

# LOS ANGELES CITY FIRE DEPARTMENT *AIRBORNE INTEGRATED GIS SYSTEM*



WILDFIRE RESEARCH NETWORK

# ABOUT WILDFIRE RESEARCH NETWORK

Wildfire Research Network is a 501 c (3) non-profit, public safety, research and education organization, created to improve wildfire suppression capability throughout the United States.

The objectives of the organization are:

- Research phenomena and promote improved methods to control wildfires.
- Provide information and recommendations to the public, private enterprise and all levels of government.
- Explore innovative **partnerships** and financial strategies to accelerate improvements.
- Facilitate establishment of a national wildfire research institute to bring final resolution to the nation's wildfire control issues.

Wildfire Research Network  
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Suite 105, PMB 190  
Topanga, CA 90290

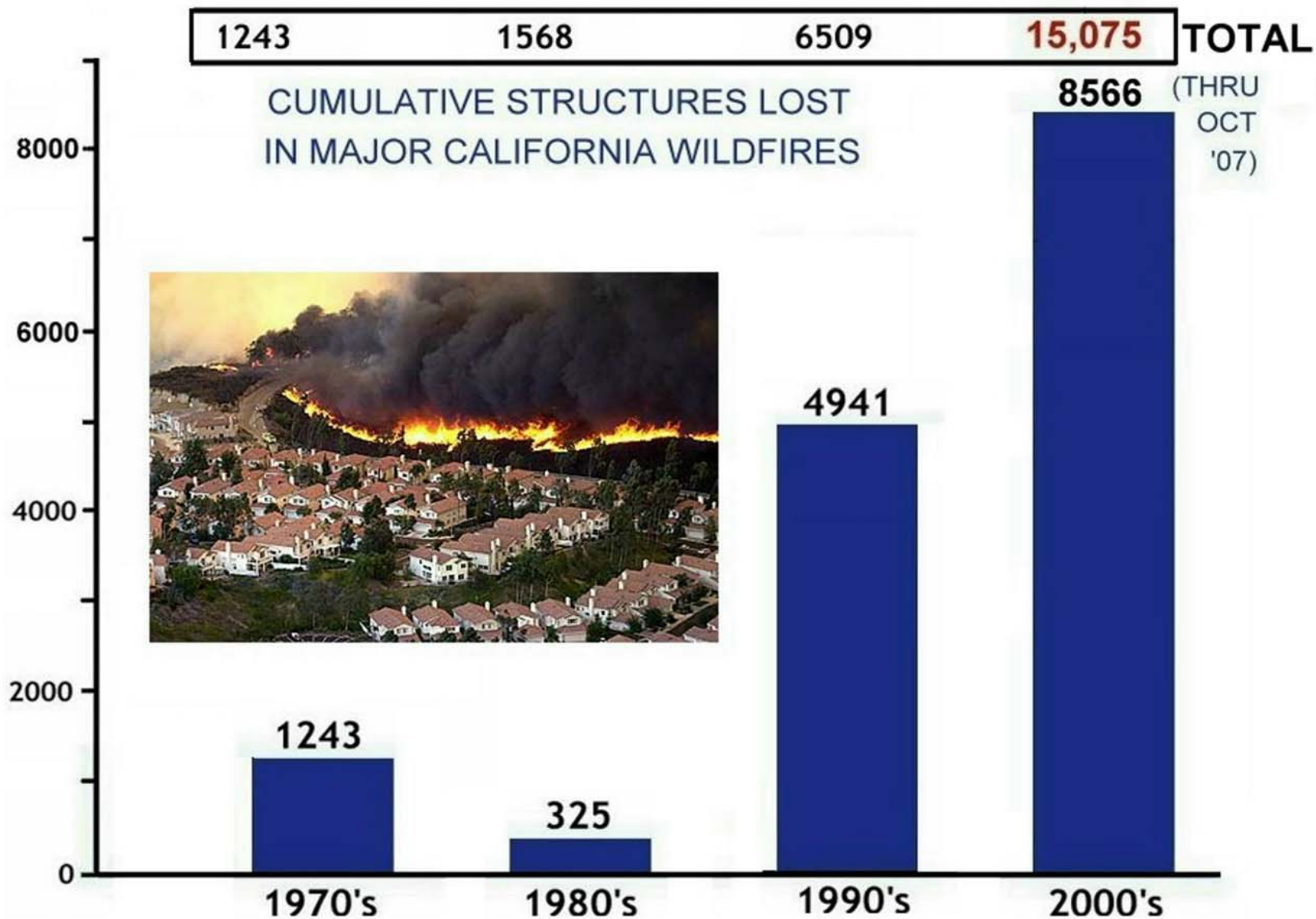
(310)455-0798 office  
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**E-mail :** [wildfireresearch@yahoo.com](mailto:wildfireresearch@yahoo.com)

**Website:** <http://www.wildfireresearch.org>

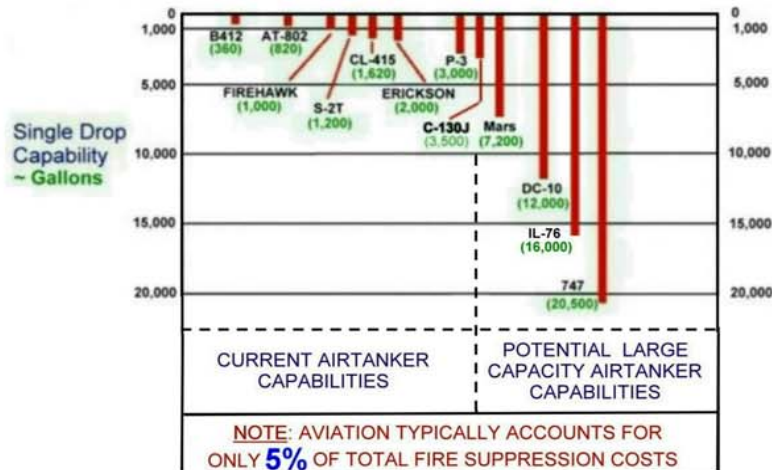
# WILDFIRE RESEARCH NETWORK

**WE'RE LOSING TOO MANY HOMES**



# WILDFIRE RESEARCH NETWORK

## DANGEROUS FUTURE TRENDS & ISSUES



# WILDFIRE RESEARCH NETWORK

## WILDFIRE FIGHTING FUNDAMENTAL TECHNICAL CHALLENGES

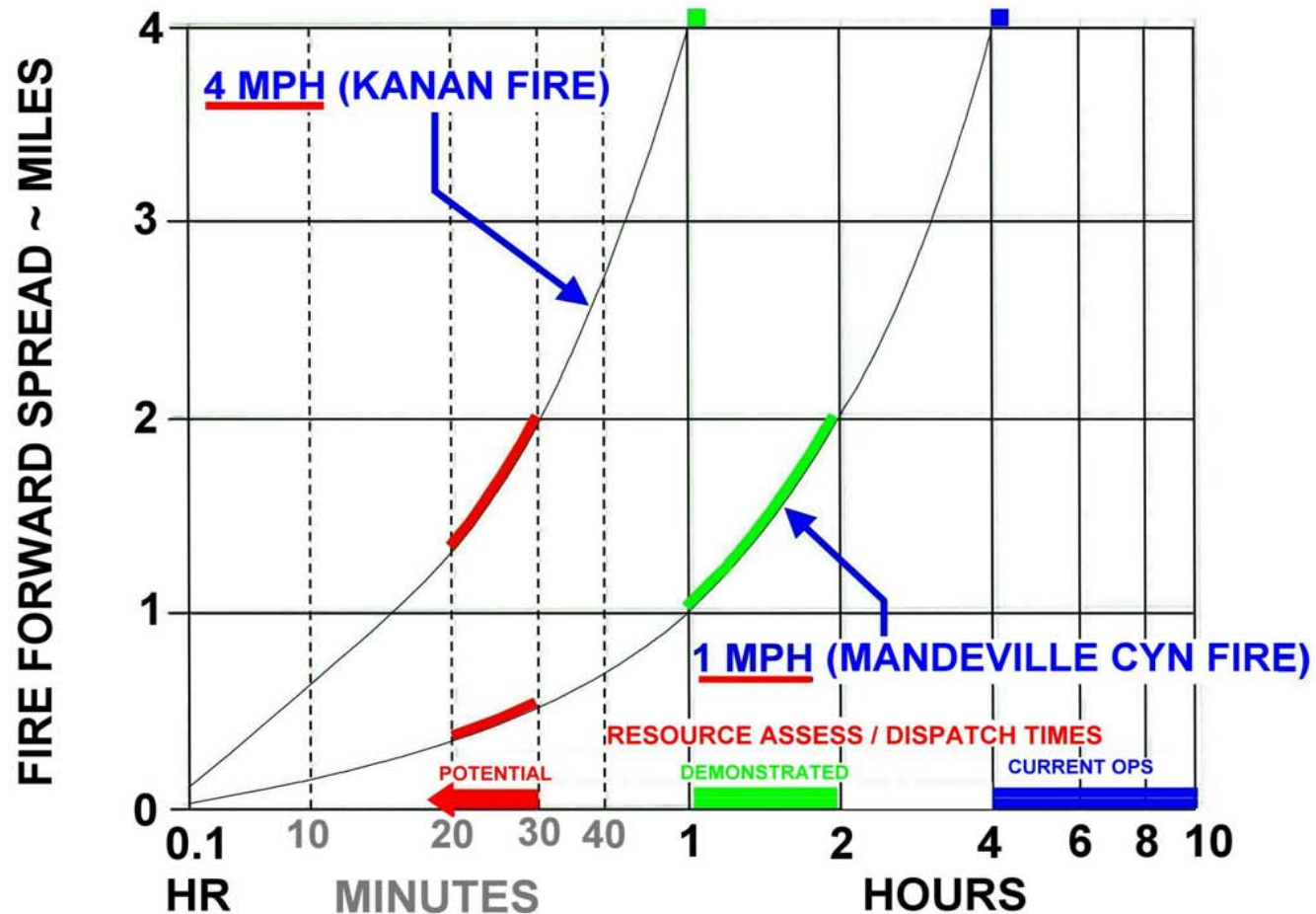


- ✓ 1. Potential Big fires are not attacked soon enough with effective resources
- 2. Current air tankers do not carry enough suppressant to attack the heads of the big fires
- 3. Airborne firefighting assets do not fight fires at night
- 4. Current firefighting systems have limited effectiveness in high winds
- 5. The fire services are without an active, viable research and development program to identify appropriate technical resolutions

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## TYPICAL SERIOUS WILDFIRE SPREAD RATES

- DEPENDING ON TERRAIN, FUEL & WINDS, THE WIDTH OF THE HEAD OF SERIOUS WIND-BLOWN FIRES IS 1/4 TO 1/2 OF THE FORWARD SPREAD



IF YOU DON'T CATCH THESE FIRES QUICK... IT'S VERY HARD TO CATCH UP!

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## WHAT THE FIRST RESPONDER / INCIDENT COMMANDER OFTEN SEES & NEEDS TO KNOW **FAST**



**NOTE: THE LONGER IT TAKES TO GET  
THE ANSWERS, THE LESS LIKELY  
THE FIRE WILL BE STOPPED  
AND LOSSES MINIMIZED.**



1. What is going on here.....?
2. What direction is it going.....?
3. How fast is it going.....?
4. How many homes or other critical facilities are in its path.....?
5. Do we need evacuation efforts and other emergency support.....?
6. What kind of resources should be applied to stop it and/or minimize losses.....?
7. Where are these resources.....?
8. How long will it take for them to get into position to be effective.....?
9. Where should I tell them to go .....?
10. Etc, Etc as an ongoing cycle until resolution....

***An aerial 360° view is much more effective  
than a ground point-by-point survey.***

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## NOTIONAL FIRE EXTINCTION CRITERIA ( Example )

Gallons of Suppressant Aerially Applied \* In (E.G.) 1 Second Over 100 Feet of Flame Front Required for Effective Extinction:

40,000 →

20,000 →

10,000 →

5,000 →

3,000 →

1,000 →

xxx →

Manual Attack Limit →

Rx Burn Limit →

\* Flank / Head

Spotting →

INTENSITY / RATE OF SPREAD PARAMETERS

FOR SPECIFIED VALUES OF:

Temperature

Vegetation Type

Slope

Moisture

% Dead Fuel

■

■

50

40

30

Avg Wind Speed

20

10 mph

xx mph

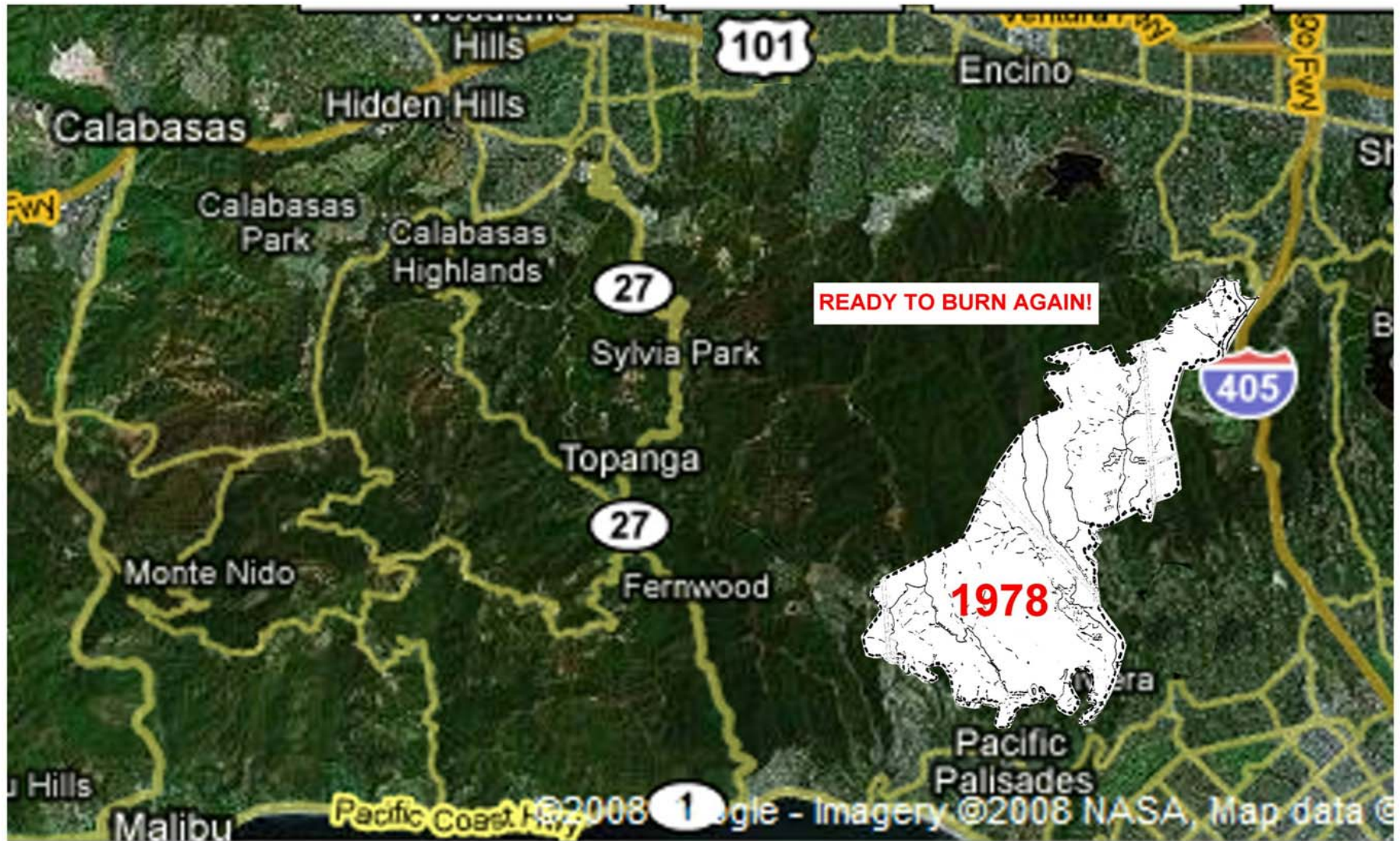
0 10 20 30 40

VEGETATION AGE ~ YEARS

- ⊕ Because of radiant heat, firefighters with hoses cannot stop fires burning in dry vegetation older than 20 years with winds above 30 mph. To save homes, there must be defensible space adequate for radiant heat protection and firefighters to continuously douse flying embers caused by the wind-driven spotting. As wind speed and vegetation age increases the embers are larger, more numerous, and travel farther. To stop these fires, systems capable of applying much larger quantities of suppressant over very short periods of time are required.

# WILDFIRE RESEARCH NETWORK

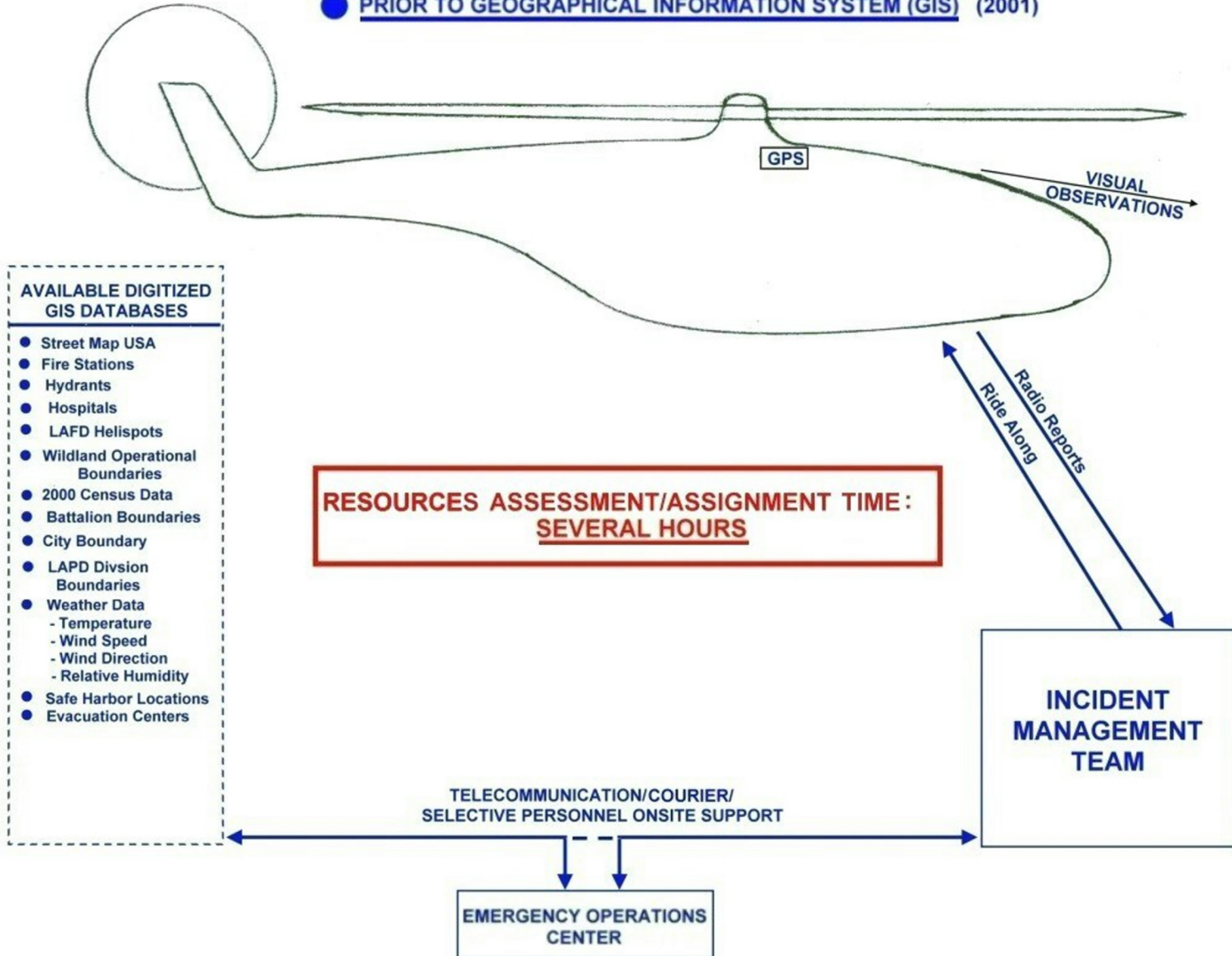
## SANTA MONICA MOUNTAINS / MANDEVILLE CANYON FIRE



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## AIRBORNE INTEGRATED GIS SYSTEM - PHASE 0

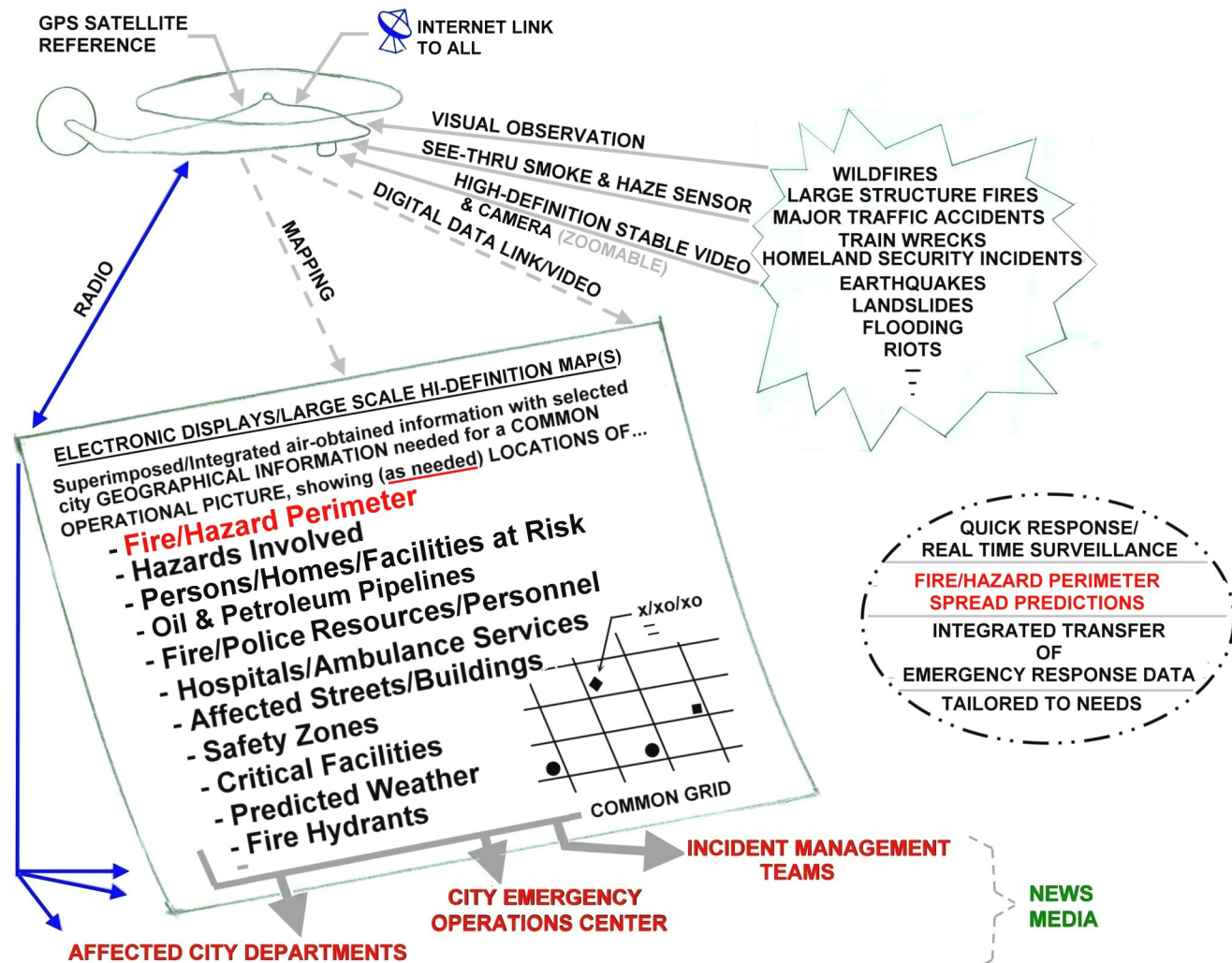
● PRIOR TO GEOGRAPHICAL INFORMATION SYSTEM (GIS) (2001)



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## AIRBORNE INTEGRATED GIS SYSTEM

CAN REDUCE THE CRITICAL RESOURCE ASSESSMENT/ASSIGNMENT TIMES FOR LARGE SCALE CITY EMERGENCIES FROM SEVERAL HOURS TO LESS THAN 30 MINUTES!



# WILDFIRE RESEARCH NETWORK

## SYSTEM ACQUISITION SUMMARY (2001 - 2007)

SYSTEM COMPONENT	AVAILABILITY					6 UASI GRANT FUNDS	7 COMMERCIAL VALUE OF DONATED EQUIPMENT & SERVICES
	1 EXISTING F.D OR OTHER CITY DEPT EQUIPMENT	2 OFF SHELF NEW EQUIP REQ'D	3 NEW TECHNOLOGY EQUIPMENT REQUIRED	4 NEW OPER. PROCEDURES SOFTWARE REQUIRED	5 UNIQUE INTEGRATION FACILITIES REQUIRED		
<u>AIRBORNE</u>							
BELL HELICOPTER	✓						
INERTIAL NAVIGATION SYSTEM		✓		✓	✓		*
GLOBAL POSITIONING SYSTEM (GPS)	✓				✓		*
CAMERA GIMBEL SYSTEM		✓		✓	✓	\$585,000	\$205,000
HIGH-DEFINITION VIDEO CAMERA		✓	✓				
THERMAL IMAGING CAMERA		✓					
AERO COMPUTER MAP SYSTEM	✓			✓	✓	\$1,100,000	
VIDEO DOWNLINK (AIRBORNE)		✓		✓			
<hr/>							
<u>GROUND BASED</u>							
PLANNED VIDEO DOWNLINK (GROUND VEHICLE)		✓		✓		(TBD)	
DIGITIZED GIS DATABASES	✓				✓		\$250,000
ESRI GIS COMPUTER SYSTEM		✓	✓	✓	✓		
HP GROUND SUPPORT COMPUTING		✓					
OVERSIZE PLOTTER/PRINTER		✓		✓			

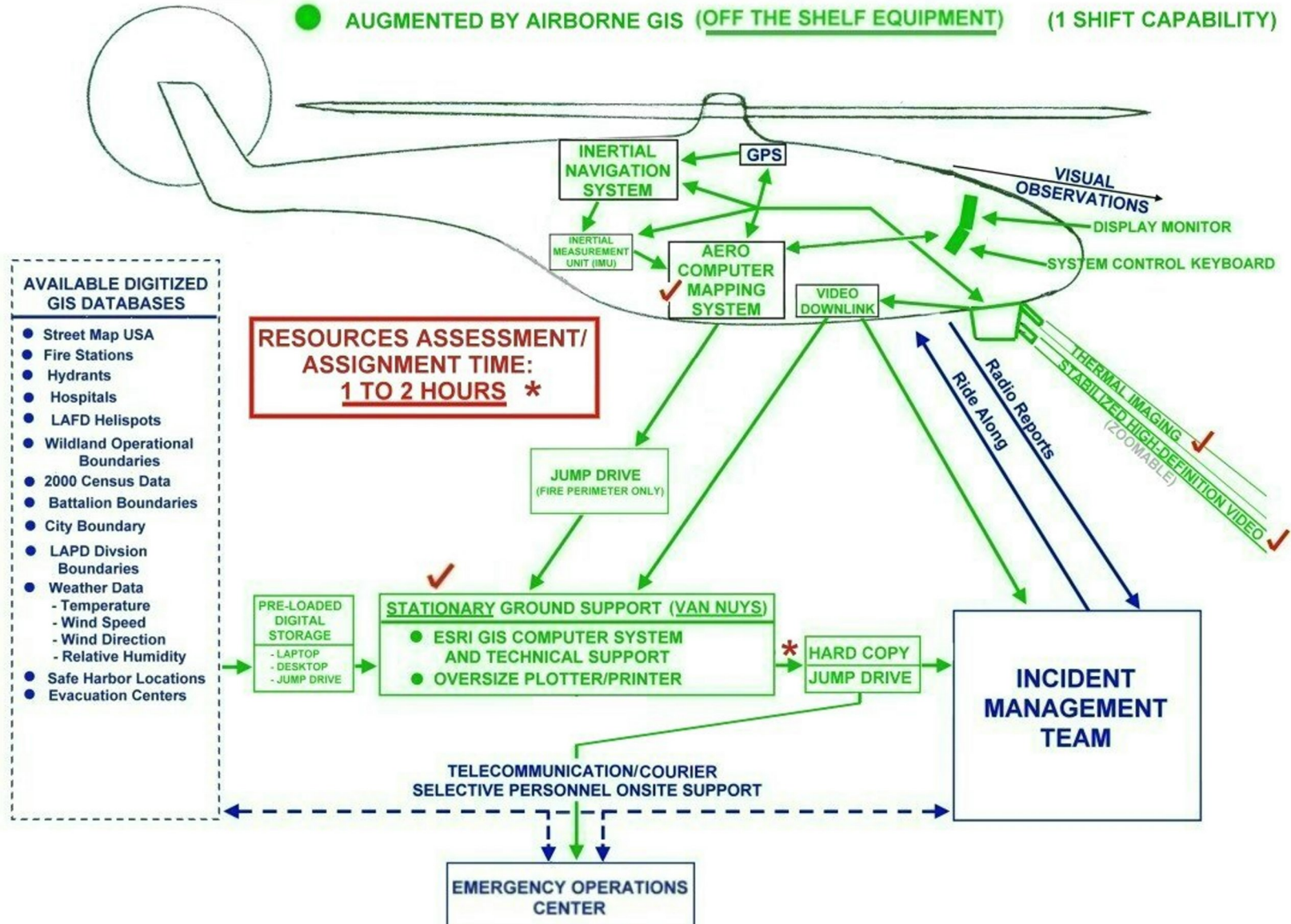
**TOTALS:** \$1,685,000 \$455,000  
 (\$2,140,000)  
 \* INCLUDED IN OTHER TOTALS

**NOTE:** No Fire Department funds were required to obtain the equipment or software/procedures development for this system. All were donated or obtained via UASI grants.

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## AIRBORNE INTEGRATED GIS SYSTEM - PHASE I

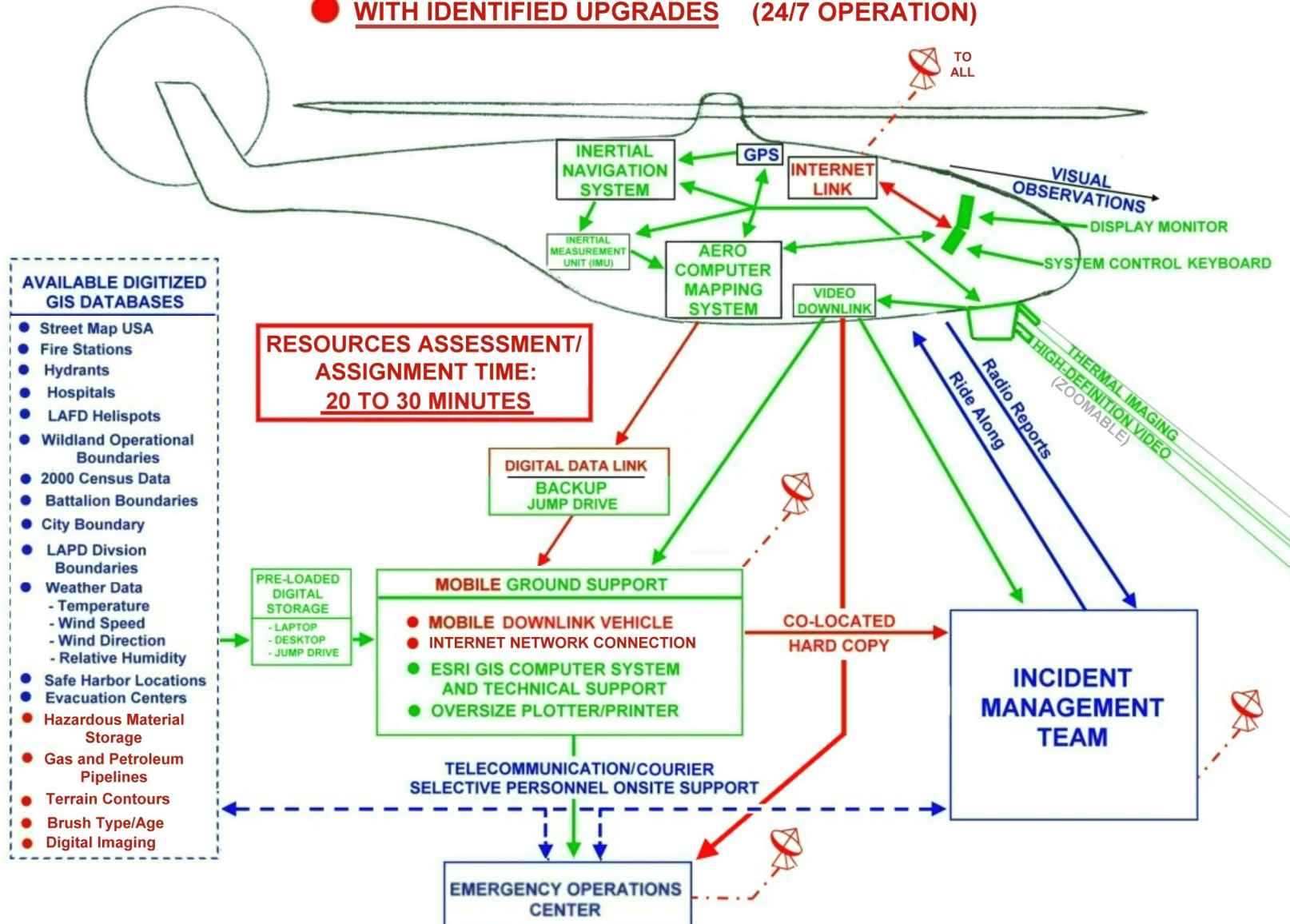
● AUGMENTED BY AIRBORNE GIS (OFF THE SHELF EQUIPMENT) (1 SHIFT CAPABILITY)



# WILDFIRE RESEARCH NETWORK

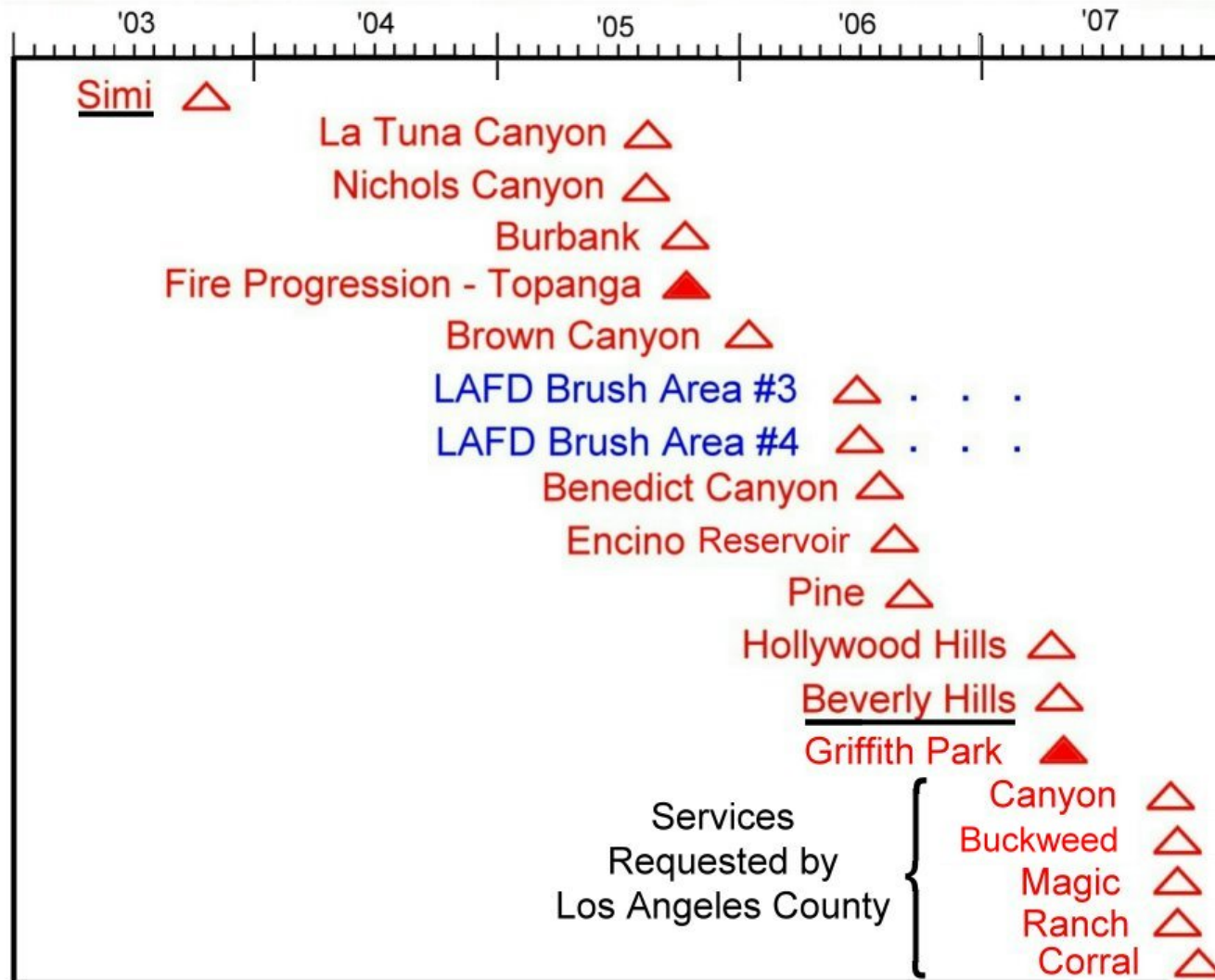
## AIRBORNE INTEGRATED GIS SYSTEM - PHASE II

● WITH IDENTIFIED UPGRADES (24/7 OPERATION)



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## BRUSHFIRE OPERATIONS SUPPORTED BY THE AIRBORNE INTEGRATED GIS SYSTEM



# WILDFIRE RESEARCH NETWORK

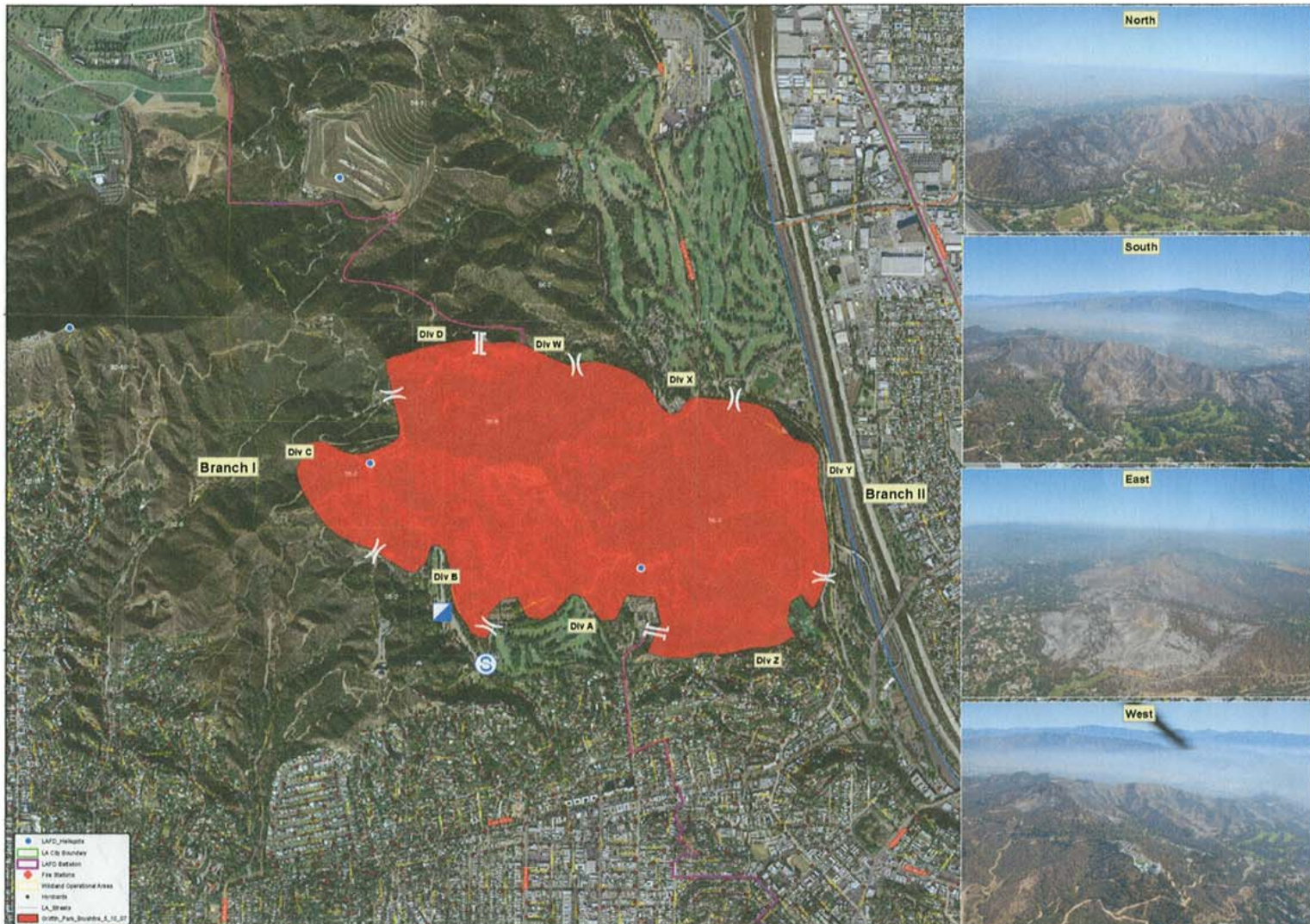
## FIRE PROGRESSION - TOPANGA FIRE 10-3-05



● **ACCURATE PREDICTED FIRE SPREAD ALLOWED TIMELY EVACUATIONS & PREDEPLOYMENTS TO SAVE HOMES**

# WILDFIRE RESEARCH NETWORK

## GRIFFITH PARK BRUSHFIRE AS OF 5-09-07



● PERIODIC ACCURATE FIRE PERIMETERS & SPREAD PREDICTIONS  
CONTRIBUTED TO EFFECTIVE FIRE CONTROL & TO FIREFIGHTER SAFETY

# WILDFIRE RESEARCH NETWORK

## LAFD/CITY OPERATIONS SUPPORTED BY THE AIRBORNE INTEGRATED GIS SYSTEM

	'03	'04	'05	'06	DEPT. SUPPORTED		
					FD	PD	OTHER
▲ 75th Annual Academy Awards					✓	✓	✓
▲ Israeli Festival					✓	✓	✓
▲ Operation Determined Promise - LA Harbor					✓	✓	✓
▲ Laurel Canyon Hill Slide					✓	✓	✓
▲ LAFD Storm Information					✓		
▲ Metrolink Passenger Train Derailment					✓	✓	✓
▲ 77th Annual Academy Awards					✓	✓	
▲ 47th Annual Grammy Awards					✓	✓	
Downtown LA Highrise Evacuation Plan ▲					✓	✓	
Haskell Dynamite Incident ▲					✓	✓	✓
LAFD Central Produce Fire ▲					✓		
48th Annual Grammy Awards ▲					✓	✓	✓
NTSB Fatality Crash Investigation ▲					✓	✓	✓
Beverly Hills Academy of Achievement ▲					✓	✓	✓
Wilshire May Day March ▲					✓	✓	✓
New LAFD FS 87 under construction ▲					✓		
New LAFD Air Operations under construction ▲					✓		
LAFD Homeless Outreach Program to Encampments (HOPE) ▲					✓	✓	
US Bank Tower Evacuation Drill ▲					✓	✓	✓
AON Tower Evacuation Drill ▲					✓	✓	✓
Operation Lead Shield LA Harbor ▲					✓	✓	✓
LAPD Operation Silent Night ▲						✓	
CA-TF1 Mobex Collapse Site ▲					✓	✓	✓
CA-TF1 Mobex Fumarole Area ▲					✓	✓	✓
NTSB Fatality Air Crash Investigation ▲					✓	✓	✓

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## LAUREL CANYON SLIDE ZOOM SHOT (January 2005)



**EARLY DETERMINATION OF SIGNIFICANT RISK TO LAUREL CANYON BLVD  
DICTATED CLOSURE TO MITIGATE RUSH HOUR MOTORIST EXPOSURE**

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## METROLINK DERAILMENT JANUARY 2005



- **EARLY GRAPHIC EVIDENCE OF THE EXTENT OF THE TRAGEDY, POTENTIAL INJURIES, ETC. ALLOWED QUICKER CONVERGENCE OF THE APPROPRIATE NEEDED EMERGENCY ASSISTANCE**

# WILDFIRE RESEARCH NETWORK

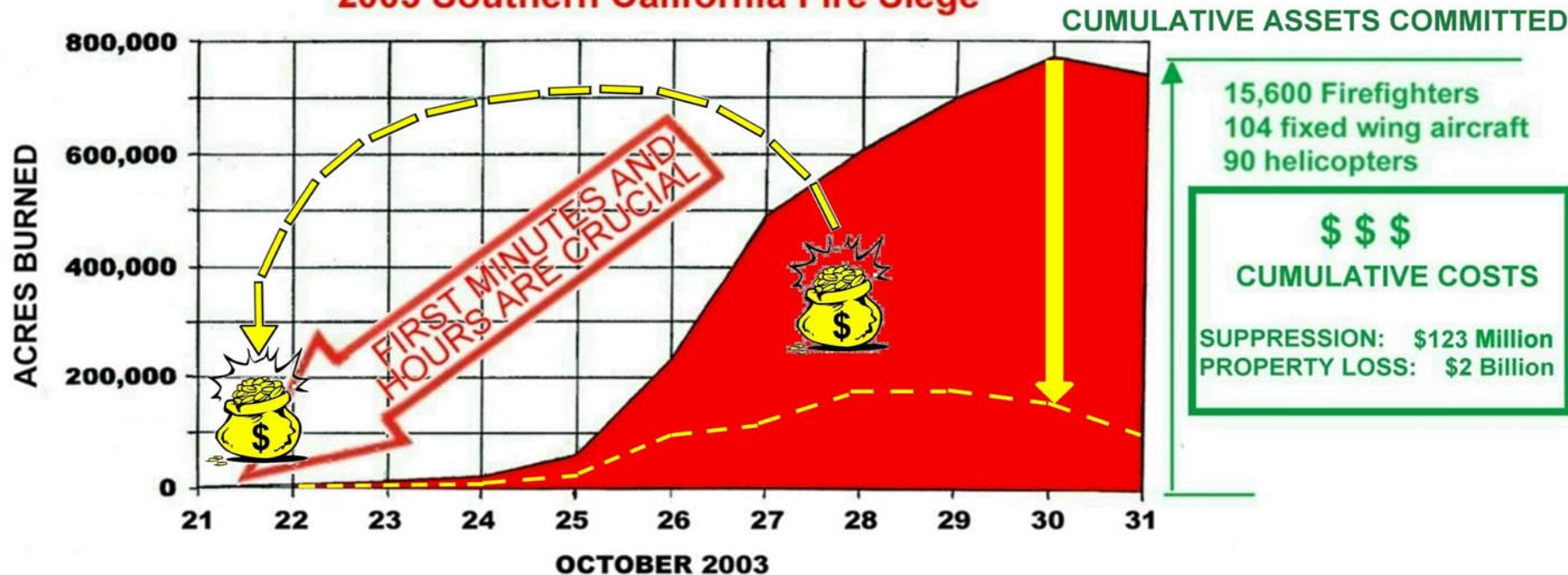
## SYSTEM OUTPUTS & ADVANTAGES

- ✓ 1 Dramatically reduces initial resource assess / dispatch times from several hours to potentially less than 30 minutes
- ✓ 2 Provides a timely "complete" continuously updated SITUATIONAL AWARENESS and COMMON OPERATIONAL PICTURE tied to a common GIS reference
- ✓ 3 Saves firefighter lives and reduces injuries
- 4 Continuous fire perimeter updates/tracking with expansion predictions
- 5 Real time, zoomed high-definition, stabilized video/camera information
- 6 Real time thermal imaging information (see fireline & hotspots through smoke/haze)
- 7 Presents digestible layers of GIS information tailored to the needs of the moment
- 8 Early identification of critical plan changing events
- ✓ 9 System will increase the efficiency and effectiveness of many other city departments during emergency and Homeland Security events
- 10 System in its current incomplete status has demonstrated significant operational improvements on 16 brushfires and over 16 other city emergency/alert incidents
- 11 Cost of fully implementing this system is less than the cost of a handful of hillside homes

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## MORE EMPHASIS NEEDED ON EARLY DETECTION / INITIAL ATTACK

### 2003 Southern California Fire Siege



- Total Supression Costs Are Proportional to Acreage / Perimeter Burned
- Early Effective Attack Is Essential to Reduce Losses & Total Suppression Costs
- **PAY NOW... OR... PAY A LOT MORE LATER!**

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## REMAINING ISSUES

- 1 System is complex and requires dedicated/specialized personnel
- 2 Current capability & future potential is solely dependent on one individual  
His employment status and salary integrity have remained insecure for six years without appropriate job reclassification in recognition of the significant contributions he provides to the effectiveness of the department. The current city budget crisis has targeted his unfunded position status.
- 3 Funding and staffing has not been provided to build 24/7 capability
- 4 System has not been incorporated into department standard operating procedures or included in training courses
- 5 Continued donated technical support is contingent on formal recognition & permanent status of the system development program in the department
- 6 System is basically a prototype demonstration system that has significant improvement potential
- 7 The system has national attention -- a hope of the future for many far-sighted professionals in fire services around the country

REVISED  
Vision Statement  
(Shortly after Doug Barry took the reins)

The Los Angeles Fire Department continues to strive toward recognition as a world-class provider of all-risk emergency service. Accomplishing this goal in the midst of current global challenges such as terrorism, natural disaster, epidemic, flood or fire – and with an increasingly diverse workforce – demands courageous and innovative approaches that exceed the limits of current practices.

The Department is committed to meeting these challenges by implementing a model of leadership that engages employees, rewards risk-taking and creativity, creates an environment founded on trust and effective communication, and ensures that employees are supported in ways that allow them to excel. This means forming cooperative partnerships with other local and national emergency response organizations, providing state-of-the-art equipment to ensure operational effectiveness and employee safety, and providing premiere training and professional development opportunities, thus enabling all employees to reach their full potential.

Department employees are committed to meeting these challenges by providing exceptional prevention, preparedness, and response services to the communities we serve, maintaining meaningful partnerships within these same communities, adhering to recognized physical and safety standards, and treating one another as the Department's greatest and most valuable resource. By ensuring that people at all levels are valued, respected, and treated fairly, we will create the type of professional work environment that attracts and retains highly qualified candidates who will take the innovative risks necessary to significantly shape the organization's future.

This vision drives us to be our best for one another, for our Department, and for the people of the City of Los Angeles.