



First Responder Location

The Real World

Ric Plummer, Fire Engineer
Berlin, MA Fire Department

Trooper Jeffrey Lenti, STOP (SWAT) Team
Massachusetts State Police



A Glimpse at the Real World of First Responders

Time is Critical – In general, there is very little

We already carry a lot of gear

Our jobs are physical ones – think of tracking football players !

Visualizing location accurately

often with little prior knowledge

These are the keys to SUCCESS



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Personal Locator Operational Goals

Drastically Reduce Line of Duty Deaths and Injuries

BY

Effective Rescues by KNOWING where they are AND how they got there

Provide an EFFECTIVE Command and Control tool for PREVENTION

Knowing where everyone is BEFORE an event !!



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Time – The Critical Parameter !!

We are CALLED BECAUSE

The “Customer” is having a BAD DAY

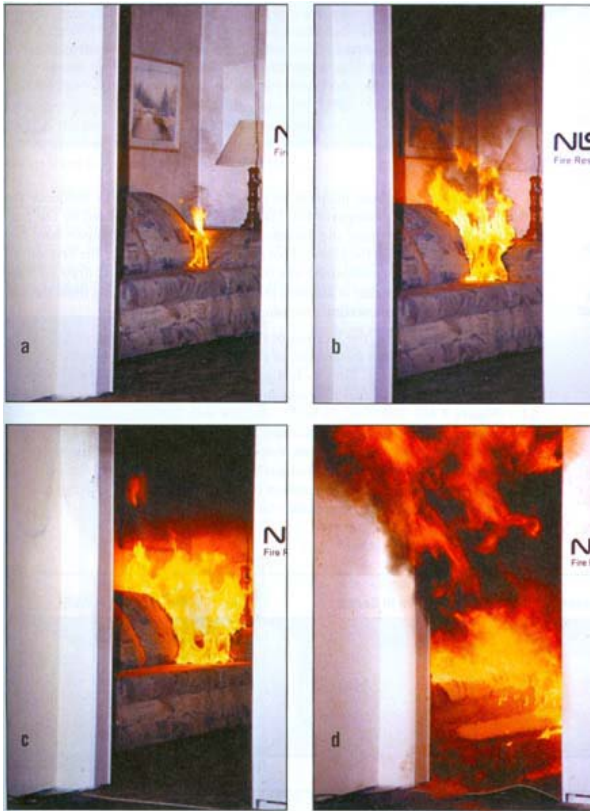
Our Job – Make it better, QUICKLY

Most BAD things get worse over time

Just One Example – 1 to 2 minutes

Shorter than the response time

NOW, incident time lines:



NIST Photo

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Time – The Critical Parameter – BAD Things Happen QUICKLY

Stark Reminders that:

Things happen quickly on “routine” calls

There is no such thing as “ROUTINE”

Things turn BAD QUICKLY and with NO WARNING



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Time Is CRITICAL – Time Line Analysis #1

The scenario

WORCESTER, MASS.

18:15 December 3, 1999 – Box 1438

18:25 2 homeless people reported inside

Rescue 1 attempted to find them.

In their search attempt, conditions worsened

R1 ran out of air before they could be found

Of the 6 teams that searched for R1, two other teams were lost as well



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Time Is CRITICAL – Time Line Analysis #1

Time Points

1 minute response time first units, 4 minutes for IC#1

IC#2 arrives 12 minutes after IC#1

12 minutes on scene, R1 was on the roof and had ventilated

2 minutes to gain access to 6th floor

17 minutes in the building, they call for help

8 minutes later we hear their last message

94000 sq ft on 6 floors, floor ambiguity, 8 minutes to locate

Locator Implications

Need IMMEDIATE and ACCURATE location, Floor then X Y

Rapid visualization of 3 D data to building

No building data was available

IC was dynamic – First became interior, Second overall

Ease of use, regular use and Training – Keys to success !



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Time Is CRITICAL – Time Line Analysis #2

To Explore Again How and Why Time is Critical
we will explore another LODD Incident
A *Typical* Residential Structure

April 16, 2007 – Prince William County, Virginia

06:01 Multiple 911 calls for structure fire, 15492 Marsh Overlook Drive

Vehicles in the driveway, no visible occupants, 2nd Alarm Requested

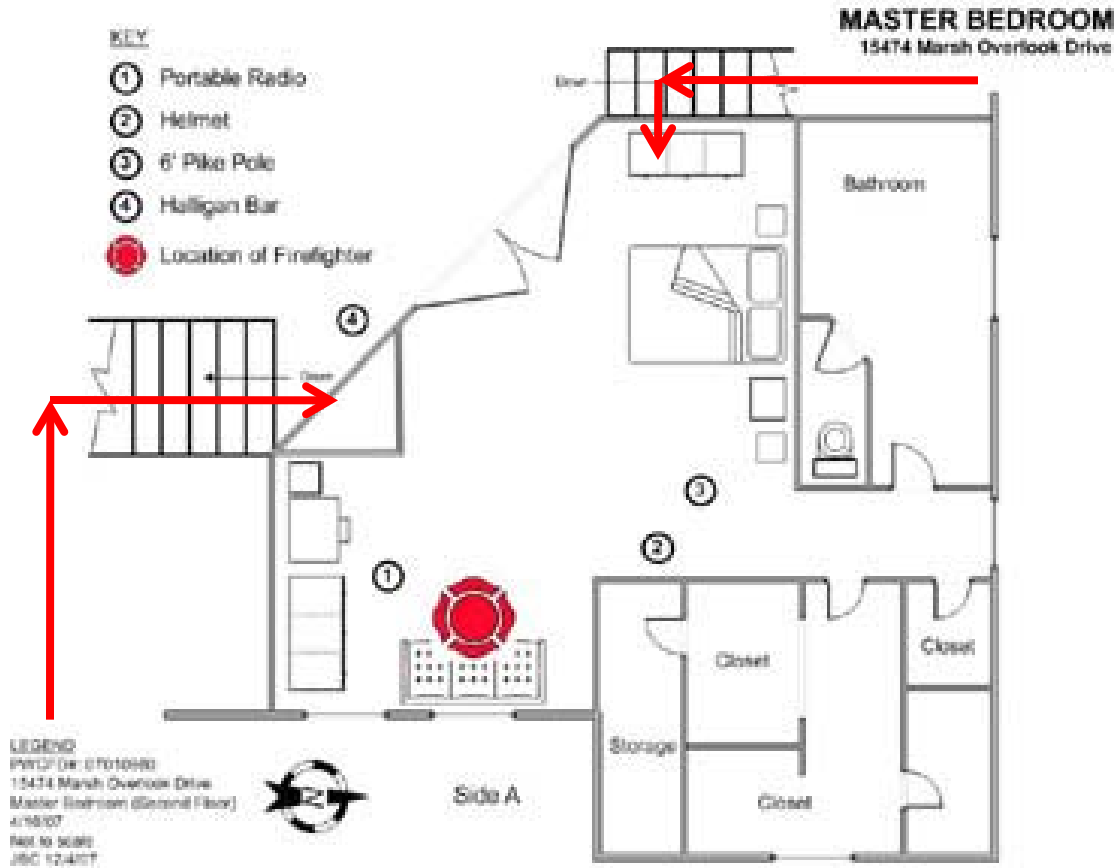


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Time Is CRITICAL – Time Line Analysis #2



06:57 Technician I Kyle Wilson was found in the Master bedroom



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Time Is CRITICAL – Time Line Analysis #2

Time Points:

- 5 Minute response time
- 3 Minutes later, primary search team entered
- 1 Minute later, Command assumed by BC503
- 1 minute later evacuation called for

3 minutes Entry to Mayday

4 Minutes Mayday to his last message

Summary

High Level of Dynamics, both in tasks and fire progression
VERY short time intervals !

Locator Implications

Need for IMMEDIATE and ACCURATE location (Floor and X Y)
Need to solve the visualization problem, in addition to accurate location
Must be easy to use, trained on, and in constant use



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Looking at TASKS

Now that we have a framework

Let's look at some typical tasks

Pay particular attention to movements and motion

These are the people you will be tracking

ACCURATELY

QUICKLY



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Geared Up,



The Fully Dressed FF Wears:

Boots, Pants

Coat

Hood

Helmet

Gloves

SCBA – Pack & Face Piece

Personal Rope

Carries:

Radio

Flashlight

Full Pockets

Axe / Halligan Tool

Hose Line

35-80 lbs

Plus the Locator



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Geared Up

Patrol Officer Gear worn for the entire shift



Patrol Officer Gear

Soft Body Armor
Boots
Duty Belt



Duty Belt

Magazines	Cuffs (1)
Radio	Baton
Pepper Spray	Weapon
Flashlight	Cuffs (2)
CPR Mask	Keys

ADD Locator – to be ready at all times



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Geared Up



PhotosByJodie.com

Tactical Officer Carries More
Heavy armor
Helmet
Added weapons
Self Aid Medical Gear
Distraction Device(s)



Chem-Bio Incident requires all this
PLUS added PPE



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Physical Tasks and Movements



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Physical Tasks and Movements



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Incident Command

The first unit on the scene is the first IC

Size up, initial action plan, go to work

Prioritize Scarce Resources

A more senior officer arrives, often later by short time

They are briefed and take over

The IC has a dynamic strategy and directs a set of task to accomplish it

Sector and Division level “layers” may be added

For larger incidents

To maintain a manageable span of control

There is always only ONE “COMMAND”



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Incident Command

Varieties of Command:

Single Patrol Officer – He's there, he's it

Back Up Arrives – Likely assumes command

K-9 & Others arrive – Now a senior person in charge

STOP Operation – Formal Team Command Structure

Other Resources Added – NIMS Structure comes in to play



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The Rescue



If all else fails, we need to find and rescue FFs

Remember the PPE, SCBA, RIT Pak, Camera, etc.

What FLOOR ???!!!!!! Are they on.

Where are they on the floor ?

There is NO TIME

We are highly committed to saving our own !

The command interface will be critical
ease of use and fast action must be the norm

Extra size and weight will shorten available working time to find them.
Typically 30 or 45 minute “bottles”



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Structure Information

What can we know about a structure BEFORE the incident ?
Sometimes a lot, some times very little

Floor plan overlays are very useful IF available AND Up To Date / Accurate
Many jurisdictions would have very few if any
Preplanning is helpful, but may not be on the locator system

GIS and Google etc may be useful
If up to date
And aligned with the system

The General Case However, Must Assume no data
May be a Technological Handy cap
BUT IT IS a REAL WORLD Reality



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Adopting New Technologies

Soft Body Armor

Portable Radios

Dash Cam

N I M S

Adopting New Technologies

PPE / PASS

Thermal Imaging Camera

Rescue Ropes

Some things CAN'T CHANGE:

Instant Action (We can't wait for a locator)

It can't impede actions – Transparent to the wearer

A Locator SHOULD BE:

Fitted to their gear; automatic activation

Regularly tested for proper function

Included In Policies and Training to Ensure it's Use

Used in New Ways to conduct tactical operations

We'll know where everyone is ! NO Friendly Fire !

Like those above, when they save OUR lives WE'll use them



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SUMMARY



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Implications for Locator SYSTEMS

- 1 – Must be ready to “Rock and Roll” at all times !
Small, Light, Always There
- 2 – Must be ACCURATE under Real World Conditions
Floor is of utmost importance
X, Y on that Floor
- 3 – All Aspects must accommodate VERY short time lines
- 4 – Must be able to VISUALIZE location often with no previous knowledge
and be intuitive to the Commander and Their staff

Consider What you’ve seen and how a device fits these requirements



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PLEASE – Try This At Home

If you Specify, Develop or Test

Most of these maneuvers can be simulated in your lab or office or outdoors

Consider the types of motions and movements

Consider the time line implications – time intervals are SHORT

Use First Responders to Help – BUT have them “Do What They Do”

PLEASE - SOLVE THE REAL WORLD PROBLEM

IT WILL SAVE THE LIVES AND PREVENT INJURIES TO

YOUR FIRST RESPONDERS !!!!



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C R E D I T S

Fire Photos courtesy of Berlin, MA Fire Department

Worcester Fire Department and DC John Sullivan for information and support

Prince William County, VA and BC J. Collins for support and information

Numerous peer reviews that enhanced this presentation.



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