



In this lesson we will look at the Air Operations map. This is one of the "other" map products regularly produced for an incident.

Standards for the air operations map can be found in Chapter 6 of GSTOP, page 69

# Air Operations Map

## *Lesson Objectives*

- Explain the purpose and use of the air operations map.
- Learn the two different types of air operations maps.
- Describe the standard features associated with the air operations map.
- Give examples of optional features that may be included in an air operations map.
- Review map examples



### Lesson Objectives:

- Explain the purpose and use of the air operations map.
- Learn the two different types of air operations maps
- Describe the standard cartographic and data features of the air operations map.
- And go over of optional cartographic and data features that may be included in an air operations map.
- We will also look at several examples of air ops maps.

# Air Operations Map

## *Purpose*

The purpose of the *Air Operations Map* is to provide Air Operations staff with enough detail to aid in locating key features on an incident.



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This map *is not* for navigating to and from the incident. Aeronautical charts fulfill that purpose.

# Air Operations Map Use

- Pilot orientation to incident area
- Identification of aviation hazards
- In-aircraft reference
- Air Operations Branch planning



The uses of this map include:

- The air operations map is a map used in the cockpit by pilots to become familiar with the incident air space and topography. It enables pilots to relate the critical ICS features on the map such as a helispot, a division, or a water source and to communicate incident information with other pilots and ground resources.
- It is used to identify aviation hazards that are found in and around the incident airspace – things like power lines, towers, and ridges.

Two types of maps may be produced, an E Size maps for posting within Air Operations locations and a smaller 11”x17” Pilot Map of similar information.

Both maps should be produced as GeoPDF files as pilots will load them into Avenza for use on mobile devices.

# Air Operations Map

- E Size wall map for posting at Air Operation locations such as in dispatch, helibase or tanker base.
- The whole incident or a larger area covering the entire TFR should be displayed.
- May contain planning features, such as trigger points or contingency lines not shown on Pilot Maps.



Air Operation maps are designed to be printed as large wall maps and displayed at dispatch, helibases or tanker bases. Commonly this is as an E size map.

The entire incident or TFR area should be displayed on the Air Operations map unless, directed differently by the SITL. It is not uncommon for two or more Air Operations map being produced when a fire grows large and there are Zones or multiple IMTs assigned to different sections of the same incident.

This map is used not only for aviation resources for reference, but for planning as well.

# Pilot Map

- **Pilot Maps differ from Air Operations Maps in the fact they are specifically designed as a 'Lap Map' for incident pilots on knee boards.**
- **Pilot Maps are usually designed for a 11"x17" layout.**
- **Pilot Maps have all of the same data and map elements as the Air Operations map.**
- **For larger incidents, the incident area on Pilot Maps can split and printed front to back.**



- Though common for the Air Operations Map to be used as the Pilot Map, a separate pilot map product may be needed if the Air Operations map is not usable on a smaller page size or if it contains planning features not needed by pilots.
- Printing larger incidents as multi-page Pilot Maps allows for a smaller map scale and more map detail on a small page size.
- If the incident area fits on one side of a Pilot Map, the Latitude and Longitude Point Table can be printed on the back.
- The pilot 'flips' a double sided Pilot Map and care must be made that when they flip the map, the map will be display properly (not upside down).

# Air Operations : *Design Criteria*

- Simplicity for Safety
- Not all ICS elements should be shown
- Elevation shaded relief or FAA sections are a good way to show topography



Design guidelines:

The air operations map is normally produced in color.

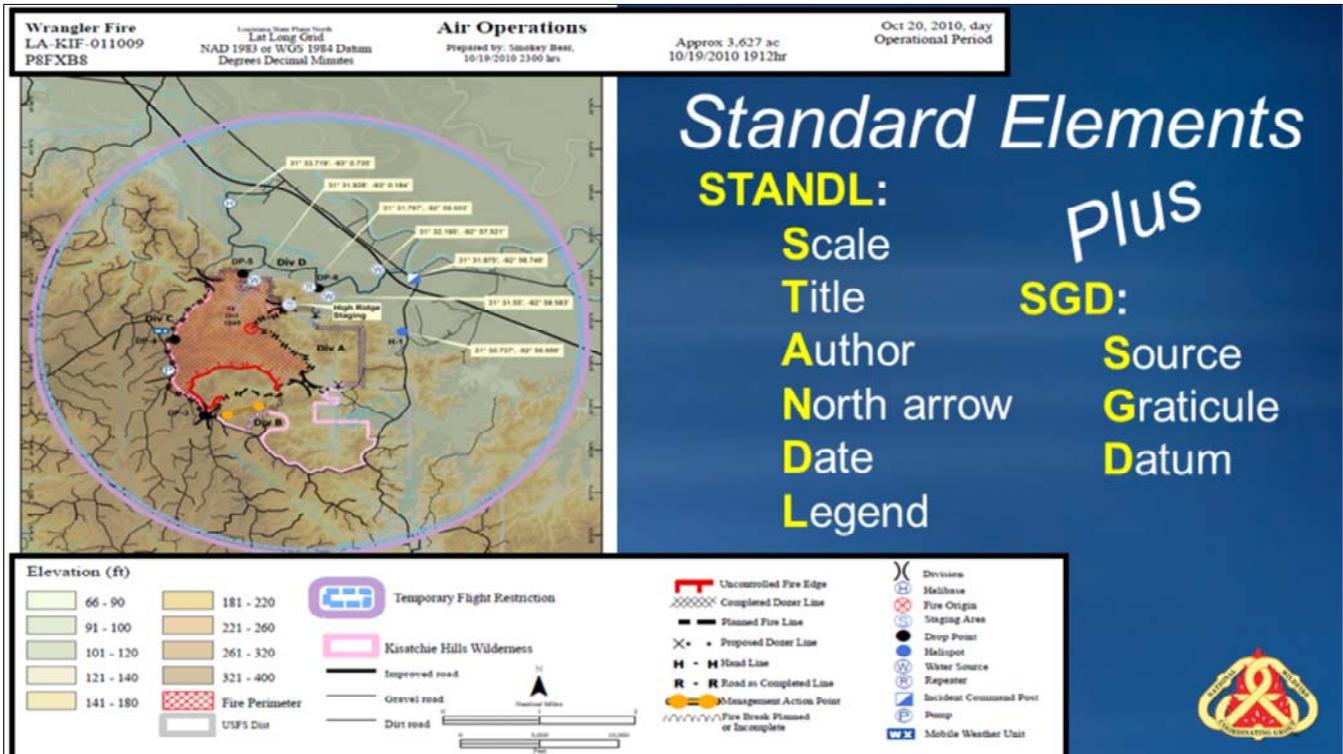
The design criteria on this map focus on visual simplicity.

Clarity of communication is the most important feature of the air operations map so the map is generally more simple than the Operations or Planning maps.

Detail is limited to the features requested by Air Operations staff.

Backgrounds and symbology need to be simple to be readable in the aircraft.

A DRG map used as a base is often good because labels for geographic features are included. An elevation shaded relief base or FAA sectional base map may also work well because it shows topography and elevation with less symbology than a DRG. Contour lines on small scale incidents may help pilots understand the landscape elevation and relate it to flight altitude. Resizing or moving of symbols may be required so information in the basemap is not covered up.



Let us take a look at this air operations map and see some of the features that are unique to the Air Operations branch staff's needs.

This map has all the standard cartographic elements of STANDL

It also has the optional SGD elements –

a Source statement about the date and acres of the fire perimeter

A lat long graticule

And a map datum identified along with which format of lat long

# Air Operations Map: *Standard Data Elements*

- Incident perimeter
- Helicopter dip-sites, Helispot locations
- Division/branch breaks
- Aviation hazards
- Key landmarks
- Roads, hydro, elevation
- TFRs (when in place)



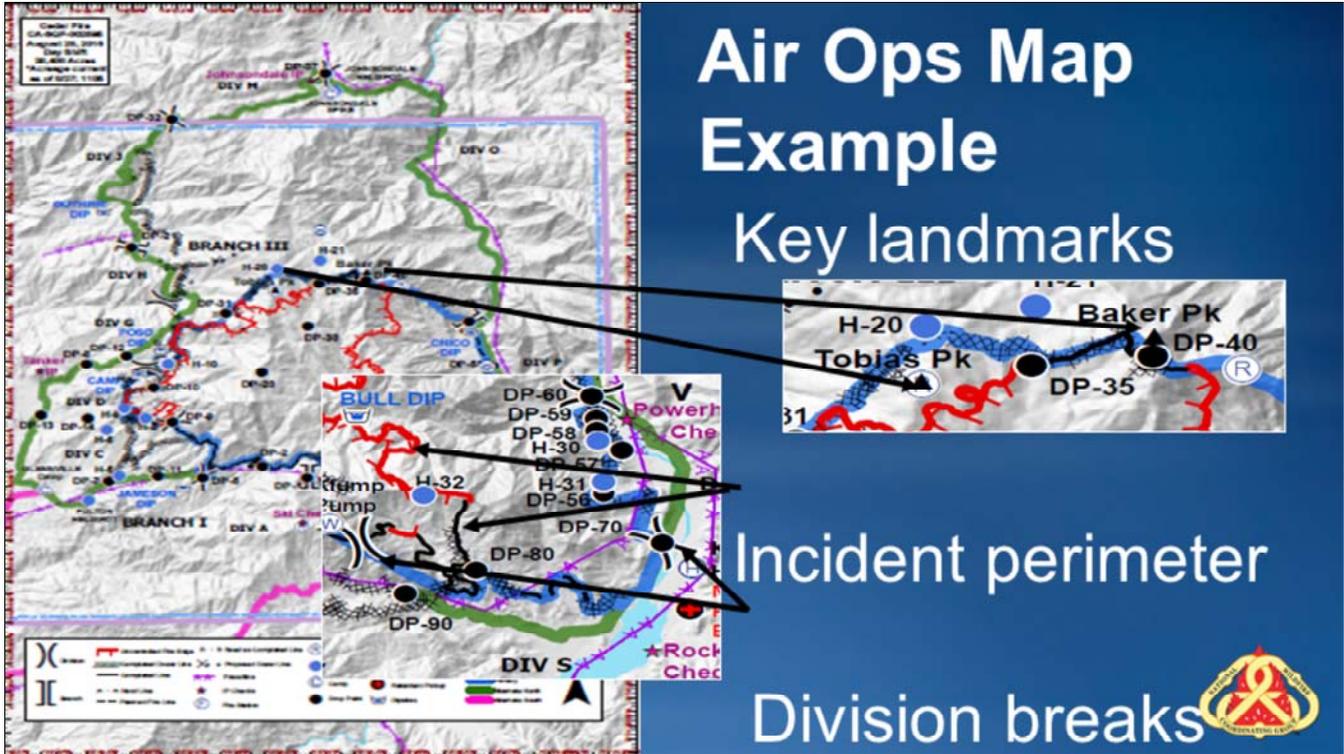
Air ops maps have standard data elements – incident perimeter, ICS line and point features such as dip sites and helispots, division and branch breaks, aviation hazards, key landmarks, roads, hydrography, elevation shaded relief or FAA sections, and Temporary Flight Restrictions (or TRFs, when in place),

The incident perimeter is needed to show active and contained portions of the perimeter. Division breaks are needed to show the location of work assignments and the identity of operational leaders.

In addition to a base map which includes roads, hydro and elevation, ICS features such as dip sites, helispot locations are included as well as key landmarks. These data features are all used by pilots when talking with each other and with ground personnel, to enable avoidance of other aircraft, as well as identifying operation locations on the fireline.

Aviation hazard identification is essential on this map, since aircraft

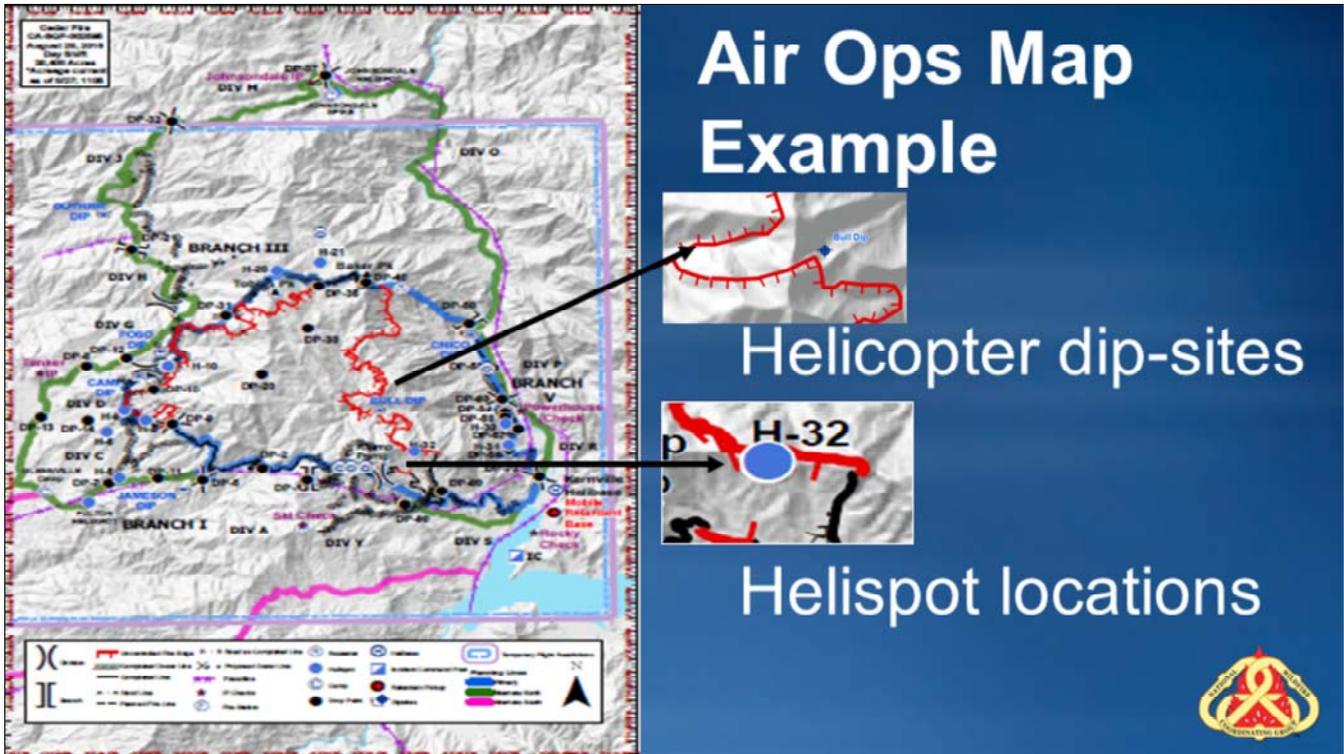
safety is the main focus.



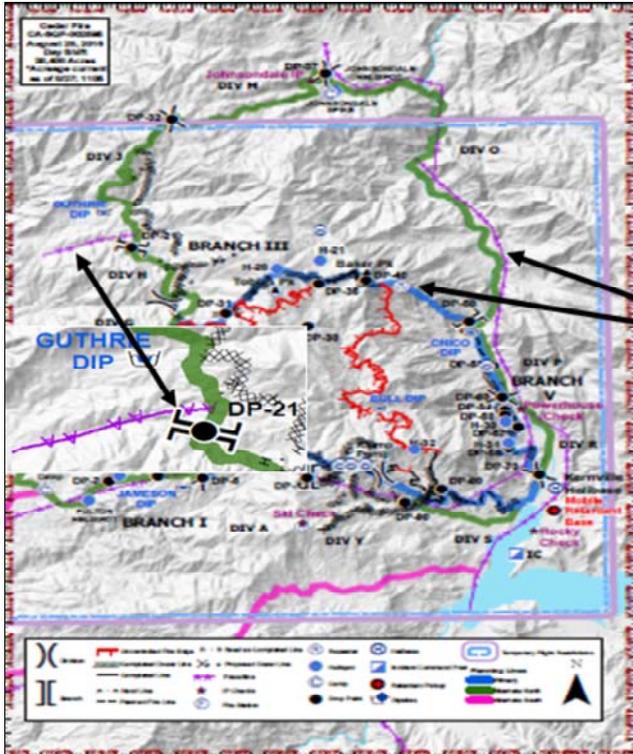
Here is an Air Ops Map Example.

Key landmarks are often identified, perhaps as hazards, or as part of navigation traffic instructions,

The divisions and branch breaks are shown to ensure common understanding of work assignment locations.



The helispots are labeled by number, as well as the approved helicopter dip sites by name. In this example the pilot requested a unique symbol for the air ops map. This is a good example of a SITL approved move away from standard GSTOP symbols (the W) to meet the needs of the user. GSTOP should always be followed unless the symbol is changed for clarity or safety reasons, for example all MediVac and Unimproved Landings should be removed from all incident maps. All changes should come from the map user and approved by the situation unit leader or plans section chief.



# Air Ops Map Example

Powerline

Repeater

Aviation hazards



Aviation hazards are shown, like repeaters and powerlines.

# Air Operations Map: *Optional Elements*

- **SGD** – Source statement, Latitude/Longitude Graticule/Grid, Map Datum
- Latitude/longitude graticule and/or table should be in Degrees, Decimal Minutes and Datum should be WGS84
- Latitude/Longitude Table
- Frequency Table
- Flight instructions

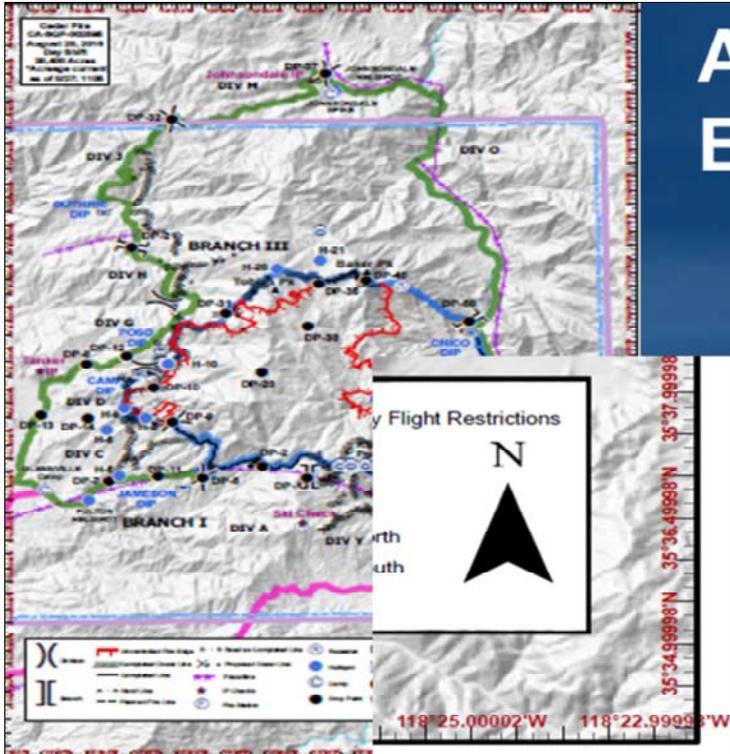


Optional but normally utilized cartographic features include: a source statement, a lat/long graticule or grid, and a corresponding map datum

Latitude and longitude is important since that is the main way that pilots navigate to a location they have not been to before.

A table of latitude and longitude is used to define specific locations for aviation work sites or hazards. The coordinates in the latitude longitude table or graticule will likely be in in Degrees, Decimal Minutes WGS84 datum since that is the format for aircraft.

Specific aviation instructions can include a table of frequencies, and even check points and flight instructions.



# Air Ops Map Example

Latitude/longitude graticule

- DD M.MMM
- WGS84



The graticule of latitude and longitude is shown here.

# Table of latitude/longitude

Type	Label	Comments	Elevation	Latitude	Longitude
Origin		Origin	7,933	44° 1.241' N	110° 47.147' W
ICP		ICP	6,983	43° 46.573' N	110° 30.749' W
		Coiter	6,937	43° 55.109' N	110° 37.617' W
Helibase			7,262	44° 1.100' N	110° 46.899' W
Helispot	H-1	Type II	7,208	44° 0.800' N	110° 46.499' W
Helispot	H-5		6,792	44° 0.018' N	110° 42.746' W
Helispot	H-7		7,448	44° 1.712' N	110° 45.947' W
Helispot	H-10		7,443	44° 1.922' N	110° 46.994' W
Helispot	H-15		7,620	44° 1.862' N	110° 50.182' W
Helispot	H-20	Type II	8,536	43° 56.913' N	110° 49.413' W
Helispot	H-30	Moose Cabin	6,802	44° 5.480' N	110° 40.789' W
Helispot	H-40	Ridge	6,788	44° 3.643' N	110° 43.271' W
Helispot	H-45	DIV 8 Spike Camp	6,779	44° 3.680' N	110° 42.866' W
Helispot	H-50	Type II	7,092	44° 3.919' N	110° 42.145' W
Helispot	H-55		7,245	44° 3.811' N	110° 41.901' W
Helispot	H-60	Type III	7,763	44° 3.889' N	110° 40.103' W
Helispot	H-70	Type II	9,579	44° 4.906' N	110° 35.917' W
Helispot		Huckleberry	6,769	44° 1.853' N	110° 42.425' W
Sling Site		Alpha Sling	7,278	44° 3.358' N	110° 41.417' W
Drop Point	DP-10		7,000	44° 5.39' N	110° 43.438' W
Drop Point	DP-12		6,847	44° 6.468' N	110° 40.019' W
Drop Point	DP-21		6,884	44° 7.989' N	110° 39.890' W
Drop Point	DP-22	South Gate	6,894	44° 5.579' N	110° 39.770' W
Drop Point	DP-31	Sheffield Campground	7,180	44° 3.759' N	110° 41.320' W
Drop Point	DP-32		7,398	44° 1.743' N	110° 41.227' W
Drop Point	DP-41		6,810	44° 0.497' N	110° 40.951' W
Drop Point	DP-42		7,285	44° 1.719' N	110° 41.610' W
Drop Point	DP-51		6,820	44° 6.025' N	110° 40.021' W
Drop Point	DP-53		6,785	43° 59.820' N	110° 42.718' W
Camp	Lower Berry		7,222	44° 0.816' N	110° 46.393' W
Camp	Owl		6,750	43° 51.257' N	110° 31.086' W
Camp	Pacific Spike		6,751	43° 51.324' N	110° 31.210' W
Other		Weed Wash	7,269	43° 57.421' N	110° 38.593' W
Pump	Pump 1	gh-0148-1110	7,280	44° 1.733' N	110° 41.630' W
Pump	Pump 2	gh-0148-117	6,799	44° 5.415' N	110° 40.868' W
Weather Station		27	7,461	44° 1.908' N	110° 41.303' W
Weather Station		28	6,788	44° 0.057' N	110° 41.450' W
Weather Station		30	7,670	43° 51.068' N	110° 33.884' W
Repeater		Summit	9,579	44° 4.906' N	110° 35.917' W
Repeater		Huckleberry	6,769	44° 1.853' N	110° 42.425' W

Pioneer Fire ID-BOF-000539		
Fire Points	Lat	Long
1-4	43° 59.400'	110° 41.894'
1-5	43° 58.944'	110° 43.649'
1-6	43° 57.490'	110° 45.379'
1-7	43° 58.36'	110° 44.029'
1-9	43° 57.952'	110° 45.157'
1-20	43° 57.002'	110° 45.243'
1-30	43° 56.331'	110° 46.320'
1-35	43° 56.985'	110° 46.123'
1-40	43° 57.138'	110° 46.090'
1-49	43° 58.996'	110° 46.123'
1-60	44° 00.088'	110° 45.196'
1-70	44° 00.125'	110° 42.017'
1-79	44° 2.337'	110° 46.387'
Alpha Sling	43° 58.979'	110° 45.991'
Bella Sling	43° 57.768'	110° 45.833'
Bella Sling 2	43° 57.502'	110° 46.335'
Bella Sling 3	43° 57.797'	110° 46.647'
Bella Sling 4	43° 58.473'	110° 46.738'
Bella Sling 5	43° 59.057'	110° 46.847'
Bella Sling 6	43° 58.996'	110° 46.123'
Bella Sling 7	43° 58.045'	110° 47.087'
Beta Sling	43° 58.225'	110° 44.565'
Gamma Sling	43° 57.001'	110° 45.290'
Sling 1	43° 56.353'	110° 45.966'
Sling 2	43° 57.873'	110° 45.204'
Sling 3	43° 56.347'	110° 44.879'
Sling 4	43° 57.154'	110° 45.183'
Sling 5	43° 57.311'	110° 45.189'
Sigma Dip	43° 58.360'	110° 40.629'
camp	43° 57.335'	110° 45.109'
coultter Spike	44° 00.154'	110° 44.933'
Kumear Spike	44° 01.226'	110° 40.520'
Joeman Spike	44° 04.945'	110° 37.308'
TMD 1	43° 57.962'	110° 46.187'
TMD 2	43° 57.603'	110° 41.212'
TMD 4	43° 53.920'	110° 38.926'
DP-10	43° 56.361'	110° 46.297'
DP-20	43° 55.934'	110° 46.361'
DP-30	44° 01.128'	110° 44.882'
DP-60	43° 59.400'	110° 41.894'
DP-85	44° 01.579'	110° 37.404'
DP-89	44° 01.550'	110° 36.950'
DP-90	43° 57.529'	110° 37.857'
DP-95	43° 58.986'	110° 40.980'



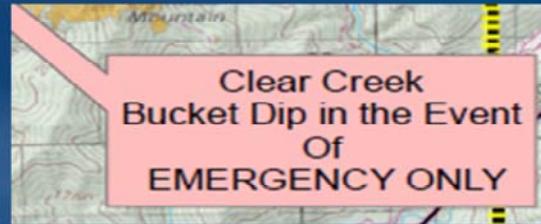
The table of Latitude/longitude is used to provide pilot's with the specific location of incident features.

These may include helicopter dip sites, helispots, sling spots, heliwell,, and other locations pilots may need to navigate to. Drop Points should not be included on Air Operations maps unless directed by the SITL.

The table may also include frequencies by branch or division, specific hazards such as towers, terrain features, or power lines.

# Specific Aviation Instructions

Helicopters  
@ 5500 MSL  
or Lower



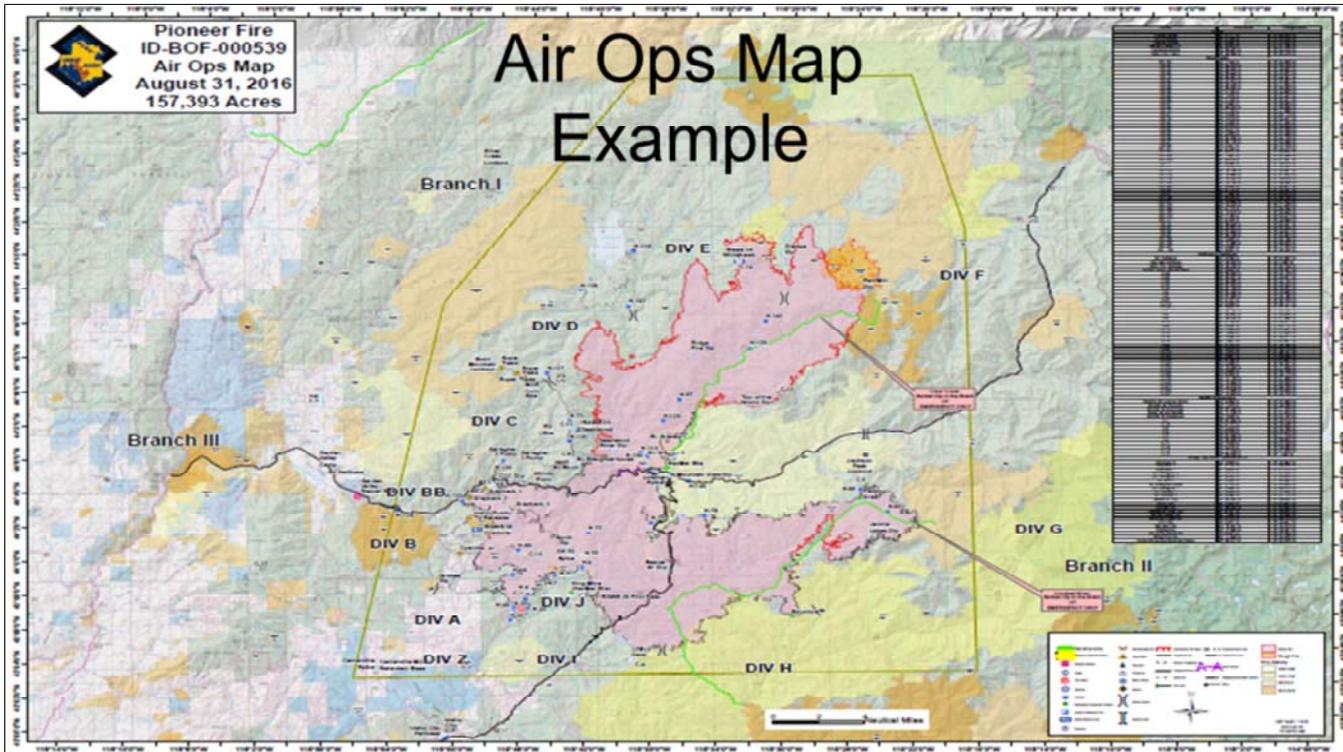
Specific aviation instructions are often included, either as labeled points on the map, or included in tables.

These instructions often include directions for entry and exit from the incident airspace to assist in traffic management.

Check points are used to trigger pilot call-in to the Air Tactical Group Supervisor when entering or leaving the incident airspace.

Initial Points are used in a similar fashion. These points may be specific for helicopters or airtankers.





Here is an example from the Pioneer fire

This is a landscape example produced at “E” size.

Note that red defines uncontained perimeter, black contained. The GISS used a pale pink inside the fire perimeter to distinguish the interior of the fire perimeter from the other colors.

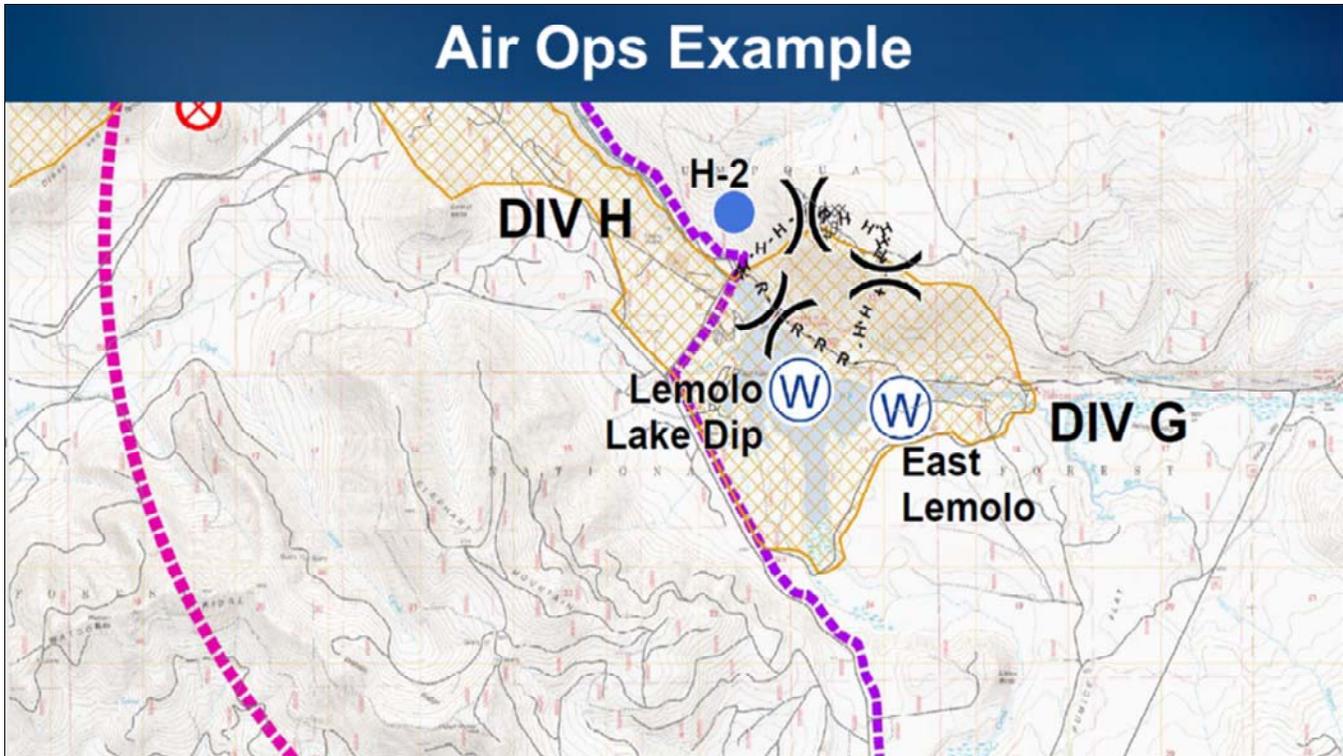
Note the large table referencing drop points, helibases, helispots, weather station and repeater locations, sling and dip sites and portable retardant base.

The TFR boundary was changed by request of air ops because the standard GSTOP symbology did not show up on the background map. Again this is only done by request of the map user, approved by the SITL, and clearly defined in the legend.

The historic fire perimeters were included for use in tying retardant lines

into natural barriers.

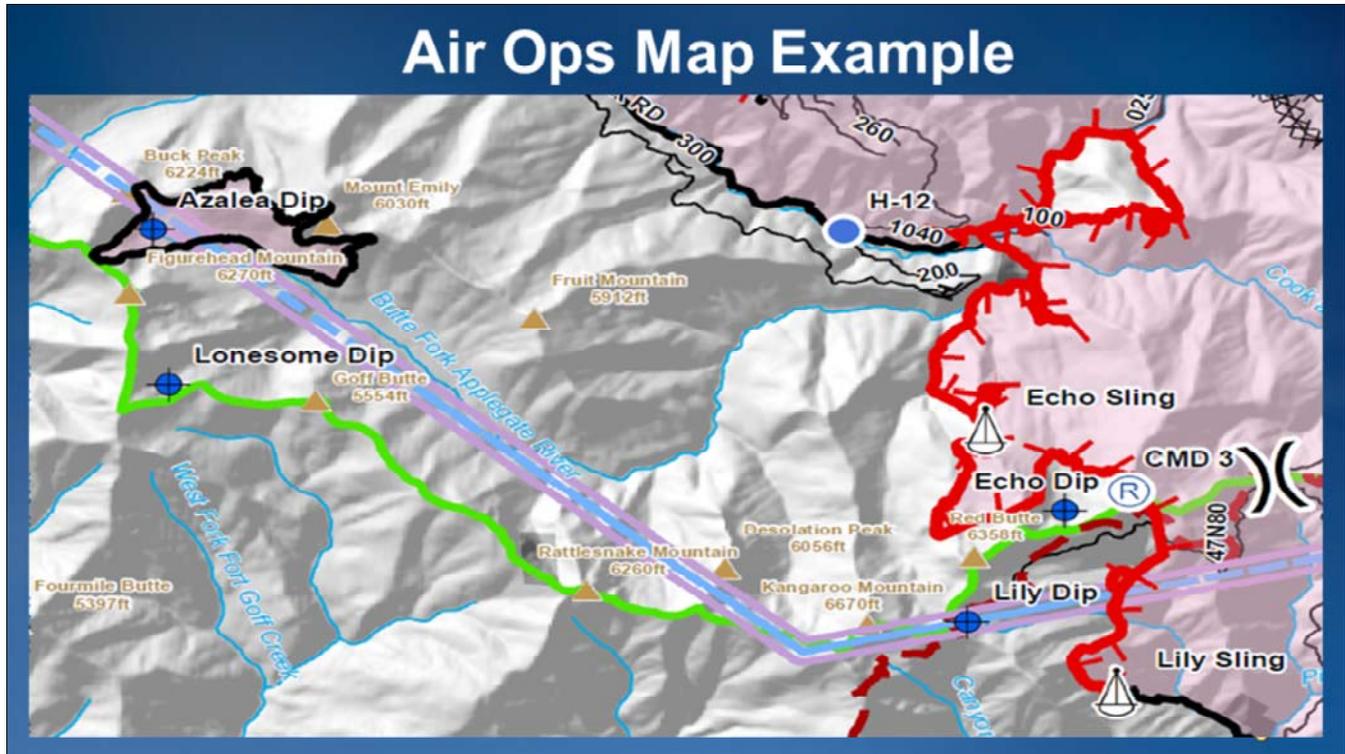




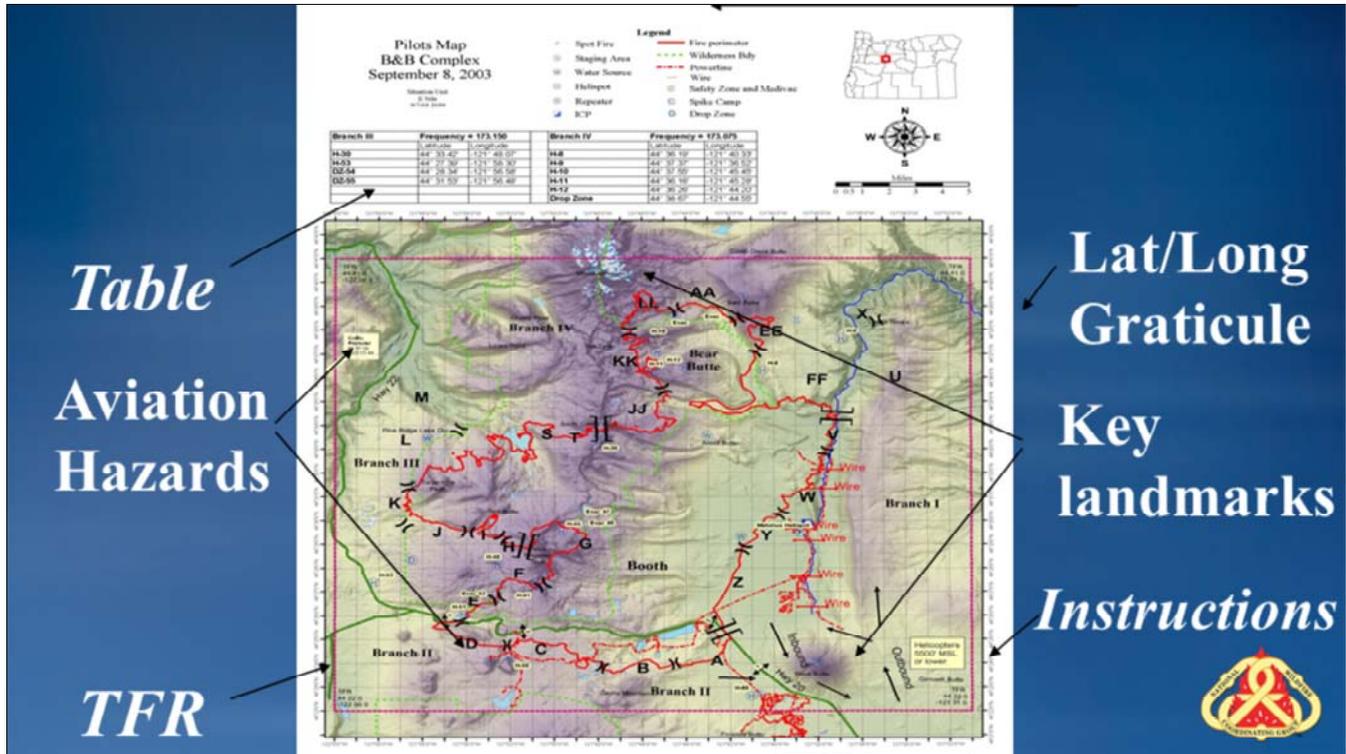
This is a zoom in of the previous slide, you can see the map details. Remember that this map needs to be simple and easy to read. For an Air Ops map of an incident that covers a large area, DRG's may make the map too busy and hard to read, but it does work well on this 11"x17" map covering a small area and provides good landmarks information for reference.

Many aviation resources also access these maps using smart mobile devices through Avenza. Test your map and make sure that all data and labels display well digitally.

This is an example of how selecting good base data "provides Air Operations staff with enough detail to aid in locating key features on an incident."



In this zoomed in example from a Air Ops map covering a large incident area. Only hillshade is used as a base map with added base layers including roads, streams and forest boundaries. Notice the fireline, helispots, dip sites, slings, TFR and summits landmarks with elevations.



In this example you can see again some special features found on the Aerial operations map such as Temporary Flight Restriction Boundaries and special flight instructions

There are definitely unique map needs from group of customers for these specialized products.

# Air Operations Map

## *Lesson Review*

- Explain the purpose and use of the air operations map.
- Learned the two different types of air operations maps.
- Describe the standard features associated with the air operations map.
- Give examples of optional features that may be included in an air operations map.
- Review map examples



In this lesson we have:

- explained the purpose and use of the air operations map
- Learned the two different types of air operations maps.
- looked at a specific example of an air operations map, and offered suggestions about standard elements that need to be included following GSTOP standards
- given examples of optional elements included on the air operations map.
- Review map examples