Introducing crucial elements of Ground Search and Rescue for first responding field searchers

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“Thus [within 5 hours] the Toyota had been checked twice, once by family members, once by police officers. Neither check involved entering the car or opening its trunk.”

The car was checked again by police at about 10 hours, and again at about 20 hours. The bodies of the boys were found by a relative at 49 hours.
Missing Person Response

- Preplanning
- Notification
- Initial Response (Reflex Tasks) ~3 hours
- First operational period
- Subsequent operational periods
- Suspension
- Critique
Search Crucials

- Search is an Emergency
- Search is a classic mystery
- Search for clues not just the subject
- Know if the subject leaves the search area
- Grid search as a last resort
- Manage by objectives
- (Search management is information management)
Search is an Emergency

- Respond urgently
- Contain the search area
- Don't Stop at Night
- Mobilize trained search resources
- Search areas of high risk and high probability (hasty tasks) first
Search is a classic mystery

• Investigation
  – Interviews
  – Timeline of events
  – Subject Profile

• What clues to look for (search data)?
  – Clothing, equipment, litter (candy, gum, etc.)
  – Name, Description, footprint, scent articles

• What places to look (planning data)?
  – Where was the subject last?
  – What were they doing?
Search for Clues not just the Subject

• One subject, many clues
  – Around 3000 clues per mile when walking [Mantrackers]
  – Scent plumes [Air scent dogs, Tracking Dogs]
  – Dropped articles [Clue aware searchers]

• Clues can give:
  – Direction of travel
  – New last known points
  – Shift of priorities of areas to search
Timmy's Hat found here by hasty task checking powerline

Timmy last seen here
Dispersion (Excluding Hunters, Hikers, Skier-nordic)

Data from ISRID (Koester, 2008)
Is this a Clue?
Search for Clues not just the Subject

- Use Clue aware search resources
- Secure the PLS
- Secure scent articles

Investigation and Interviews

Search Data: What clues do we look for? What things to secure?
Know if the Subject leaves the search area

Confinement
Last seen: About 3AM. Time now: 9AM.
Theoretical search radius: 12-18 miles
Theoretical search area: 500-1000 square miles
Lost Person Behavior

Data from ISRID (Koester, 2008)
Distance traveled in Temperate, Non-Mountainous

Data from ISRID (Koester, 2008)
Confinement

- Roadblocks / Trailblocks / Camp-ins
- Lookouts
- Road Patrols / Trail Patrols
- Create Track Traps
Initial Actions

- Classic mystery
- Subject in search area
- Emergency
- Clues and the subject

Investigate
Confinement
Hasty Tasks
Get Help

Protect Clues
- Secure the PLS
- Scent Articles
- Tracks

- Areas of high risk
- Areas of high probability
Reflex actions: The Bicycle Wheel

- Axel
- Wheel
- Spokes
- Hub
- Reflectors
Reflex actions: The Bicycle Wheel

- Secure PLS, Investigation
- Confinement
- Hasty Tasks on likely routes
- Mantrackers and Tracking dogs to area around PLS
- Hasty Tasks to points of high risk and high probability
Subject: 11 Y/O Male
Last seen: 16:00
Now: 19:00
Weather 80°F Partly cloudy.
NIMS – 2007
Option of Investigation as an additional Section

If all Section Chief and Command Staff positions are occupied, an Investigation section exceeds the span of control for the IC.
Incident Command
PIO
Safety Officer
Liaison Officer

IC: Unified Command (PD, FD, SAR manager)

Operations
Planning
Logistics
Finance/Admin

Investigation Unit

More Usual case: Investigation Unit within the Planning Section
Goals

Find the missing person.
Everyone comes home safe.

Objectives

Find out where to search.
Find out what clues to look for.
Contain the search area.
Search high risk and high probability areas.

IC: Unified Command
(PD, FD, SAR manager)

PIO
Safety Officer
Liaison Officer

Operations  Planning  Investigation  Logistics  Finance/Admin

Manage by Objectives
IC: Unified Command (PD, FD, SAR manager)

Find the missing person. Everyone comes home safe.

Objectives
- Find the missing person.
- Everyone comes home safe.
- Find out where to search.
- Find out what clues to look for.
- Contain the search area.
- Search high risk and high probability areas.

Goals
- Find the missing person.
- Everyone comes home safe.

Operations
- Protect the PLS
- Brief Resources for Reflex Tasks

Planning
- Weather Forecast
- Identify high risk areas
- Plan Containment
- Plan Reflex Tasks

Investigation Unit
- Who is missing?
- Where?
- Description?
- Photo?

Logistics
- Maps
- Photocopier
- Command Post
- Communications plan

Finance/Admin
Find the missing person.
Everyone comes home safe.
Hazards for Searchers?
What are the events surrounding the missing person's disappearance?

What do we know about the subject that would tell us where to look and what to look for?

Goals

Find the missing person. Everyone comes home safe.

Objectives

Find out where to search. Find out what clues to look for.

IC: Unified Command (PD, FD, SAR manager)

PIO
Safety Officer
Liaison Officer

Operations Planning

Investigation Unit

Interviewers

Missing Person Questionnaire

Timeline Subject Profile

Situation Unit

Finance/Admin Logistics
Profile: Children 7-12

- Inaccurate mental maps
- Often lost while taking short cuts
- May get lost “adventuring”
- Often Trail Run
- May have secret play places
- May be trained to avoid strangers.
Profile: “Timmy”

- Visitor, here 1 week
- Likes farm machines
- Won't talk to strangers
- Enjoys walks on trails in Oxbow.
- Will probably follow deer or other wild animals
- Fit, active, healthy
- No family/custody issues
- Shorts, T-shirt, hat
IC: Unified Command (PD, FD, SAR manager)

PIO
Safety Officer
Liaison Officer

Operations
Planning
Investigation
Subject Profile
Task Assignments

Logistics
Maps
Finance/Admin
Hazard Assess.

Objectives
Contain the search area. Search high risk and high probability areas.

Task Assignments
Kind of search
Objectives for task
Hazards, Communications
“Timmy”

- Visitor, here 1 week
- Likes farm machines
- Won't talk to strangers
- Enjoys walks on trails in Oxbow.
- Will probably follow deer or other wild animals
- Fit, active, healthy

- Inaccurate mental maps
- Often lost while taking short cuts
- May get lost “adventuring”
- Often Trail Run
- May have secret play places
IC: Unified Command (PD, FD, SAR manager)
- PIO
- Safety Officer
- Liaison Officer

Operations

Planning
- Objectives
- Timeline
- Subject Profile
- Interviewers
- Maps
- Maps
- Segement Map
- Task Assign. Forms
- Clue Log

Logistics
- Finance/Admin

Investigation
- Profile
- Investigation

Invest. Tasks
- Hasty Tasks
- Search Tasks
- Containment
Task Force
1 Air Scent Canine + Handler
3 Clue Aware Searchers
(communications, navigation, medical)
Look Through Things
Look UP
Look Back
Watch for Track Traps
Clue Awareness

- Observe Clues
- Protect Clues: Flag, don't touch, call in.
Grid search as a last resort
Initial Search Tactics

- **Active**
  - Investigation
  - Hasty tasks
  - [Attraction]

- **Passive**
  - Confinement

**Progressing to:**

- **Active**
  - Investigation
  - Efficient Tasks
  - [Attraction]

- **Passive**
  - Confinement
Types of Ground Search

• **Type I**
  - Hasty tasks: speed – trails, high probability and high risk areas.

• **Type II**
  - Small teams, loose grid - efficiency
  - Clue finders with critical separation

• **Type III**
  - Grid search – Thorough, slow, destructive

• **Type IV**
  - Evidence Search
Type I – Hasty Tasks

- Emphasis: Speed
- Check areas of:
  - high probability
  and
  - high risk
- Small, Fast moving, clue aware teams.
- Detect & Preserve Clues
Type I Hasty Tasks
Type II search

- Emphasis: Efficiency

Type II Grid
Critical Separation Distance

- How far apart do you place searchers in a Type II search?

Northumbrian Rain Dance
Critical Separation Distance

1 Critical Separation

POD

~25%
~50%
~80%
POD

- Apply some sensor to some search segment
- The sensor (task team) estimates its Probability Of Detection for the subject in that segment.
Critical separation & purposeful wandering
Search Crucials

• Search is an Emergency
• Search is a classic mystery
• Search for clues not just the subject
• Know if the subject leaves the search area
• **Grid search as a last resort**
• Manage by objectives
• (Search management is information management)
Type III (Line Search / Grid Search)
Type III Grid

New flag line 1 in from right boundary

New flag line on compass bearing (or boundary of segment, e.g. road)

Maintain spacing on right

Navigator

Strike Team Leader
Type III Grid Commands

- Stop
- Look Up, Look Down
- Look Left, Look Right
- Turn Around and Look Behind you
- Look Up, Look Down
- Look Left, Look Right
- Turn Around
- Advance
Type III Grid

- New flag line 1 in from right boundary
- Area Covered in previous sweep
- Flag line from previous sweep
- Maintain spacing on right
Type IV Evidence Search
Canine Task
Working with a Canine Task

Other Task Force Members
(Communications, Navigation, Tracking)
All observe for clues

Handler

Canine

Keep Behind the Handler.
Follow the Handler's instructions.

Don't pet, feed, or play with the dog.
The dog may check your scent

Don't pay the dog any particular attention. Follow the Handler's Instructions

Handler

Other Task Team Members

Keep Behind Handler
Core Land SAR Field Skills

- Land Navigation
- Seeing and Observing
- Evidence Handling
- Wilderness Foot Travel (and fitness)
- Observing and Managing Environmental Hazards
Clothing
Missing Person Response

- Initial Response (Reflex Tasks) ~3 hours
  - Secure PLS
  - Confinement, Investigation, Hasty tasks
  - Search High Probability and High Risk areas

- First operational period
  - Investigation, Hasty Tasks, Efficient tasks
  - Trackers, Dogs, Trained ground searchers

- Subsequent operational periods
  - Investigation, Efficient tasks
  - shift to Thorough tasks
Some Sources/References

- Emergency Response International
  - Search is An Emergency - A text for managing search operations
  - Basic Search and Rescue Skills – A practitioners guide to search and rescue
- National Association for Search And Rescue
  - Introduction to Search and Rescue
  - Managing the Lost Person Incident
- The Center for Search Research (UK)
  - Field Search Skills
- Emergency Management Australia
  - Land Search Operations
- Report of the review panel concerning the disappearance and deaths of three young boys in East Camden June 22-24,2005
- Open Clip Art http://www.openclipart.org

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Some Hazards

- Hypothermia
- Heat stroke
- Poison Ivy
- Tick bites
- Unfit searchers
- Unsafe structures
- Caves
- Technical terrain
- ...
Manage by Objectives

• Initial Response (Reflex Tasks)
  – Objective: Find Clues
  – Objective: High Risk and High Probability
  – Objective: Limit the search area
  – Investigation, Hasty Tasks, Confinement

• First operational Period
  – Objective: Efficient search of high probability areas
  – Objective: Find Clues
  – Investigation, Hasty and Efficient Tasks
• **PLS**: Point Last Seen
• **IPP**: Initial Planning Point
• **LKP**: Last Known Point

- Pack found here.
- Last Seen getting out of car here.
Probabilities

- **POD** - Probability of Detection
- Application of a sensor (a task team) to a search segment has some probability of finding clues or the subject.

- **POA** – Probability of area
- Probability that the subject is in a particular search segment.

- Different sensors with known PODs are repeatedly applied to each search segment, decreasing the POA of each.
Title: Introducing crucial elements of Ground Search and Rescue for first responding field searchers.

USE AT YOUR OWN RISK
While this presentation is an introduction to aspects of Search and Rescue activities it does not provide enough information to properly prepare a person for SAR operations. Substantial additional reading and training are required. Opinions presented here are the author's alone.
Thus [within 5 hours] the Toyota had been checked twice, once by family members, once by police officers. Neither check involved entering the car or opening its trunk.” The car was checked again by police at about 10 hours, and again at about 20 hours. The bodies of the boys were found by a relative at 49 hours.


### Missing Person Response

- Preplanning
- Notification
- Initial Response (Reflex Tasks) \(\sim 3\) hours
- First operational period
- Subsequent operational periods
- Suspension
- Critique

Focus for this talk – actions to take in the first three hours or so of a search, setting the framework for the first full operational period
Search Crucials

- Search is an Emergency
- Search is a classic mystery
- Search for clues not just the subject
- Know if the subject leaves the search area
- Grid search as a last resort
- Manage by objectives
- (Search management is information management)

The Search Crucials framework underlies the ERI Search and Rescue Texts.
Search is an Emergency

- Respond urgently
- Contain the search area
- Don't Stop at Night
- Mobilize trained search resources
- Search areas of high risk and high probability (hasty tasks) first

Three key implications of search as an emergency: contain the search area, search day and night (as safe), get help: trained sensors (air scent dogs, tracking dogs, man trackers, ground searchers) and search managers.
Type I tasks – search areas of high risk and high probability
Plenty of high risk areas around.
Search is a classic mystery

- Investigation
  - Interviews
  - Timeline of events
  - Subject Profile
- What clues to look for (search data)?
  - Clothing, equipment, litter (candy, gum, etc.)
  - Name, Description, footprint, scent articles
- What places to look (planning data)?
  - Where was the subject last?
  - What were they doing?

Investigation is essential in SAR.

Investigation produces search data (descriptions of what the searchers are looking for – both the missing person(s) and clues).

Investigation also produces planning data (information about where to look and what tactics to employ in the search).
Search for Clues not just the Subject

• One subject, many clues
  – Around 3000 clues per mile when walking [Mantrackers]
  – Scent plumes [Air scent dogs, Tracking Dogs]
  – Dropped articles [Clue aware searchers]

• Clues can give:
  – Direction of travel
  – New last known points
  – Shift of priorities of areas to search
Detecting a clue can indicate a direction of travel and can suggest areas on which to focus search efforts.

[Hypothetical example, Double Trouble State Park, NJ]
Dispersion (Excluding Hunters, Hikers, Skier-nordic)

Data from ISRID (Koester, 2008)
Detecting a clue can indicate a direction of travel and can suggest areas on which to focus search efforts.

[Hypothetical example, Double Trouble State Park, NJ]
Is this a Clue?

Without investigation, you won't know.
Search for Clues
not just the Subject

- Use Clue aware search resources
- Secure the PLS
- Secure scent articles

- Investigation and Interviews
  Search Data: What clues do we look for?
  What things do we find?

Trained, clue aware search resources (trained ground searchers, canines, equines) are sensors for both clues and the missing subject. Untrained searchers are subject-only detectors and are likely to both not observe and destroy clues.

The search data produced from investigation and interviews are crucial for determining if random objects encountered by searchers are clues – especially so in urban, suburban, and rural environments, less so in wilderness.
Know if the Subject leaves the search area

Confinement
Theoretical search area is large for almost any search.
People don't travel in straight lines. Three miles per hour for 6 hours is not likely to be 18 miles as the crow flies.

Terrain features can block, capture, and constrain the motion of lost persons in predictable ways.
Lost Person Behavior

Data From ISRID (Koester, 2008)

Data From: Search Management Systems

70% of most psychologically normal lost people over the age of 6 are found within 2 miles of the PLS. 70% of most children 6 or under and people with any psychological abnormality are found within 1 mile of the PLS.

20-30% of most categories of subject may be miles away from the PLS.

Early containment of the search area is important for almost all categories of missing subjects (Elderly Critical Wanderers and Children 1-6 being the exceptions, as they very rarely travel more than two miles.
Data from ISRID (Koester, 2008)
Confinement

- Roadblocks / Trailblocks / Camp-ins
- Lookouts
- Road Patrols / Trail Patrols
- Create Track Traps
### Initial Actions

- Classic mystery: **Investigate**
- Subject in search area: **Confinement**
- Emergency: **Hasty Tasks**
  - Areas of high risk
  - Areas of high probability
- Clues and the subject: **Get Help**
  - Protect Clues
    - Secure the PLS
    - Scent Articles
    - Tracks

Flowing logically out of the search crucial actions are actions. Search is a classic mystery – investigate. Know if the subject leaves the search area – contain. Search is an emergency – search areas of high risk and high probability first. Search for clues and the subject – Protect the scene, protect clues, get help from specialised resources (dogs, mantrackers, search managers, etc).
Reflex actions: The Bicycle Wheel

- Axel
- Wheel
- Spokes
- Hub
- Reflectors
Reflex actions: The Bicycle Wheel

- Secure PLS, Investigation
- Confinement
- Hasty Tasks on likely routes
- Mantrackers and Tracking dogs to area around PLS
- Hasty Tasks to points of high risk and high probability
Hypothetical example search.

Who is involved in the first response? What resources are available right away? What jurisdictions are involved?
Searches are very logically conducted with the ICS (Unified command may be a good choice for a search. Multiple services and jurisdictions are often involved (e.g. police, fire, park rangers, SAR manager)).

NIMS revision in 2007 added the option of an Investigation Section. NIMS Draft 2008, p 61. Intelligence/Investigation Function as a Separate General Staff Section:
“This option may be appropriate when there is a significant intelligence/investigations component to the incident for criminal or epidemiological purposes or when multiple investigative agencies are involved. A separate Intelligence/Investigations Section may be needed when highly specialized information requiring technical analysis is both critical and time-sensitive to life saving operations (e.g., chemical, biological, radiological, or nuclear incidents) and/or when there is a need for classified intelligence.”

Reflecting the importance of investigation in a search, an Investigation Section is highly appropriate as part of a search management team.

Highly sensitive information can also be encapsulated in a police unit within the Investigation Section and a police official in the unified command.
Searches are very logically conducted with the ICS (Unified command may be a good choice for a search. Multiple services and jurisdictions are often involved (e.g. police, fire, park rangers, SAR manager)).

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Reflecting the importance of investigation in a search, an Investigation Section is highly appropriate as part of a search management team.

Highly sensitive information can also be encapsulated in a police unit within the Investigation Section and a police official in the unified command.
IC sets goals – probably the same two for any search, develops a set of objectives (of which these are abbreviated possible initial objectives (lacking measurable criteria). All else for the operational period flows out of these objectives.
Start delegating right away – lots to be done, lots of framework to be set up for scaling up the search.

Get some initial search and planning data, hold a command staff briefing, and form focused objectives.
Assess the hazards to searchers and how to mitigate them
Hazards for Searchers?

What are some specific hazards here?

How do we manage them?
Search is a classic mystery – investigation is at the core of knowing where to search and what to look for.

Initial interviews for some basic information, followed by in depth interviews using missing person questionnaires.

From these derive a timeline of events and a subject profile (combining general information about the behavior of this class of people and specific details about this missing person).
Profile: Children 7-12

- Inaccurate mental maps
- Often lost while taking short cuts
- May get lost “adventuring”
- Often **Trail Run**
- May have secret play places
- May be trained to avoid strangers.

Missing people behave in predictable ways. People of different age groups and categories (e.g. hunters, hikers) behave in different ways.
Profile: “Timmy”

- Visitor, here 1 week
- Likes farm machines
- Won't talk to strangers
- Enjoys walks on trails in Oxbow.
- Will probably follow deer or other wild animals
- Fit, active, healthy
- No family/custody issues
- Shorts, T-shirt, hat

Initial interviews provided some specific information about the subject.
IC: Unified Command (PD, FD, SAR manager)

- PIO
- Safety Officer
- Liaison Officer

- Operations
- Planning
- Investigation
- Logistics
- Finance/Admin

Objectives
Contain the search area. Search high risk and high probability areas.

Task Assignments

Where to search
Kind of search
Objectives for task
Hazards, Communications
What initial actions?
What tasks were?
Confinement tasks
Hasty tasks
Other jurisdictions?
“Timmy”

- Visitor, here 1 week
- Likes farm machines
- Won't talk to strangers
- Enjoys walks on trails in Oxbow.
- Will probably follow deer or other wild animals
- Fit, active, healthy
- Inaccurate mental maps
- Often lost while taking short cuts
- May get lost “adventuring”
- Often Trail Run
- May have secret play places
Task teams within the control of the operations division carry out tasks.
Planning generates instructions on where to search with what kind of task, and what the objectives for the task are. Operations determines who is going to be on the task. The briefing officer briefs the task. The task searches its assigned area. The briefing officer debriefs the task on its return.

Notes made by the task and by the briefing officer during the debriefing are passed back to planning, investigation and the safety officer as appropriate.
Task Force
1 Air Scent Canine + Handler
3 Clue Aware Searchers
(communications, navigation, medical)

Task team out in the field – what do you do?

Some techniques for observing:

Near Ground/Middle Ground/Far Ground
Look Through things, look into shadows
Silhouette against sky
Look Up, Look Down, Look Back
Systematically scan the environment, dividing it into the near ground, middle ground and the far ground.
Look through foliage for the things behind.

Focus your eyes on the spaces between.
Look into shadows. Particularly at night.

Don't see a shadow as a dark patch, look into it and observe the things hidden within it.

At night, look slightly away from the places you want to observe.
Clues and subjects (e.g. bowhunters, hangings) may be above you.
As you move through the environment look ahead, to the left, to the right, above you, below you, and behind you. Some clues will only be visible if you look back.
Watch for Track Traps

Be track aware. Look for and protect places where the subjects tracks may preserved.
Clue Awareness

- Observe Clues
- Protect Clues: Flag, don't touch, call in.

A clue may be evidence – treat accordingly.

Anytime a subject is found dead or injured, treat the area of the find as a crime scene.

If you find the subject deceased, call it in by cell phone or some means other than an open radio frequency.
Grid search as a last resort

Lines of closely spaced untrained searchers destroy clues.

Do not begin a search with grid searches.

What do you do instead?
Initial Search Tactics

- Active
  - Investigation
  - Hasty tasks
  - [Attraction]

- Passive
  - Confinement

Progressing to:

- Active
  - Investigation
  - Efficient Tasks
  - [Attraction]

- Passive
  - Confinement

Begin a search with investigation, confinement, and hasty tasks to check areas of high probability and high risk. As more trained resources become available, progress to small efficient task teams (Type II grids, air scent canine tasks, equine tasks). Close grid search (Type III grids, Type IV grids) may have a place later in the search.
Types of Ground Search

- **Type I**
  - Hasty tasks: speed – trails, high probability and high risk areas.

- **Type II**
  - Small teams, loose grid - efficiency
  - Clue finders with critical separation

- **Type III**
  - Grid search – Thorough, slow, **destructive**

- **Type IV**
  - Evidence Search

Early in a search, focus on speed and then efficiency.

Type I hasty tasks focused on areas of high risk and high probability.

Type II tasks focused on efficient search. Use sensors such as small trained teams of clue finders, air scent canine tasks, tracking canine tasks, equine tasks.
Type I – Hasty Tasks

- Emphasis: Speed
- Check areas of:
  - high probability
    and
  - high risk
- Small, Fast moving, clue aware teams.
- Detect & Preserve Clues
Type I Hasty Tasks

High Probability

High Risk

Trails
Loosely spaced trained searchers moving efficiently through the terrain.
Critical Separation Distance

- How far apart do you place searchers in a Type II search?

**Northumbrian Rain Dance**

Place an object about the size of the object to be detected (a backpack makes a good proxy for an adult, a hat a good proxy for abandoned items of clothing or a young child) in ground cover similar to that typical of the area to be searched. Have two team members walk around the object moving closer to it and further away from it flagging the points at which they first observe the object while moving towards it. Measure the average distance from the flags to the object.
Critical Separation Distance

Grid searchers placed at one critical separation distance apart have about a 50% probability of detecting an object of the size used to determine the critical separation distance. Grid searchers placed at about half that distance (the distance from the object to a searcher in the Northumbrian Rain Dance), have about an 80% POD (nominally 83%), and searchers placed at about twice the critical separation distance apart have around a 25% POD.

Given a desired POD on their task assignment, a task team can identify typical terrain for their search segment, perform the Northumbrian rain dance to determine the critical separation distance, and use that as a basis for spacing their grid to approximate the desired POD.

POD

- Apply some sensor to some search segment
- The sensor (task team) estimates its Probability Of Detection for the subject in that segment.
Trained searchers in a Type II grid can efficiently cover an area by spacing themselves at a critical separation distance and employing directed wandering, where each searcher can wander within their lane to investigate places that may hide a subject or a clue (e.g. young children in hollow logs).

Technical hazards and areas that the team can't efficiently enter and search (e.g. patches of bog, caves, dense thorny brush), should be flagged, reported, and examined later by appropriately equipped task teams.

One person at one end of the grid line should flag the boundary of the covered area. Depending on the terrain, this person may be dedicated to flagging the boundary.
Search Crucials

- Search is an Emergency
- Search is a classic mystery
- Search for clues not just the subject
- Know if the subject leaves the search area
- **Grid search as a last resort**
- Manage by objectives
- (Search management is information management)

The Search Crucials framework underlies the ERI Search and Rescue Texts.
Close spaced grids are inefficient, require large numbers of people, and destroy clues. They use closely spaced subject finders to produce a high probability of detecting a subject in an area.
Maintain span of control. Use a relatively small number of untrained searchers mixed with trained searchers.
Type III Grid Commands

- Stop
- Look Up, Look Down
- Look Left, Look Right
- Turn Around and Look Behind you
- Look Up, Look Down
- Look Left, Look Right
- Turn Around
- Advance
Have one end of the line follow a marked boundary. Instruct each person on the line maintain a constant distance from the person on that side. In this case, everyone walks forward staying six feet from the person on their right.

Have one person on the far end of the line flag the boundary of the sweep. In brush, it may be necessary to dedicate this person to flagging rather than searching.
Type IV Evidence Search
Canine Task
Working with a Canine Task

Canine

Handler

Other Task Force Members

(Communications, Navigation, Tracking)
All observe for clues

Keep Behind the Handler.
Follow the Handler's instructions.

Don't pet, feed, or play with the dog.
The dog may check your scent

Don't pay the dog any particular attention. Follow the Handler's Instructions

Handler

Other Task Team Members

Keep Behind Handler
Core Land SAR Field Skills

- Land Navigation
- Seeing and Observing
- Evidence Handling
- Wilderness Foot Travel (and fitness)
- Observing and Managing Environmental Hazards
Appropriate for the weather and terrain.

Not turnout gear.

Good boots.
Foul weather gear.
Land navigation, including:
   Maps, Compass, GPS, Watch. Never rely on any single means of navigation.
Safety, including:
   Water, gloves, whistle, flashlights, first aid kit, sunblock, insect repellent, foul weather clothing, fire starting, emergency shelter
SAR, including:
   Flagging tape, radios, rope.

Balance – not too much weight, not too little equipment.

Consider environment: urban, rural, wilderness.
Missing Person Response

- Initial Response (Reflex Tasks) ~3 hours
  - Secure PLS
  - Confinement, Investigation, Hasty tasks
  - Search High Probability and High Risk areas
- First operational period
  - Investigation, Hasty Tasks, Efficient tasks
  - Trackers, Dogs, Trained ground searchers
- Subsequent operational periods
  - Investigation, Efficient tasks
  - shift to Thorough tasks

Focus for this talk – actions to take in the first three hours or so of a search.
Some Sources/References

- Emergency Response International
  - Search is An Emergency - A text for managing search operations
  - Basic Search and Rescue Skills – A practitioners guide to search and rescue
- National Association for Search And Rescue
  - Introduction to Search and Rescue
  - Managing the Lost Person Incident
- The Center for Search Research (UK)
  - Field Search Skills
- Emergency Management Australia
  - Land Search Operations
- Report of the review panel concerning the disappearance and deaths of three young boys in East Camden June 22-24,2005
- Open Clip Art http://www.openclipart.org

Emergency Response International:

NASAR:
http://www.nasar.org/

Others:
  http://www.searchresearch.org.uk/www/published_papers/  Searching at night, 2003;  Critical separation, 2003;
Extra slides follow.
Hypothetical example search.
Some Hazards

- Hypothermia
- Heat stroke
- Poison Ivy
- Tick bites
- Unfit searchers
- Unsafe structures
- Caves
- Technical terrain
- ...


Manage by Objectives

• Initial Response (Reflex Tasks)
  – Objective: Find Clues
  – Objective: High Risk and High Probability
  – Objective: Limit the search area
  – Investigation, Hasty Tasks, Confinement

• First operational Period
  – Objective: Efficient search of high probability areas
  – Objective: Find Clues
  – Investigation, Hasty and Efficient Tasks
• **PLS**: Point Last Seen
• **IPP**: Initial Planning Point
• **LKP**: Last Known Point

Investigation determines places to start searching.
Probabilities

- **POD** - Probability of Detection
  - Application of a sensor (a task team) to a search segment has some probability of finding clues or the subject.
- **POA** – Probability of area
  - Probability that the subject is in a particular search segment.
  - Different sensors with known PODs are repeatedly applied to each search segment, decreasing the POA of each.

Search theory is driven by probabilities: the probability that a particular sensor may detect clues or the subject, and the probability that the subject is in or passed through the area where that sensor is searching.

Search areas are never “Cleared”. They have only had a sensor with some probability of detection applied to them.

Improve the chance of finding the missing subject by repeatedly applying sensors to the same search areas.