



Primary Maps

An Introduction To The Incident Action Plan Map Part 1

GSTOP Chapter 6, Page 59-60

This presentation is titled “Primary Maps, An Introduction To The Incident Action Plan Map”, also known as the IAP map.

Creating and updating the IAP map will be the central focus of many lessons and exercises as students learn to develop incident maps to GSTOP standards.

Aside from the S-341 class itself, learning how to develop a good IAP map will provide students with the skills necessary to create other incident maps.

Standards for the IAP map can be found in Chapter 6 of GSTOP, pages 59 and 60.

Primary Maps

- Incident Action Plan (IAP) Map
- Briefing Map
- Situation Unit Map
- Transportation Map
- Progression Map



The incident's situation unit produces six primary maps, and may produce or provide input for a variety of other maps and products.

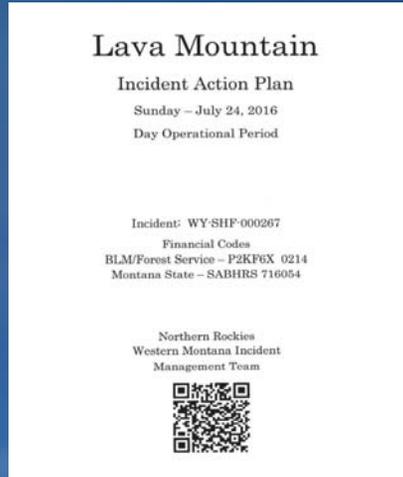
The five primary maps produced by a GISS are:

1. The Incident Action Plan (IAP) map
2. The Briefing map
3. The Situation Unit map
4. The Transportation map
5. And the Progression map

The sixth primary map is the Facilities map, which is often created by someone other than a GISS.

Incident Action Plan

What is an IAP?



But, before we talk about the map, what is an Incident Action Plan, or IAP?

The IAP contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the current operational period.

The plan has a number of sections, including:

1. Incident objectives
2. Organization assignment list
3. Division assignments
4. Incident radio communication plan
5. Medical plan
6. Traffic plan
7. Safety plan
8. Incident map

Lesson Objectives

- Define IAP map purpose and use
- List standard cartographic elements
- Define standard and optional data
- Explain importance of consultation with Situation Unit Leader (SITL)
- Show IAP maps and standard symbols, labels



The objectives for this lesson are:

1. Define the purpose and use of the Incident Action Plan map.
2. List the IAP map's standard cartographic elements.
3. Define what data are needed to create an IAP map, and where to obtain the data.
4. Explain why it is important to consult with the Situation Unit Leader (SITL) before creating an IAP map.
5. Look at examples of IAP maps, and at standard GSTOP symbols and labels.

IAP Map: Purpose

- **The Incident Action Plan map conveys fire location, operational and logistical sites, travel routes, safety issues, geographic features, and incident objectives**
- **This map is the highest priority map**



What is the IAP map's purpose?

The IAP map is the primary method for delivering information to firefighters about the fire environment, the fire's location, operational and logistical sites, transportation routes, and safety hazards.

The Incident Action Plan map also conveys the relationship of geographic features, and the incident's management objectives.

This map is the highest priority map produced by the GISS.

IAP Map: Use

- It is used by operations staff to display field assignments, crew instructions, and safety concerns at the operational period's briefing and at breakout meetings
- The IAP map is essential to firefighter safety



What is the IAP map used for?

It is used by operations staff to display field assignments, crew instructions, and safety concerns at the operational period's briefing and at breakout meetings.

The IAP map is essential to firefighter safety because it provides information about the landscape that affects fire behavior, and identifies hazards, safety zones, and escape routes.

IAP Map: Cartographic Elements

STANDL:

- **S**cale bar
- **T**itle – including operational period
- **A**uthor
- **N**orth Arrow
- **D**ate of preparation
- **L**egend

SGD:

- **S**ource
- **G**raticule
- **D**atum



The IAP map must contain certain cartographic elements, as described below.

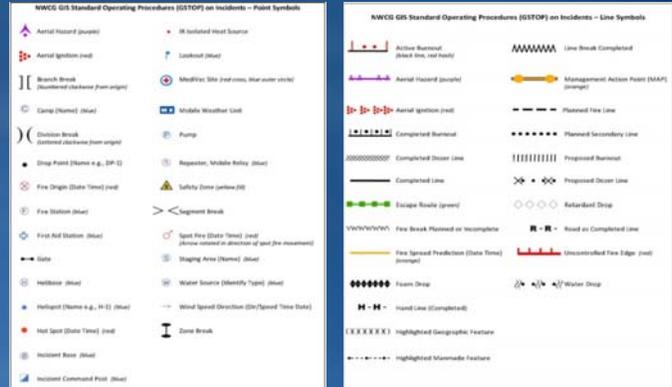
1. STANDL elements (scale bar, title, author, north arrow, date/time, legend) are required.
2. SGD elements (source statement, graticule, and graticule datum) are optional, but are recommended.

The fire's perimeter date is usually provided as part of the source information, and the STIL may want to include fire's acreage as well.

A Lat/Long graticule referenced to WGS84 degrees, decimal minutes is typical rather than one of another coordinate system, and the graticule's datum must be specified so coordinates can be interpreted and conveyed correctly.

IAP Map: Standard Data Elements

- Incident perimeter
- Labeled incident point and line features
- Division and Branch breaks with labels
- Topography



Standard IAP map data elements include:

1. Incident perimeter
2. Labeled incident point and line features, whose symbols are illustrated here
3. Labeled division and branch break locations
4. Topographic basemap with the green tint turned off

IAP Map: Optional Data Elements

As directed by the SITL

- **Index map**
- **Structures**
- **Management action points**
- **Travel and safety hazards**
- **Hydrography**
- **Wilderness boundaries**



Examples of optional IAP map data elements that may be directed by the SITL, include:

1. Index map
2. Structures
3. Management action points
4. Travel and safety hazards
5. Hydrography
6. Wilderness boundaries

IAP Map: Part 1 Review

- One of five primary incident maps
- Part of the Incident Action Plan
- Purpose and use
- Standard cartographic elements
- Standard and optional data elements

Next, Part 2 of Introduction to the IAP Map



We've discussed these points in Part 1 of this introduction to the IAP Map:

1. The IAP Map is one of five primary incident maps, and it is part of the Incident Action Plan document
2. The IAP Map's purpose and use
3. Its standard cartographic elements
4. Its standard and optional data elements

After a short break, continue with Part 2 of this introduction to the IAP Map.



Primary Maps

An Introduction To The Incident Action Plan Map Part 2

GSTOP Chapter 6, Page 59-60

This is Part 2 of An Introduction To The Incident Action Plan Map.

Standards for the IAP map can be found in Chapter 6 of GSTOP, pages 59 and 60.

IAP Map: Incident Data

In different formats and from various sources:

- Hand drawings, written or verbal descriptions
- Infrared interpreter (IRIN)
- GPS, Avenza, and ArcGIS Online service
- Local agency
- SITL, FOBS, OPS, READ



Where do incident data come from?

Incident data may be in many different formats, and come from a variety of sources.

Here are some common examples:

1. A hand drawn map, written coordinates on a sticky note, or a verbal description
2. A shapefile provided by an infrared interpreter
3. A GPX file downloaded from a GPS receiver, a KMZ file e-mailed from Avenza Maps, or an ArcGIS Online feature service
4. A geodatabase on a flash drive from a local agency

Data may come from a variety of incident roles, like the Situation Unit Leader, Field Observers, Operations staff, Resource Advisors, and so on.

IAP Map: File And Data Management

- **GSTOP chapter 2**
- **Use established file naming conventions**
- **Develop and maintain data within the established incident directory structure**
- **Do not place incident files outside of the established incident directory structure**



File and data management is a critical component of any GISS workflow.

Refer to GSTOP, chapter 2, for guidance on file naming conventions and the established incident directory structure.

A GISS must adhere to these practices.

1. Use established file naming conventions.
2. Develop and maintain data within the established incident directory structure.
3. Refrain from placing incident files outside of the established incident directory structure.

IAP Map: Consultation with SITL

- Discuss your GIS skills and limitations
- Learn SITL expectations and map standards
- Obtain incident data and information
- Obtain safety and hazard information
- Discuss special map features, or data issues
- Production, printing, and delivery schedule
- Approve maps prior to final printing



Despite established GSTOP standards, the Situation Unit Leader has the final say on all incident maps. Consultation with the SITL will be essential to your success.

As a GISS trainee, you must be honest with the SITL and the Lead GISS about your skills and limitations.

Consultation with the SITL will include obtaining or verifying information about:

1. Their expectations and standards for map products
2. Operational incident data like the location and status of fire points, lines, and perimeter
3. Safety issues and hazards, like snag areas and abandoned mine shafts
4. Special features to include on maps, like power lines and structures
5. Data issues

Make sure that map production, printing, and delivery deadlines are understood and realistic. If they can't be achieved by assigned staff, ask for additional staff or reprioritize the workload.

Have the Situation Unit Leader approve the IAP map prior to final printing.

IAP Map: Base Data

- Topographic base map
- Transportation data (roads and trails)
- Administrative boundaries
- Utilities (power lines, gas pipelines, etc.)
- Structures
- Pertinent features not well identified on the topographic base map



Incident data will typically come to you through the SITL and other incident roles, but base data is typically obtained from a GISS external hard drive, the local hosting unit, online sources, and so on.

Base data typically include:

1. Topographic base map, like DRGs, USGS topos, or FSTopo
2. Transportation routes, like roads and trails
3. Administrative boundaries
4. Utility corridors
5. Structures
6. Other pertinent features

However, don't put so much additional information on the IAP map that it becomes cluttered.

IAP Map: Part 2 Review

- Sources of incident data
- Importance of file and data management
- Consultation with the Situation Unit Leader
- Base data

Next, Part 3 of Introduction to the IAP Map



We've discussed these points in Part 2 of this introduction to the IAP Map:

1. Sources of incident data
2. Importance of file and data management
3. Consultation with the Situation Unit Leader
4. Types of base data

After a short break, continue with Part 3 of this introduction to the IAP Map.



Primary Maps

An Introduction To The Incident Action Plan Map Part 3

GSTOP Chapter 6, Page 59-60

This is Part 3 of An Introduction To The Incident Action Plan Map.

Standards for the IAP map can be found in Chapter 6 of GSTOP, pages 59 and 60.

IAP Map: Putting It All Together

- Process/edit incident and base data
- Use current, approved data
- Incident perimeter, point, and line features
- Division and branch breaks
- Use established ICS symbols for all elements
- Label points, and other pertinent features
- Optional and base data elements



As we've discussed, incident and base data come from a variety of sources, and some of it may require processing or editing prior to use.

As you compose the IAP map, be sure to use current, approved data, and symbolize incident features using established ICS symbology, as described in GSTOP, chapter 5.

Adjust symbol and label or annotation size as appropriate for the map's scale and page size.

Position labels or annotation so they can be easily read, and so they don't cover up important map detail.

Include optional and base data elements.

Let's get more specific about these points.

IAP Map: Design Basics

- IAP maps are photocopied, so don't use color
- Turn topo map green tint transparent or white
- Assemble DRGs as mosaics or raster catalogs
- Allow sufficient area around the current perimeter to allow for fire expansion during the operational period
- Make a sample photocopy for approval



Here are a few map design basics.

IAP maps are typically reproduced as grey-scale photocopies, so don't count on using color to symbolize, distinguish, or call attention to features.

Set the green vegetation tint of topo maps to transparent or white to avoid having it appear as an obscuring grey smudge on photocopied maps.

If possible, assemble DRGs into edge-matched mosaics or raster catalogs, such that their backgrounds and collars are transparent.

Allow sufficient area around the current perimeter to allow for fire expansion during the operational period. Consult with the SITL for guidance.

Make a sample photocopy for SITL approval prior to production printing.

IAP Map: Division/Branch Symbols

- **Symbol must be perpendicular to the incident perimeter, or to the feature they subdivide**
- **If located at an angle in the perimeter or feature, the symbol should bisect the angle**



It is important to use Division and Branch symbols properly.

Division or Branch break symbols should be placed perpendicular to the incident perimeter, or to the feature symbol they subdivide.

If Division or Branch breaks occur at an angle in the perimeter or feature, the symbol should bisect the angle.

IAP Map: Division/Branch Labels

- Place labels outside of the perimeter
- Center labels between adjacent Division or Branch symbols
- Use multiple labels if Division or Branch symbols are far apart
- Label font size varies by map size and scale, but 18 pt - 24 pt bold is typical



Place labels outside of the perimeter. This helps orient viewers to the exterior of the perimeter, especially on multi-page IAP maps that may display only short segments of the perimeter.

Center labels between adjacent Division or Branch symbols without covering up important incident or map features. Use multiple labels if the Division or Branch breaks are far apart, or if the intervening perimeter is very irregularly shaped.

Label font will vary by map size and scale, but a 18 pt – 24 pt bold font is typical.

IAP Map: Incident Point Labels

- **Not all symbols require a label – ask SITL**
- **Labels must not cover important features**
- **12 - 16 pt bold font, 4 - 8 pts smaller than Division/Branch labels**
- **Label standards for ICS points:**
 - **Drop Point: DP-1**
 - **Helispot: H-1**
 - **Fire Origin, Spot Fire, Hot Spot: Date and Time**



Not all symbols may require a label. For instance, ICP does not typically have a label. Ask your SITL if in doubt.

Place labels as practically as possible without covering important incident or map features.

Point feature labels are typically rendered in 12 pt – 16 pt bold font, or about 4 – 8 pts smaller than Division and Branch labels.

Several point types have a specific naming convention. For instance:

1. Drop points are labeled like DP-1.
2. Helispots are labeled like H-1.
3. A fire's origin, spot fires, or hot spots are labeled with the date and time of their discovery.

IAP Map: Incident Point Labels

- **Label standards for ICS points (cont):**
 - **Staging Area, Camp, Helibase:** Include only the feature's name, and not the “Staging Area”, “Camp”, or “Helibase” text in label
 - **Water Source type:** “Draft”, “Dip”, etc.



Some features, like staging areas, camps, and helibases are labeled with only their name, and do not include the “staging area”, “camp” or “helibase” text in their labels.

Water source feature labels often identify the type of water source they represent, like “draft” or “dip”.

But remember, use labels only as needed. Too much text clutters the map, and may cover important map features.

IAP Map: Size and Orientation

- Letter (8½" x 11")
- Tabloid (11" x 17")
- Portrait or landscape
- Map scale of 1:24,000 – 1:40,000 is typical
- Create a multi-page IAP if the incident is too large to fit legibly on a single page



IAP maps are typically formatted to fit on a letter- or tabloid-sized page, and may have either portrait or landscape orientation.

A map scale of 1:24,000 through 1:40,000 is typical.

Create a multi-page IAP if the incident is too large to fit legibly on a single page.

IAP Map: Use Of Space

- **Set page margins close to printer's capability**
- **Position content for max use of space**
- **Be efficient with space allotted to STANDL and SGD elements**
- **Legible, sized appropriately, not obscuring**
- **Photocopy to check appearance and legibility**



Space on an IAP map may be limited, given the map's relatively small page size. Here are some considerations when composing an IAP map layout.

Set page margins as close as possible to the printer's capability.

Position map content for maximum use of space within the margins.

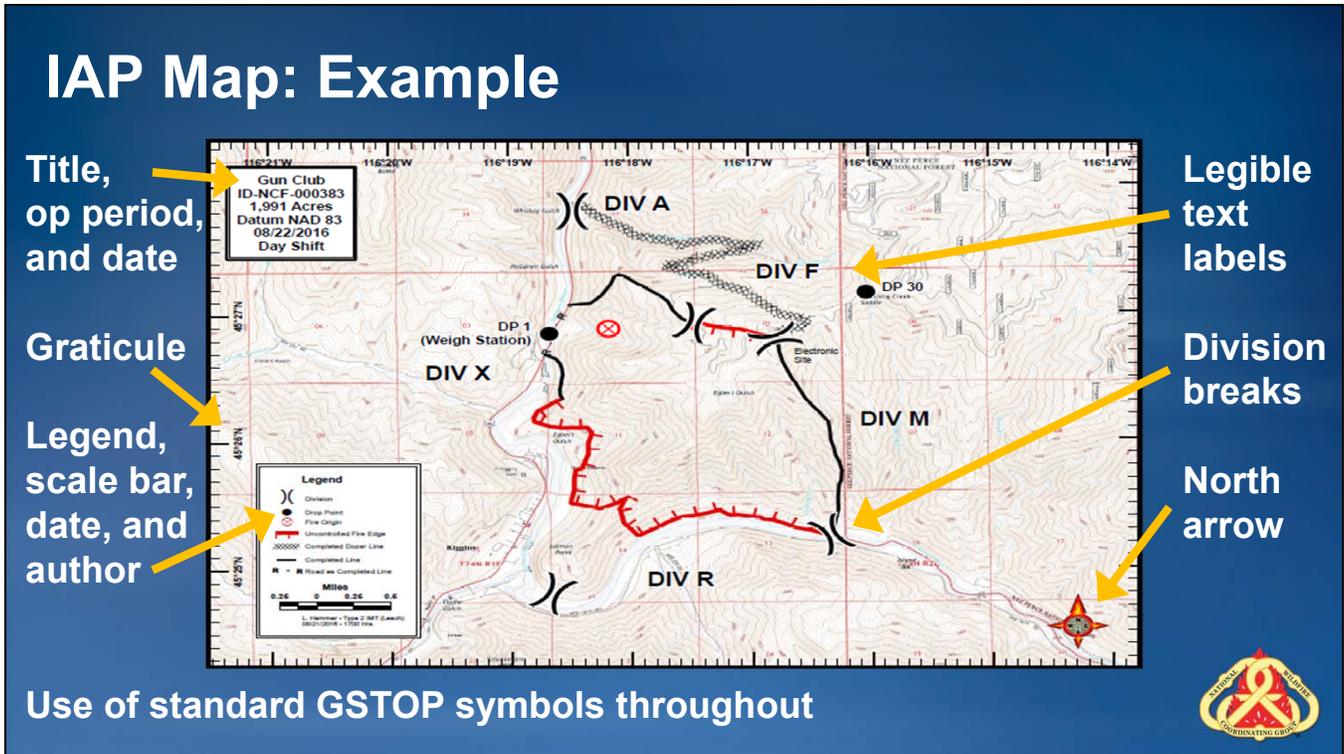
Size and arrange STANDL and SGD elements to make the most efficient use of map space.

Symbols, labels, and cartographic elements should:

1. Be legible
2. Be sized appropriately for the map's scale and page size
3. Not cover up important incident or geographic features

Create a multi-page IAP map if features, labels, and cartographic elements are too crowded.

Don't forget to make a sample photocopy to check appearance and legibility prior to printing.



Here's an example of a basic IAP map.

It contains all of the STANDL cartographic elements, as well as a graticule and datum reference.

Its features are rendered with standard GSTOP symbols, and its labels are legible and well placed.

Division breaks are shown both on the fireline, and away from the current perimeter in anticipation of fire growth. Division breaks are labeled away from the fire perimeter.

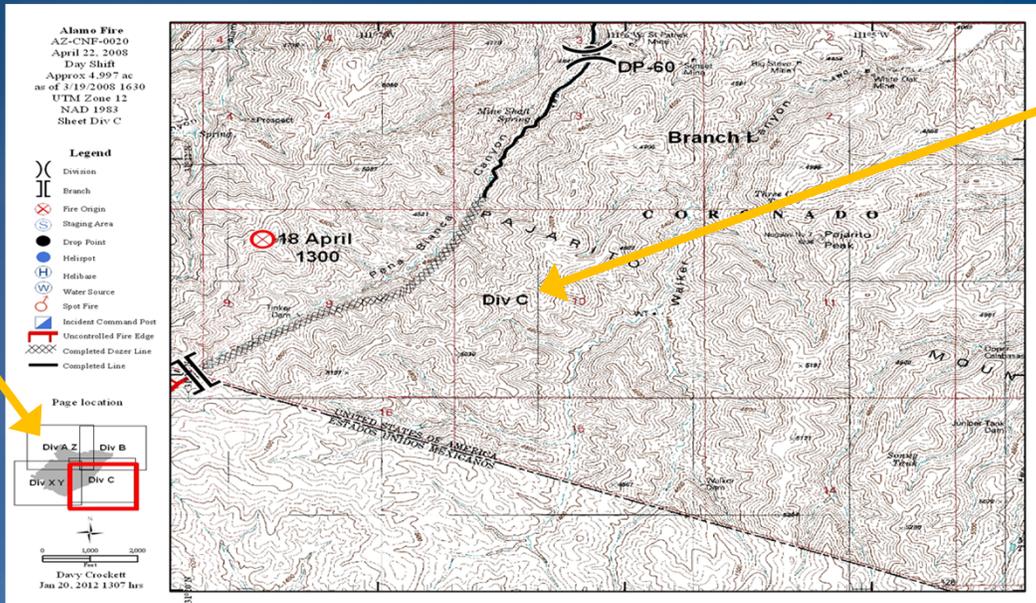
Resolution and color of the contour lines will photocopy well.

Space was used efficiently, and important map features are all clearly visible.

Remember, the primary customer for this map are on-the-ground firefighters, so make it simple, legible, and informative.

IAP Map: Multi-Page Map

Index map with four map tiles



Map page for Div C

A multi-page IAP map is produced when an incident becomes too large to fit legibly on a single page.

In this example, the incident requires four map tiles, or pages, to cover its extent.

In addition to the STANDL cartographic elements, a small index map is added to bring spatial context to each of the individual map pages.

In this example, each tile has been cleverly positioned to take in one or more operational Divisions, plus some overlap.

IAP Map: Part 3 Review

- Design basics
- Branch and Division symbols and labels
- Point feature labels
- Map size, orientation, and scale
- Economical use of space
- Example IAP maps



These topics have been discussed in Part 3 of this introduction to the IAP Map:

1. Map design basics
2. Branch and Division symbols and labels
3. Point feature labels
4. Map size, orientation, and scale
5. Economical use of space
6. Reviewed several example IAP maps

IAP Map: Lesson Review

- Define IAP map purpose and use
- List standard cartographic elements
- Define standard and optional data
- Explain importance of consultation with Situation Unit Leader (SITL)
- Show IAP maps and standard symbols, labels



Finally, let's review the overall objectives for this IAP Map lesson. They were:

1. Define the purpose and use of the Incident Action Plan map.
2. List the IAP map's standard cartographic elements.
3. Define what data are needed to create an IAP map, and where to obtain the data.
4. Explain why it is important to consult with the Situation Unit Leader (SITL) before creating an IAP map.
5. Look at examples of IAP maps, and at standard GSTOP symbols and labels.