Phoenix System

Where We Were, Where We’re Going
WHY IR LINE SCANNERS?

- Map extremely large areas in a very short period of time
  ... while simultaneously ...
- Detecting very small fires
- Extremely accurate for geo-positioning pixels
- Ability to over-sample = multiple looks at same area
- Multi-channel fire detection & false target rejection
What is Phoenix?

- Phoenix is a digital image processing system coupled with a dual-channel line scanner.
- Maps 6 mile swath width (at 10,000 ft AGL) while detecting 6-8 inch heat sources (at 10,000 ft AGL).
- Collects data, processes fire detections, and creates imagery in near real-time.
Phoenix Data Products

- Detected Heat point shapefiles
- Orthorectified GeoTiffs
  - Color
  - Grayscale
  - Fire Layer
- Quick-Look JPEGs
- Mosaics
- Metadata
1964 – Research begins with DoD, Civil Air Patrol, NASA, USFS

1969 – First full system deployment

**Deliverable Products:**
- 1969-1972 – “stitched” Polaroids
- 1972-1993 – 5” continuous dry silver film
- 1993-2005 – 8½” continuous thermal paper
- 2004-present – digital GIS-ready orthos

**Delivery Methods:**
- 1976-2005 – drop tubes
- 1996-present – hand delivered imagery
- 2006-present – Files uploaded to ftp site
- 2009-present – AirCell to ftp site

**Systems:** HRB Singer, RS-7, RS-25, FLAME, FireFly

**Ordering Process:** FAX, hand written, call in.

**System Weights:** 350 to 400 lbs system racks

**Aircraft:** Beech 99, Queen Air, Merlin IIIB, King Air B90, Sabreliner (Christine)
### Past/Present IRIN Duties

(not all inclusive)

<table>
<thead>
<tr>
<th>Past ... remember when ...</th>
<th>Present</th>
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<tbody>
<tr>
<td>Travel to Fire Camp</td>
<td>Order flight online</td>
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<tr>
<td>Load up IRIN Kit (light table, bottle of fixer, colored pencils, paper maps, etc. etc etc.)</td>
<td>Download imagery from ftp site</td>
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<tr>
<td>Drive up to several hours one way to pick up imagery from air crew</td>
<td>Create maps using GIS software</td>
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<td>Visually remove distortions</td>
<td>Present briefing to IMT via ftp site using Word, Excel, Adobe Reader</td>
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<td>Hand draw map and needed products on clear media</td>
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<td>Setup tent, live in fire camp, attend briefings, etc. etc.</td>
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New Phoenix Data Features

Work is underway to implement:

1. Google Earth output layer
2. Auto-upload of individual run imagery
3. Upgrade Mission Planner software
   1. - coordinate and share flight plans
4. Upgrade Phoenix software
   1. - change DSP board, integrate FPGA for clamp/timing, improve user control of image enhancements, protect FTP transfers, auto-calibrate ortho alignment