in technical/specific requirements section; *does not* need to be too specific for *RFQ*.
- Coordination with security director 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



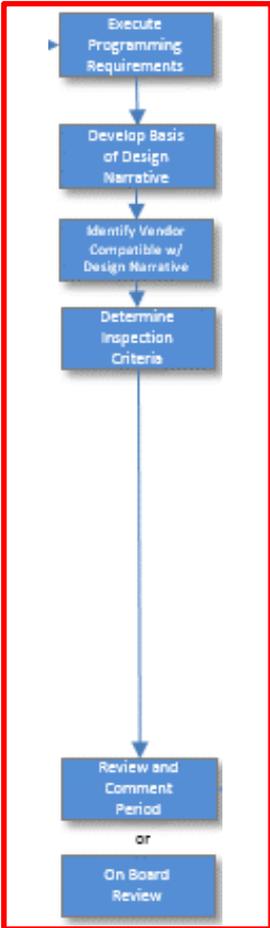
- Architect compiles list of owner requirements
- Design standards to be used are determined; CPTED and physical security design standards are also determined.
- If your industry or league does not have its own CPTED and physical security design standards; you can cite the most applicable sections of 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 3<sup>rd</sup> party estimators if available.



The Security Director's Role – Sports Venue Design Project



Schematic Design Phase (10-30%)



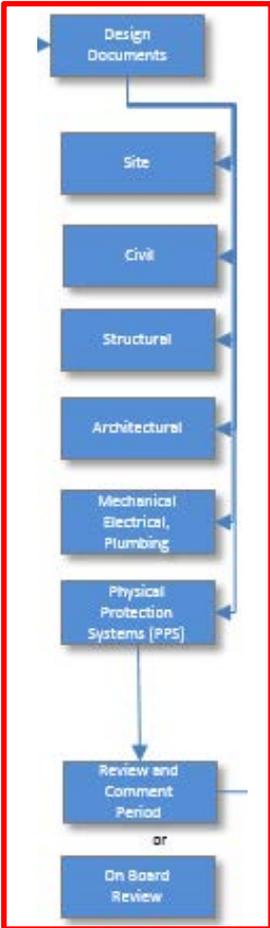
- Architect develops a narrative which documents how the design will meet the Owner's list of requirements.
- Preliminary list of service, equipment providers is developed of firms that can help fulfill owner's design requirements as articulated in the narrative.
- Design inspection criteria determined.
- 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%)



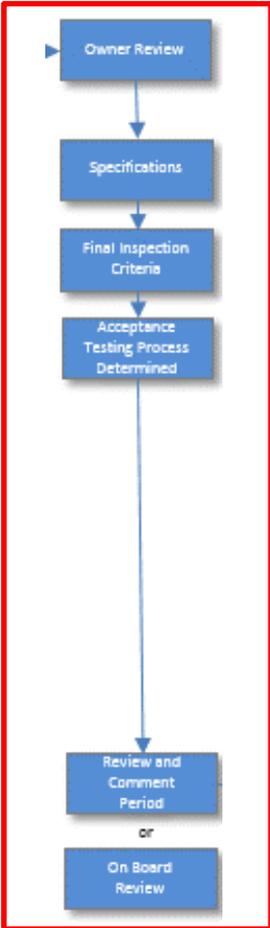
- Engineering disciplines complete design submittals; including physical security engineering.
- Security Director can provide input concerning design document review periods, via Owner's Representative.



The Security Director's Role – Sports Venue Design Project



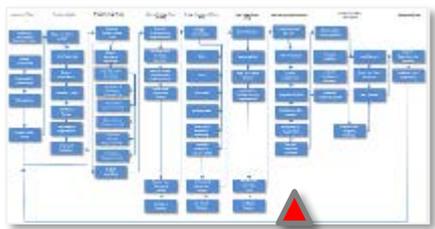
Final Drawings (95%)



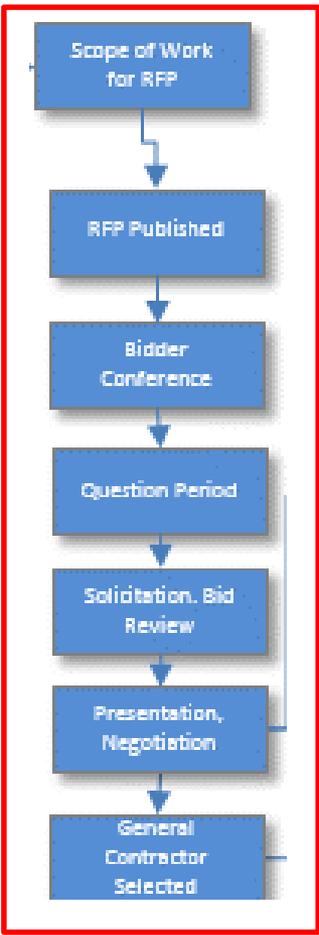
- Final pre-construction design review.
- Design documents evaluated according to agreed criteria.
- Physical security specifications are developed for selected systems and equipment. Range of device types, manufacturers, quantities and placement will be known at this point.
- Ensure that any equipment 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



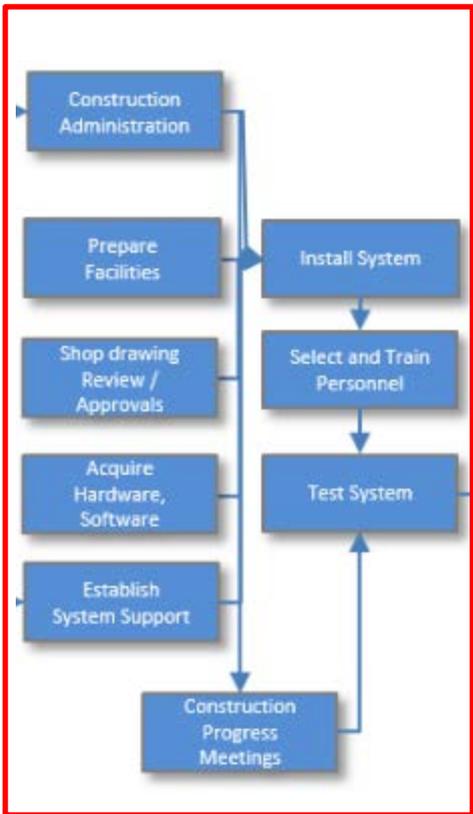
- Security Director should assist with SOW development; provide suggested language and editing assistance to procurement staff.
- CPTED and Physical Security may be addressed in their own annex. Technical requirements are specific; may include system/equipment matrix, and summary testing criteria (or 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.



### The Security Director's Role – Sports Venue Design Project



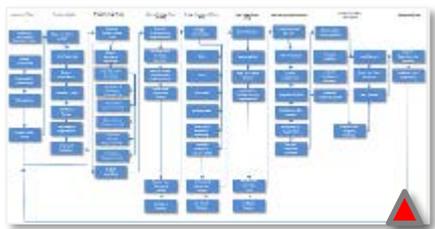
### Construction Phase



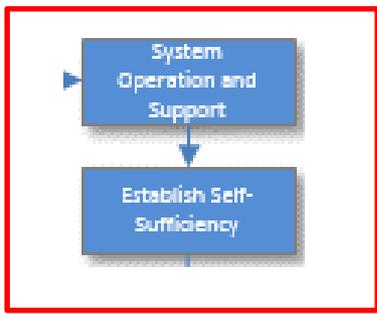
- Final Review / Approval of shop drawings
- As Built, point-to-point drawings completed
- Account for construction/installation impact on normal operations, and associated downtime of any existing systems.
- Develop commissioning plan. *Will a third party tester be used?*
- Coordinate Site Acceptance 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  $\geq 12$  months.



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.



## 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

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