WILDFIRE FIGHTING IN AMERICA

AT A

CROSSROADS!

MARCH 2009

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.

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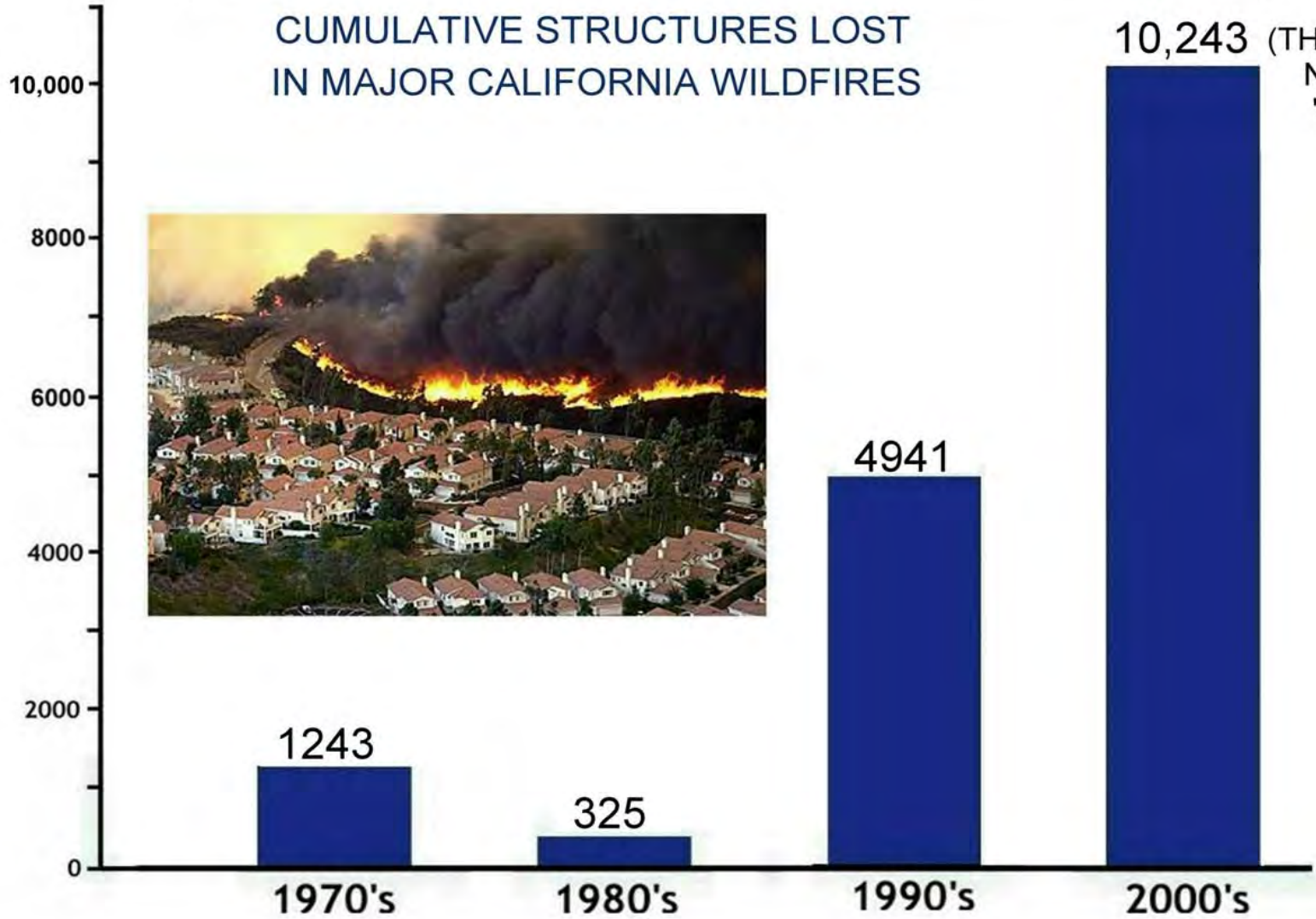
E-mail : wildfireresearch@yahoo.com **Website:** http://www.wildfireresearch.org

WILDFIRE RESEARCH NETWORK

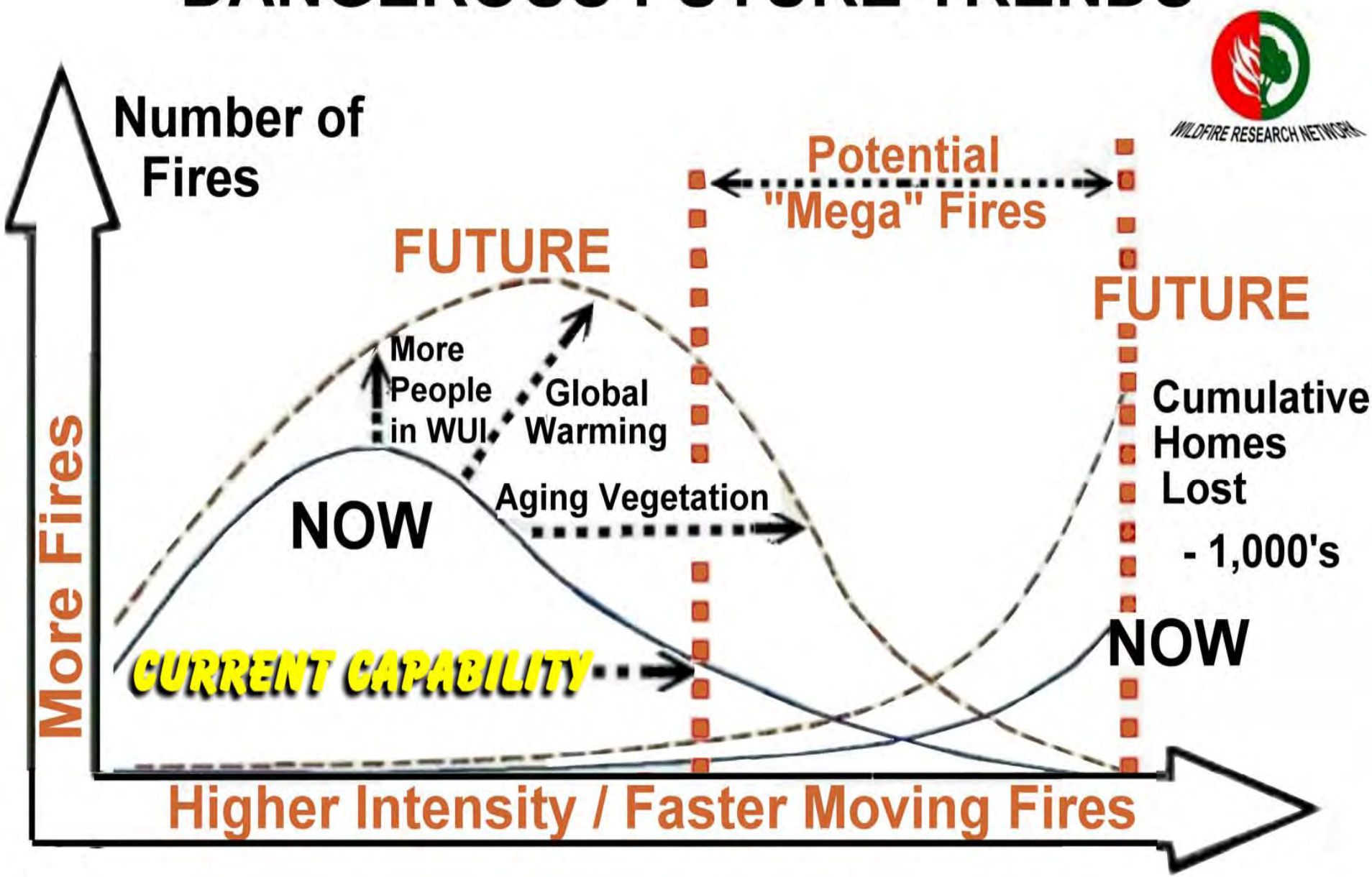
WE'RE LOSING TOO MANY HOMES

1243	1568	6509	16,752 TOTAL

CUMULATIVE STRUCTURES LOST
IN MAJOR CALIFORNIA WILDFIRES



DANGEROUS FUTURE TRENDS



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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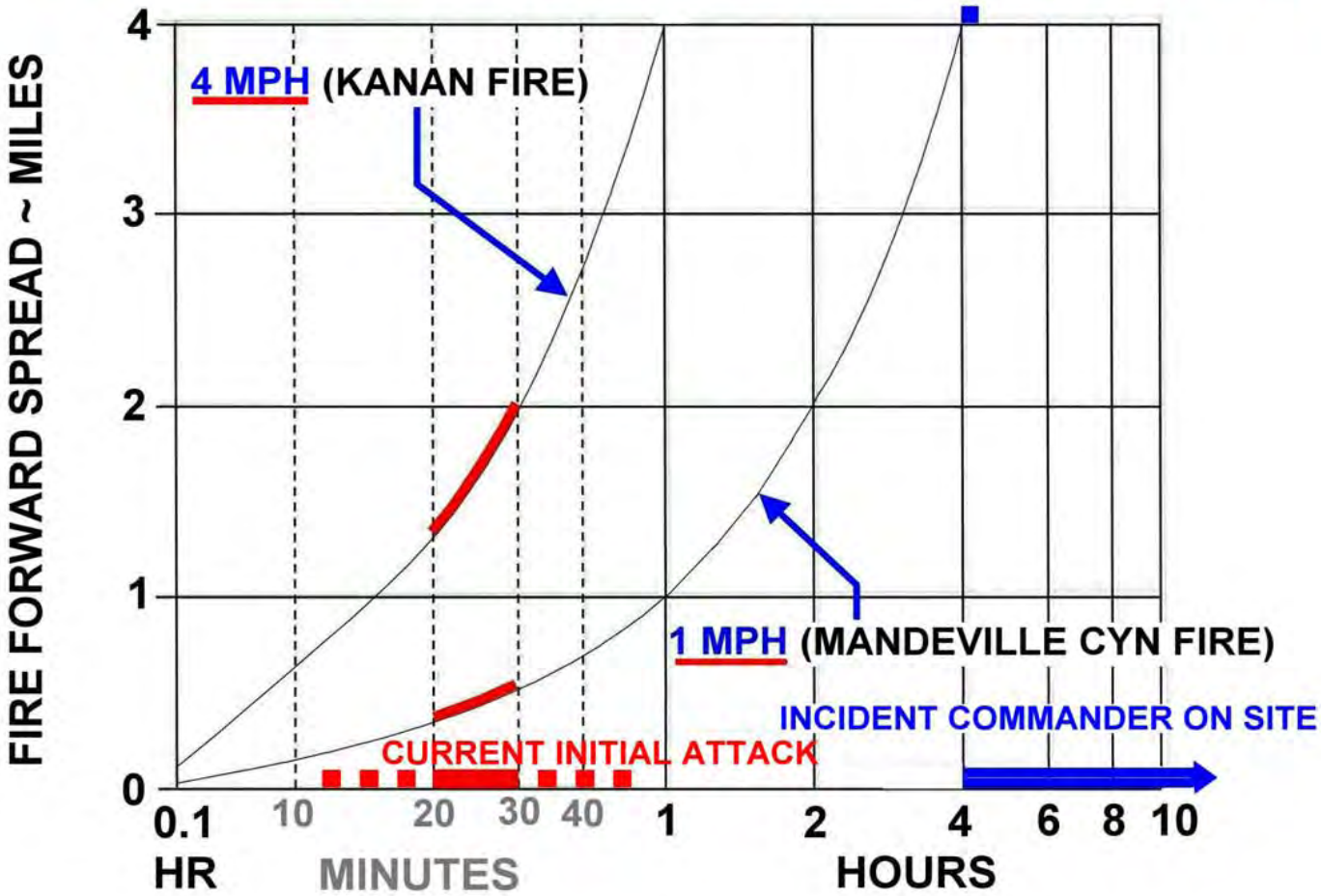
IF YOU DON'T CATCH MEGA FIRES QUICK... ITS VERY HARD TO CATCH UP!



INITIAL ATTACK / ASSESS - DISPATCH TIMES

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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 faster & more effective than a ground point-by-point survey.

INITIAL ATTACK IMPROVEMENT OPPORTUNITIES

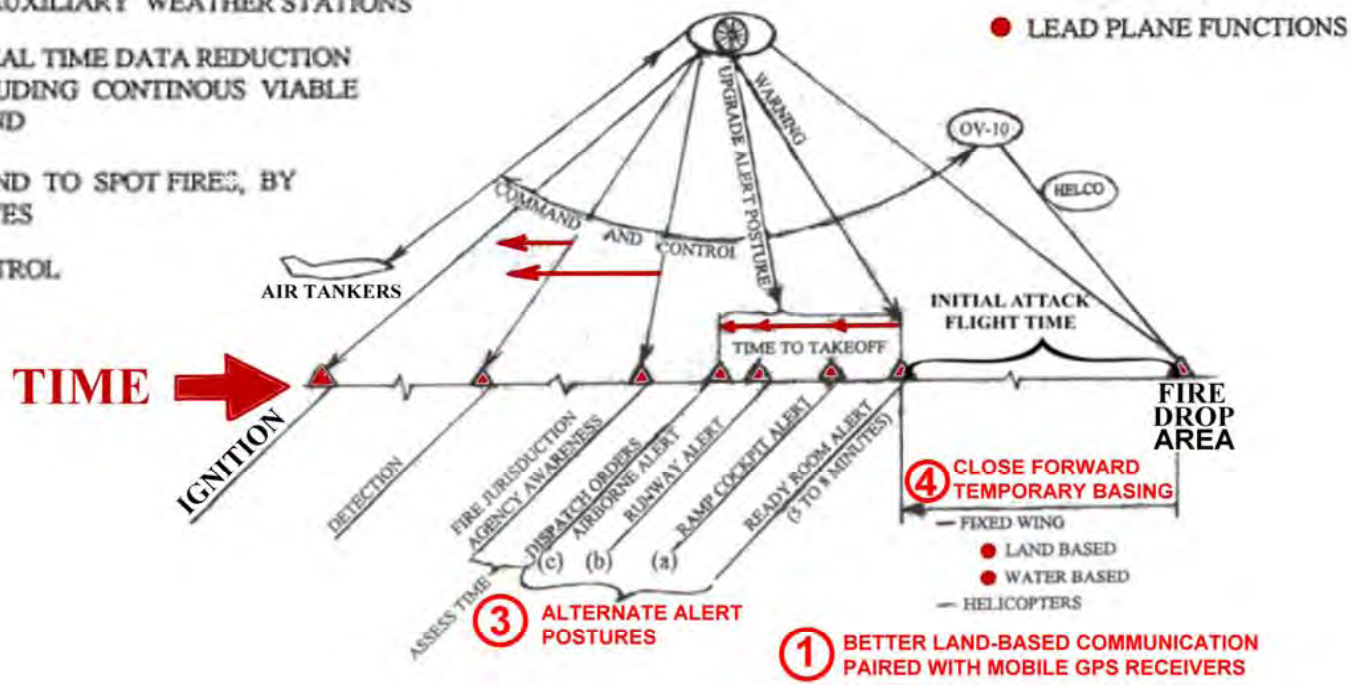
② POTENTIAL NEW FUNCTIONS

- CONTINUOUS NIGHT & DAY
- SINGLE POINT REAL TIME REGIONAL SITUATION AWARENESS VIA DIRECT SENSOR OBSERVATION, TRANSPONDER UPDATES
- CONTINUOUS IR SURVEILLANCE/ DETECTION THRU SMOKE
- CONTINUOUSLY UPDATED FIRE SPREAD BEHAVIOR BASED ON LATEST WIND, WEATHER AND FIRE PERIMETER-- INCLUDING SPOTTING & IN-PLACE FIRE SUPPRESSION FORCES
- RADAR & TRANSPONDER ASSISTED ATC THRU SMOKE
- HELICOPTER PLACED MOBILE AUXILIARY WEATHER STATIONS
- INTEGRATED , AUTOMATED, REAL TIME DATA REDUCTION DECISION FACILITATION INCLUDING CONTINOUS VIABLE OPTION DISPLAYS -- ON DEMAND
- ABILITY TO DETECT & RESPOND TO SPOT FIRES, BY DIRECTING AIRBORNE RESERVES
- REGIONAL COMMAND & CONTROL
- COMMUNICATIONS RELAY

CURRENT SYSTEM

- DAYTIME OPERATIONS ONLY
- DISPATCH BASED ON LAND BASED DETECTION & COMMUNICATION
- SUPPORT SYSTEMS DISPATCHED WITH AIR TANKER(S)
- VISUAL/ RADIO ATC
- LOCAL INCIDENT COMMAND & CONTROL
- LEAD PLANE FUNCTIONS

ADD AGILE INTELLIGENT EYE(S) IN THE SKY



CONTRACTOR FLIGHT DEMONSTRATION PROGRAM OF REAL-TIME AIR TANKER PERFORMANCE MONITORING SYSTEM WITH USFS

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- **MARTIN MARS WATER SCOOPING AIRTANKER**
  - **WITH ATIS (AIR TANKER INFORMATION SYSTEM)**
    - Record / broadcast air tanker location on Google Earth topographical map - - available real-time to fire management officers
    - Shows location & time of all drops
    - Tells how much suppressant dropped
    - Records real-time temperature/humidity
    - Allows real time tracking of air tanker performance in terms of cost per gallon of suppressant being delivered on the fire

- **SUPPORT RECONNAISANCE AIRCRAFT (SRA) - - S-76 HELICOPTER**
  - **(With In-Air Information Flow Capabilities)**
    - Onboard Thermal Imaging capability
    - Maps fire and exports information live to Incident Commander, Dispatcher, and Fire Forecaster located in Sacramento
    - Provides information every 30 minutes instead of current practice of one mapping per day (at dusk)

- **SYSTEM PROVIDES REAL-TIME INPUT TO FIRE MANAGEMENT THROUGHOUT DAY AND PROVIDES HARD PERFORMANCE DATA OF AIR ASSETS EQUIPPED WITH ATIS ELECTRONIC RECORDER/TRANSMITTER**
- **USFS CONSIDERING SYSTEM AS MANDATORY FOR FUTURE AIR-TANKER CONTRACTS FOR COST ACCOUNTABILITY BENEFITS**

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MORE EMPHASIS NEEDED ON EARLY DETECTION / INITIAL ATTACK

2003 Southern California Fire Siege

Cumulative Assets Committed

15,600 Firefighters
104 fixed wing aircraft
90 helicopters

$ $ $
CUMULATIVE COSTS

SUPPRESSION: $123 Million
PROPERTY LOSS: $2 Billion

- 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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WILDFIRE FIGHTING FUNDAMENTAL TECHNICAL CHALLENGES

TYPE II
HELICOPTER
(360 GALLON CAPACITY)

1. Potential Big fires are not attacked soon enough with effective resources
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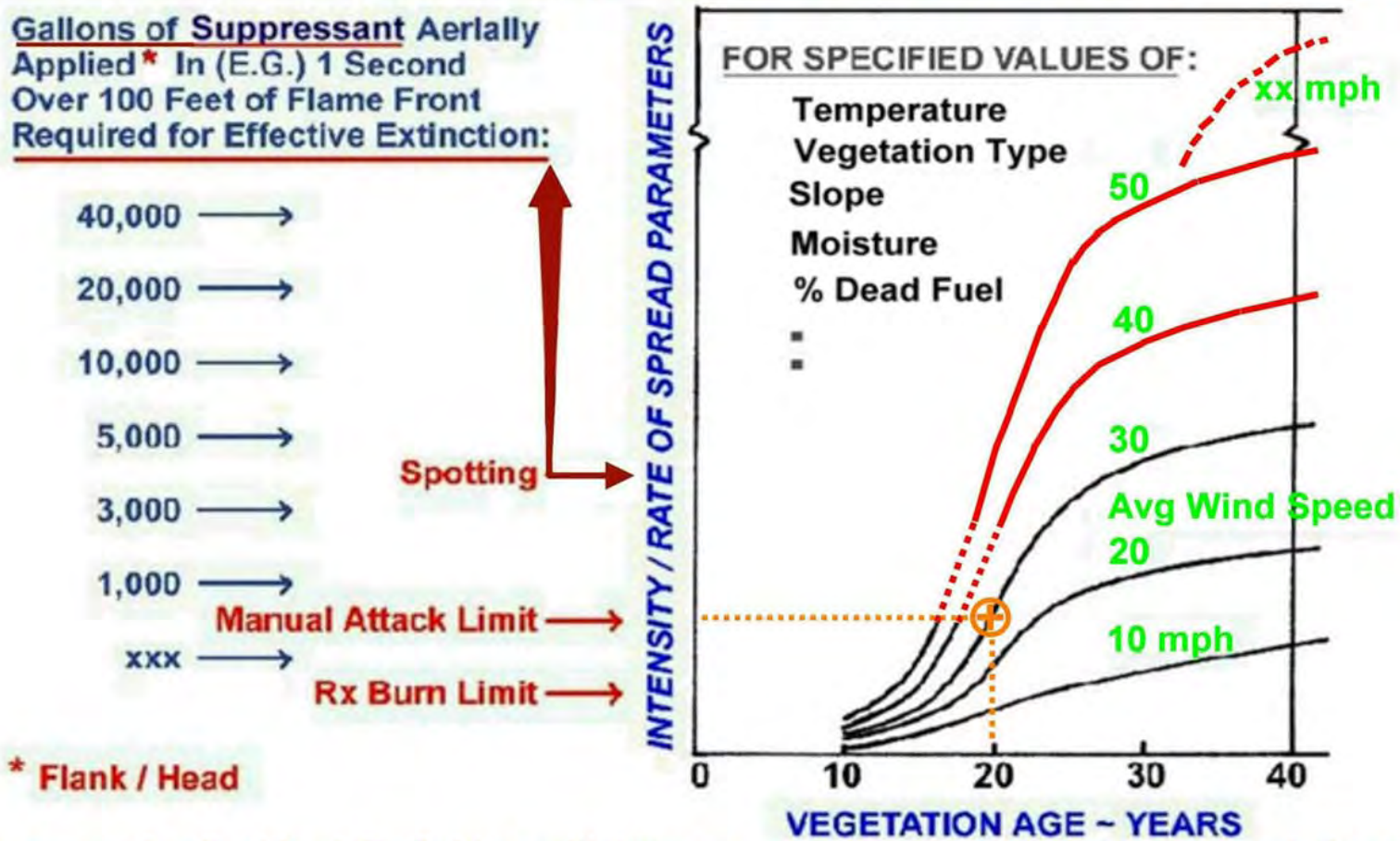
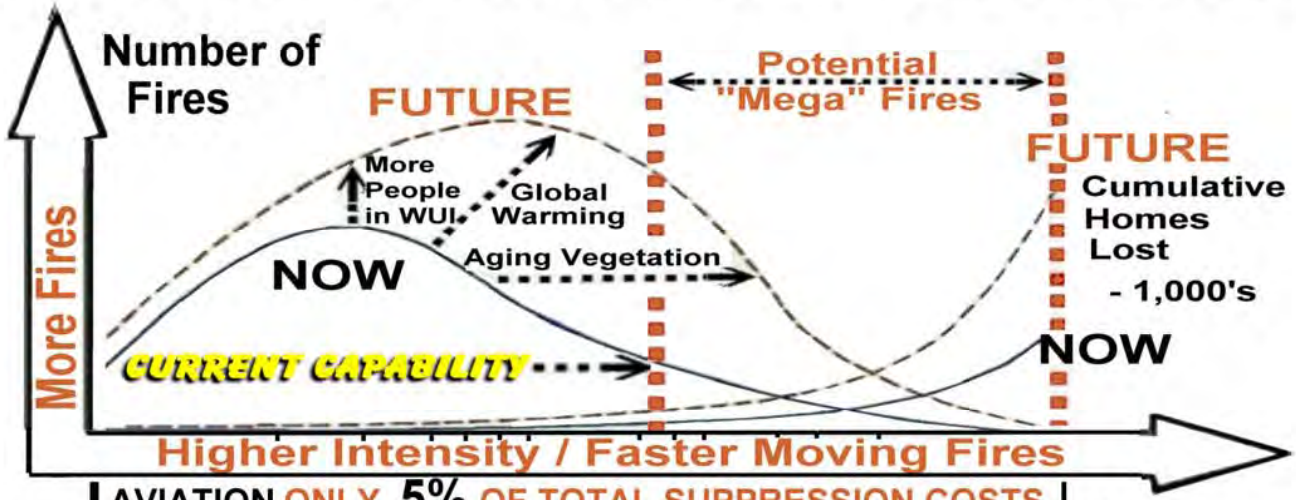
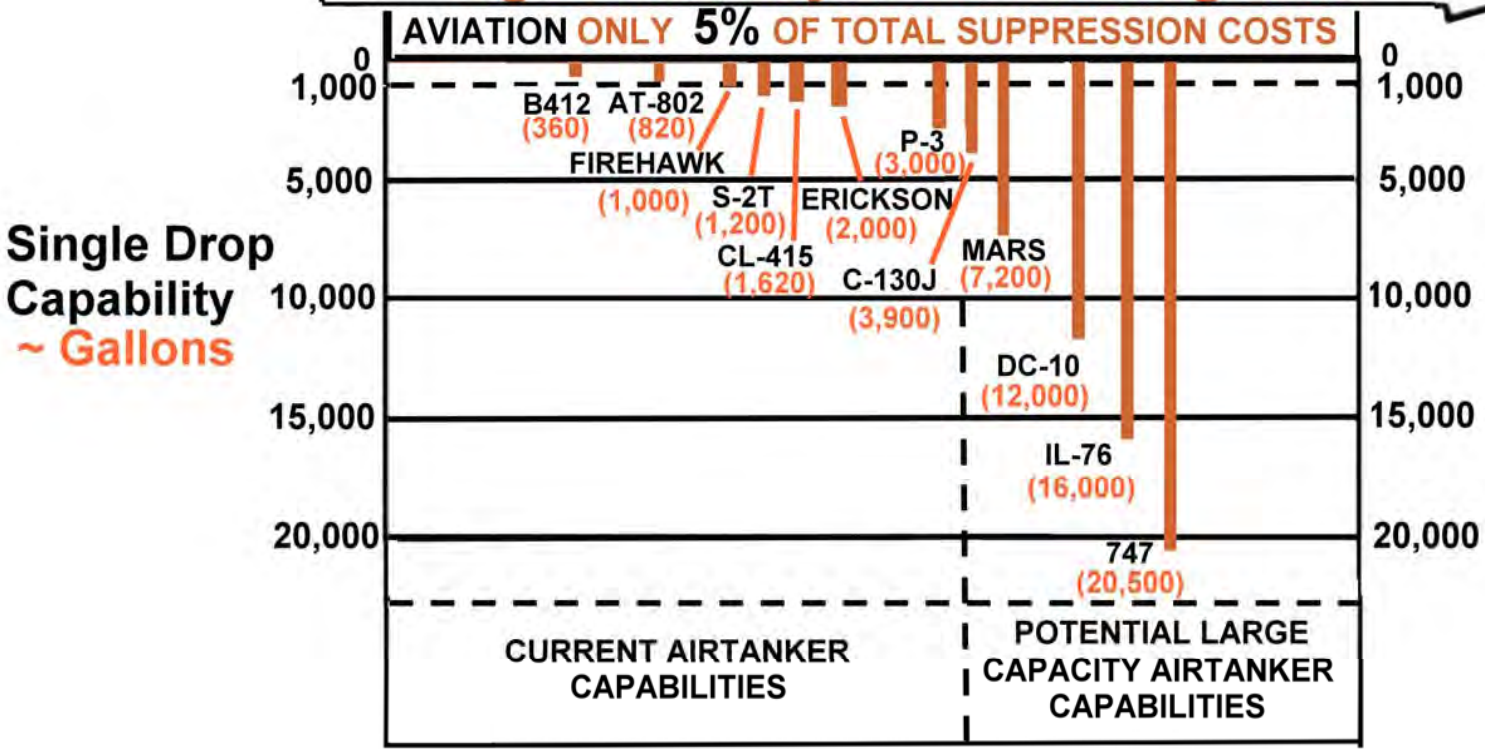
NOTIONAL FIRE EXTINCTION CRITERIA (Example)



⊕ 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 effectively applying much larger quantities of suppressant over very short periods of time are required.

DANGEROUS FUTURE TRENDS & ISSUES





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THE TIME HAS COME

FOR WILDFIRES TO BE FOUGHT AT NIGHT

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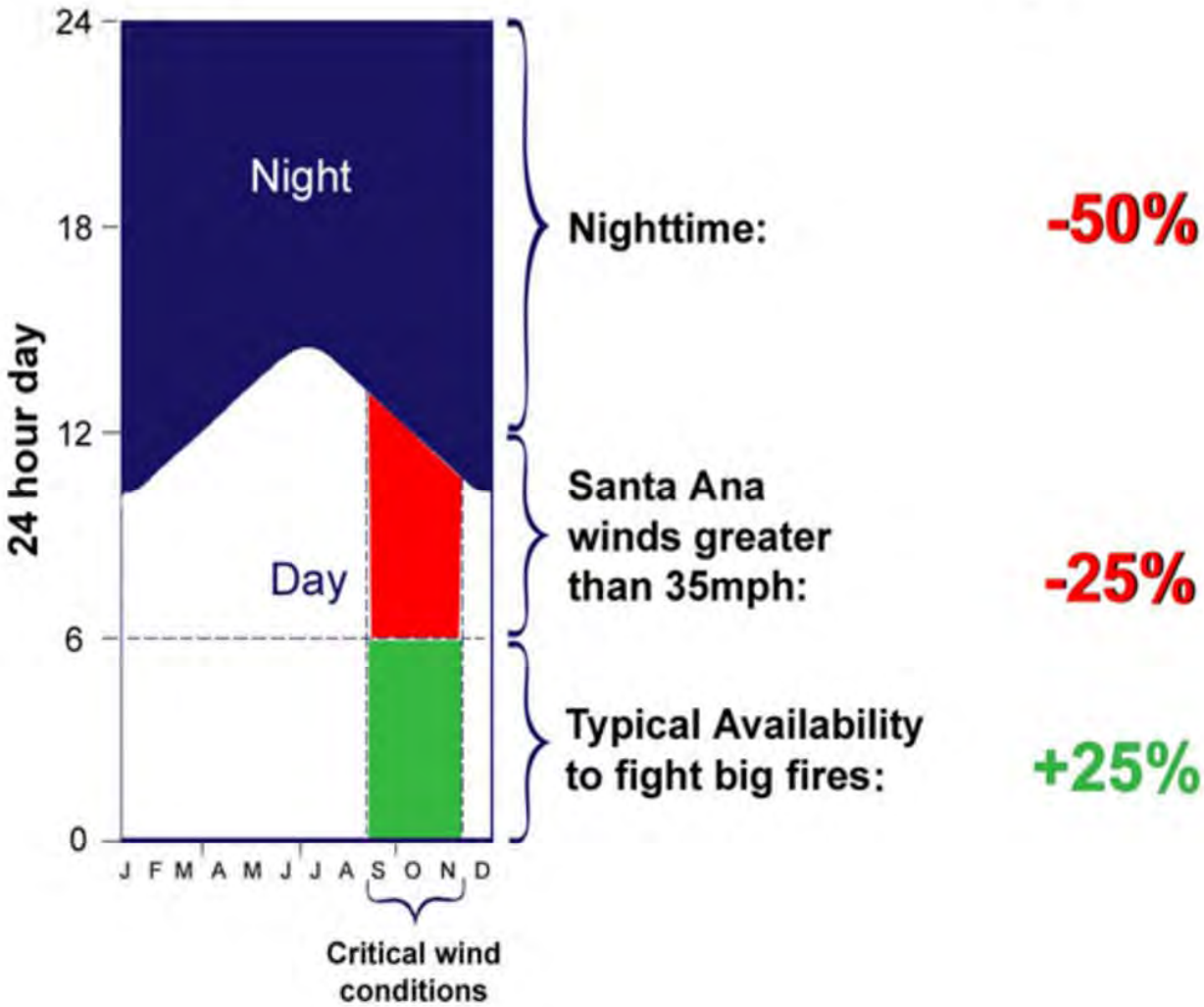
AIRTANKER DAILY AVAILABILITY

(Critical California Conditions)



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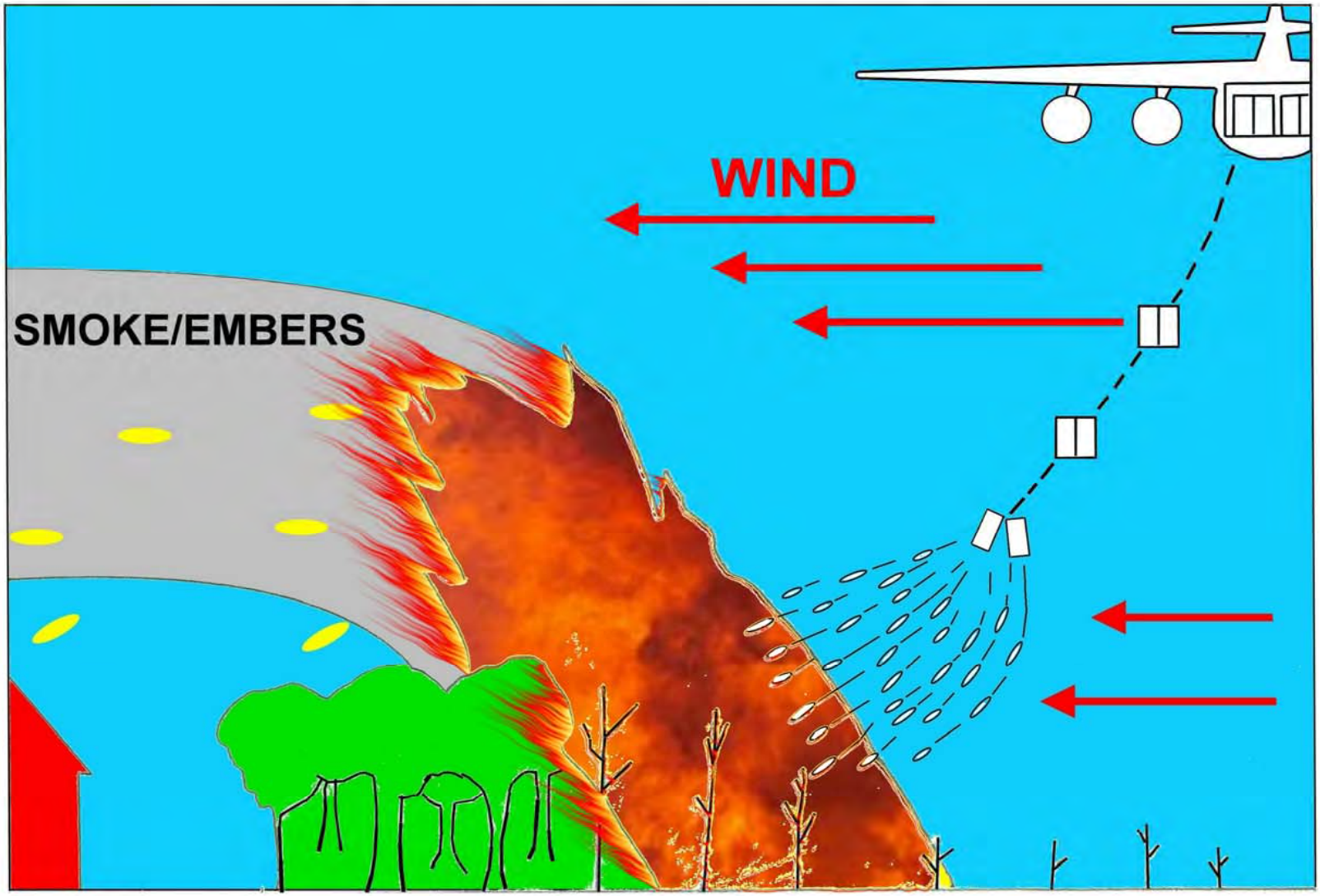
PCADS APPLICATION & DEVELOPMENT

PCADS

Precision
Container
Air
Delivery
System

PCADS POTENTIAL EFFECTIVENESS IN HIGH WINDS



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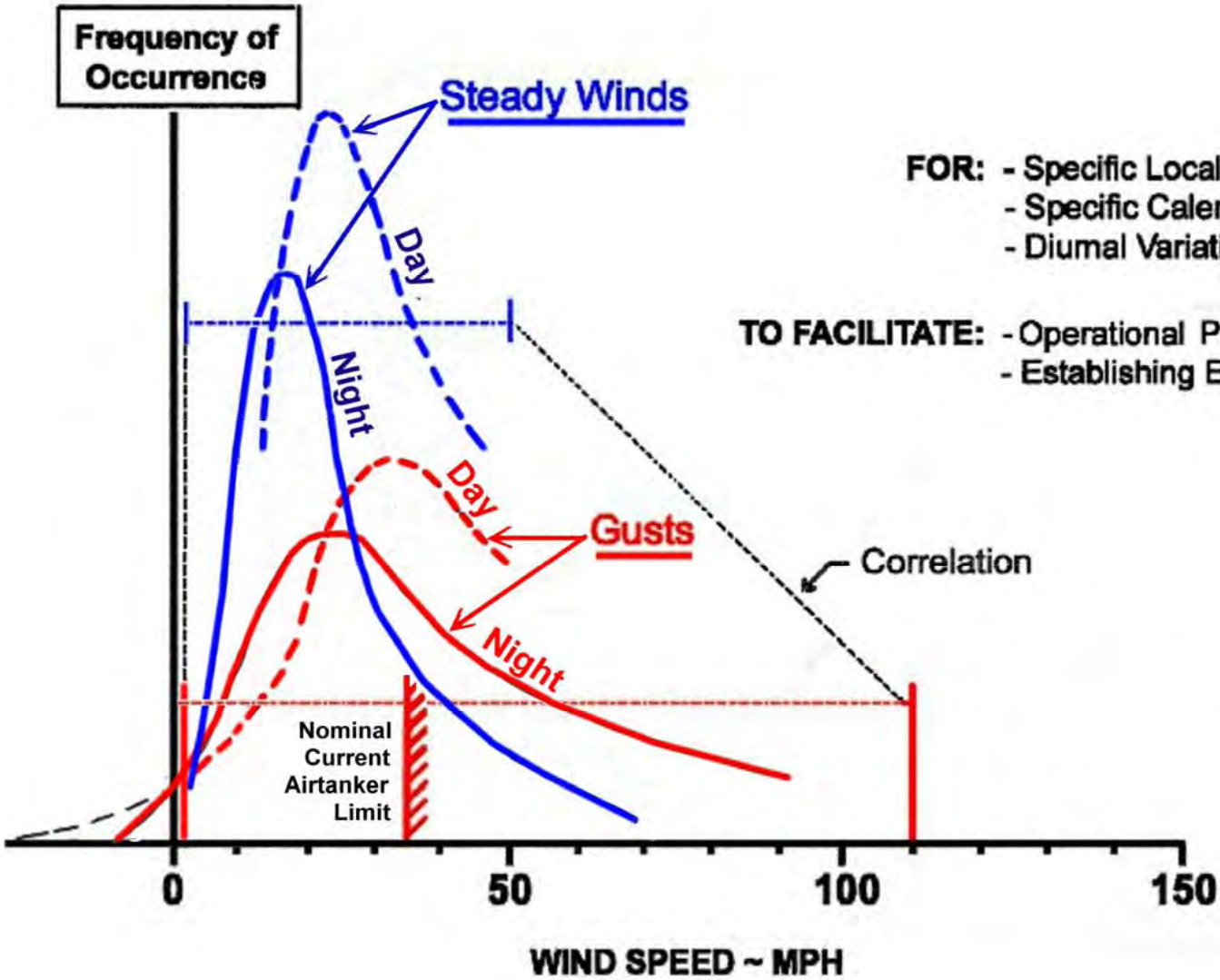
DESIRED FIRE WEATHER WIND STATISTICS & PREDICTIONS



FOR: - Specific Local Geographic Areas
- Specific Calendar Timespans
- Diumal Variations

TO FACILITATE: - Operational Planning and Decisions
- Establishing Equipment Design Criteria

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CIVIL FIREFIGHTING vs. MILITARY AVIATION

OPERATIONS

CIVIL

- Daylight only
- Grounded for winds > 35mph
- Fires detected by ground based 911–type system
- Local, visual/radio air traffic control
- Navigation primarily by maps and dead reckoning, some GPS
- Primarily hand-me-down equip. adapted to firefighting

MILITARY

- Night & day
- All-weather capability
- Continuous air or space borne surveillance using multi-sensors
- Local/regional radar/ transponder assisted air traffic control
- Navigation by GPS and common grid system
- Specialized new/updated equipment

RESEARCH AND DEVELOPMENT

- Spotty uncoordinated efforts by independent agencies, less than 1% of total budget
- Centrally controlled, constant effort, focused on being the best in the world, 3 to 5% of total budget (DOD)

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(CALIFORNIA)

Governor's Blue Ribbon Fire Commission

Nov. '03 to Apr. '04

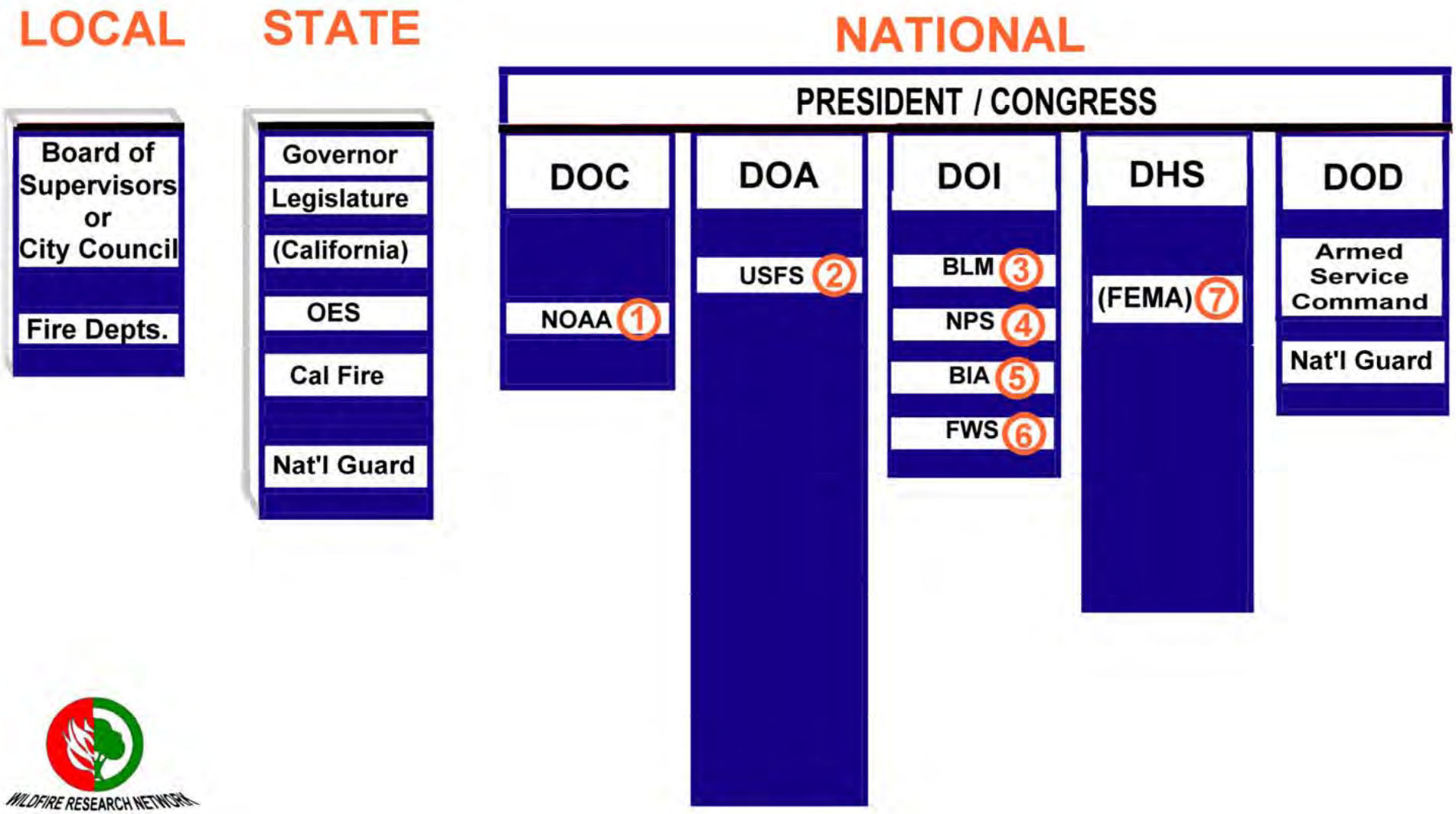
WRN RECOMMENDATION ACCEPTED BY THE COMMISSION:

Federal Recommendation 3

The Commission recommends that Congress consider authorizing Additional federal grant funds for wildland fire mitigation, including The establishment of a National Fire Research Institute to Compile, evaluate and fund technological advances related to fire Prevention and suppression at the federal level. (Fiscal-1)

References: Pages 17/63 of Commission's Report

TOTAL NATIONAL WILDFIRE FIGHTING SYSTEM



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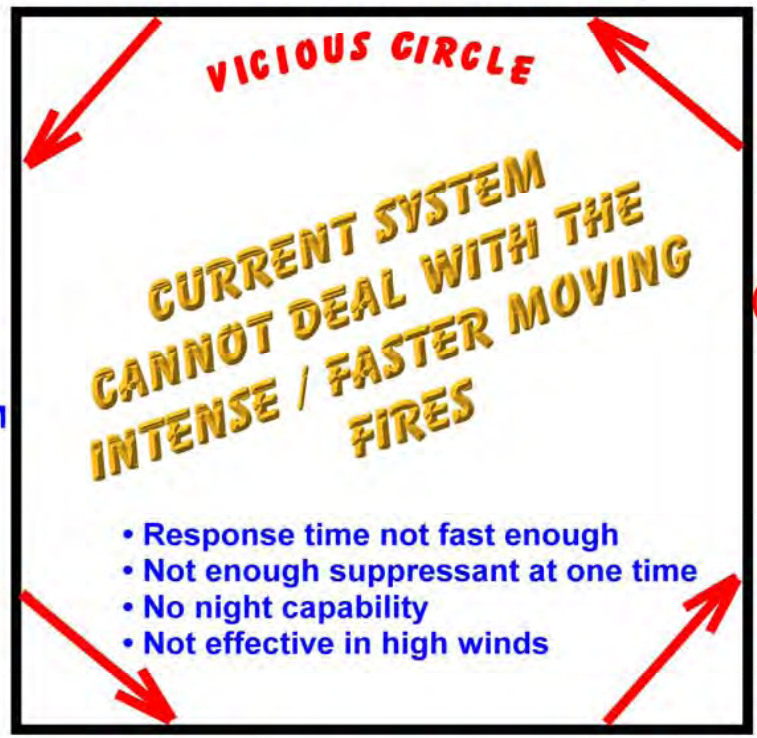
CURRENT WILDFIRE FIGHTING AGENCIES FIND THEMSELVES CULTURALLY STUCK IN A BOX AND NEED OUTSIDE ASSISTANCE

(2) OPERATIONS BUDGET LIMITED
(STAFFING, EQUIPMENT, NO R&D)

(3) LIMITED IN-AGENCY EXPERTISE

- NEW BIG AIRCRAFT
- SATELLITES
- UAV'S (PREDATOR, GLBL HAWK)
- AIRBORNE GIS AIRCRAFT
- GEN III NIGHT VISION GOGGLES
- IRIDIUM FLEET MONITOR SYSTEM
- SEAMLESS COMMUNICATIONS
- WATER-SCOOPING AIRCRAFT

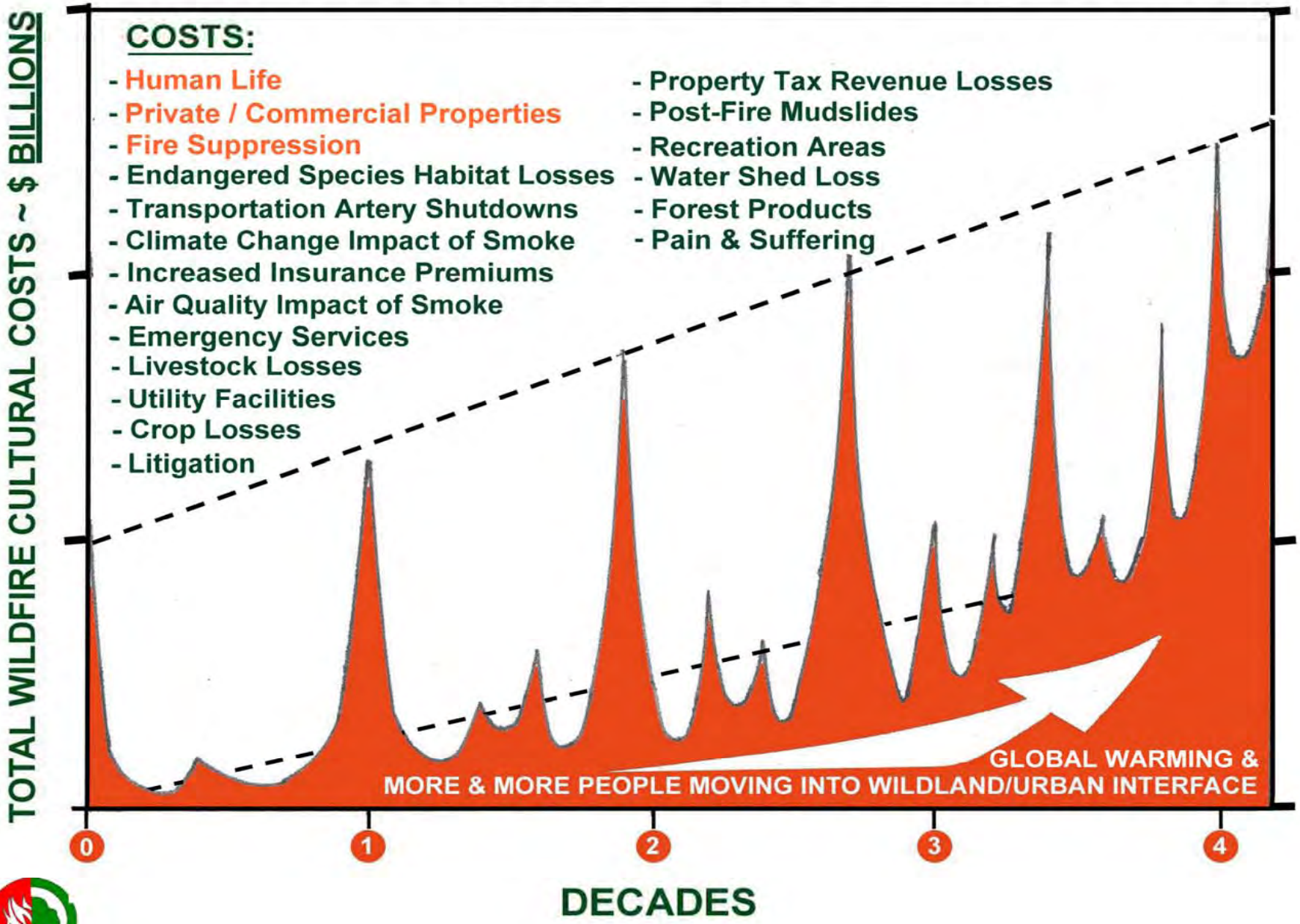
NOTE: Military Services, NASA, & other organizations have decades of experience with such systems



(1) NO SINGLE CHAMPION AT HIGH ENOUGH LEVEL AND SPAN OF AUTHORITY TO GET ISSUES PROPERLY HEARD

(4) STUCK WITH MINOR IMPROVEMENTS TO CURRENT EQUIPMENT LINES

NOTIONAL TOTAL WILDFIRE CULTURAL LOSSES



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OPTIONS

I LONG-TERM: A NEW FEDERAL WILDFIRE LEAD AGENCY

- CHARTERED TO TAKE ON THE FULL RANGE OF TECHNICAL, FINANCIAL, AND ADMINISTRATIVE WILDFIRE ISSUES THAT NEED RESOLUTION

II TEMPORARY: WILDFIRE TECHNOLOGY FACILITATION WORKING GROUP

- CHARTERED TO FORMULATE A COMPREHENSIVE PLAN TO RESOLVE THE COUNTRY'S IMMEDIATE HIGH INTENSITY / FAST-MOVING WILDFIRE FIGHTING TECHNICAL CHALLENGES
- BRING EXISTING EXPERTISE IN THE MILITARY SERVICES, NASA AND OTHER ORGANIZATIONS TO BEAR ON THE ISSUES

III CONGRESSIONAL WILDFIRE CAUCUS

IV CONGRESSIONAL HEARING(S) TO EVALUATE WILDFIRE RESEARCH & DEVELOPMENT REQUIREMENTS & NEED FOR LEGISLATION

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SUMMARY

- While handling upwards of 95% of the wildfires very well, the current US wildfire fighting system cannot stop the high intensity, fast moving fires currently increasing around the county.
- What is needed is focused research and development to apply existing and limited extension of current technologies to solve the fundamental technical challenges that prevent fire agencies from satisfactorily controlling these fires.
- The one time only / up front amount of money required to accomplish implementing the technology changes is small compared to the enormous suppression costs and cultural losses that will inevitably be suffered if such changes are not made.
- Current agencies, because of their cultural evolution, do not have in-house capability to implement the required changes in a timely fashion without outside assistance.
- Outside assistance can be provided via two general approaches:

1. A new top-level federal agency chartered to address and resolve all the long term cultural shortcomings of the current system and speak with a single strong voice in the national forum for adequate budget support.
2. A federally-funded, near-term, temporary working group chartered only to provide a comprehensive plan to resolve the technical challenges of the high-intensity/fast-moving wildfires.