2007 Western States Fire Mission

Kathleen Howell, Ikhana Flight Operations Engineer
NASA Dryden Flight Research Center
Introduction

The NASA Dryden Flight Research Center
Ikhana Project Team and Ikhana
IKHANA

Ikhana Aircraft

Ground Control Station (GCS)

OTH KU Antenna
The Ikhana “Cockpit”
Ikhana UAS / Ground Control Station (GCS)

IKHANA

Pilot Displays for Situational Awareness

Falcon View Route

45 Degree Camera

Electronic Flight Bag Xm Wx

IR Camera

Tracker Display

Color Camera
IKHANA UAS / Ground Control Station (GCS)

IKHANA

Mission Control and Research Workstations
Communications with Ikhana and ATC

- **LOS - C-band Command/Control** (simplified)
- **OTH - Ku band Command/Control** (simplified)

ATC

Phone
Science Partners

Operational Partners
Ikhana UAS / Aircraft

Ikhana with the Fire Sensor Pod

NASA Ames Fire Sensor
FAA Certificate of Authorization (COA)

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COA Application Boundary
FAA Certificate of Authorization (COA)

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Population Keep-Out Zones (Pop KOZ)
FAA Certificate of Authorization (COA)

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“Backbone” Routes

Zone A
Route A

Zone B
Route B

Zone C
Route C
FAA Certificate of Authorization (COA)

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Contingency Planning – Primary ELSs
Contingency Planning – Secondary ELSs

Route Specific ELS Subset
FAA Certificate of Authorization (COA)

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Pilot ELS Information

038 Coyote Flats - USFS strip
Inyo County, CA
- 37° 12' 12.97" N
- 118° 28' 34.15" W
- FRD: BIH119012
- Zones: A, B
- Length: 3000 ft.
- Type: Dirt
- Elev: 10000 ft.

Sectional: None
Contact Info: None
Sheriff Info: Inyo County Sheriff, Bishop - 12 Miles
Phone 760-873-7887
WX: BIH ASOS 125.25 13mi NE

Pilot Ranking: 3
Looks OK.
Mission Information

Flight Planning
FAA Certificate of Authorization (COA)

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Approved COA Area

Special Provisions
Western States Fire Missions 2007

IKHANA

WSFM 1 Aug. 16
4 Fires, 1400 nm, 9.5 hrs

WSFM 2 Aug. 29 – 30
7 Fires, 2500 nm, 16.1 hrs

WSFM 3 Sept. 7 – 8
12 Fires, 3200 nm, 20.0 hrs

WSFM 4 Sept. 27
BAER, 3 Fires, 1800 nm, 9.9 hrs
WSFM #1 2007

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Active Fire

Zaca Fire Images

Changing Fire Perimeter

Unknown Fire

Coby Fire

Yosemite

Tar Fire

Zaca Fire
WSFM #2 2007

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New Detects from Overhead

3-D View

Castle Rock Fire Imagery
WSFM #4 2007

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Burn Area Emergency Rehabilitation and Stabilization (BAER) Assessment Imagery
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California Wildfire Emergency Response 2007

WSFM 2007 Objectives Accomplished

New Research Configuration

Flexible Rubber Tape
WSFM 5
Oct. 24, 11 Fires,
~1350 nm, 9.0 hrs

WSFM 6
Oct. 25, 8 Fires,
~1350 nm, 7.8 hrs

WSFM 7
Oct. 26, 8 Fires,
~1350 nm, 7.8 hrs

WSFM 8
Oct. 28, 8 Fires,
~1350 nm, 7.1 hrs
IKHANA

WSFM #5 Emergency Response 2007

Harris Fire
Hot Detects

Ammo Fire
Hot Detects

Ranch / Buckweed
Magic
Grass Valley / Slide
Rosa
Poomacha
Rice
McCoy
Coronado Hills
Witch

6/3/2008

EAA AirVenture 2008
WSFM #6 Emergency Response 2007

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Poomacha / Rice Fires – 3D with Hot Detects

Grass Valley / Slide Fires – 3D with Hot Detects
WSFM #7 Emergency Response 2007

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Santiago Fire – 3D with Hot Detects

Ranch Fire – 3D
WSFM #8 Emergency Response 2007

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Santiago Fire Detects Ranch, Ammo and Esperanza BAER

Ranch, Buckweed BAER

Grass Valley / Slide

Esperanza '06 BAER

Poomacha Rice Witch

Housing

BAER Grass Valley / Slide

6/3/2008

EAA AirVenture 2008
### WSFM Achievements

**IKHANA**

<table>
<thead>
<tr>
<th>Flight Date</th>
<th>Flight Duration</th>
<th>Fires Flown</th>
<th>Mileage NM</th>
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<tr>
<td>WSFM 1</td>
<td>16 Aug</td>
<td>9.5 hrs</td>
<td>4</td>
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<tr>
<td>WSFM 2</td>
<td>29 Aug</td>
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<td>7 Sept</td>
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<td>28 Oct</td>
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