



# SQUADRON D-11N TRAINING

Module 8 , Navigation (Observers)

Developed by Skip Morford



**U.S. COAST GUARD AUXILIARY**



# NAVIGATION

## Observer Syllabus

1. Navigate from aeronautical sectional charts
2. To locate/transfer datum between sectionals/marine charts
3. To locate nearest airport and direct the pilot to its location
4. To plot a course to a given lat/long
5. To communicate chart information to flight crew
6. To coordinate search pattern legs and timing with the pilot



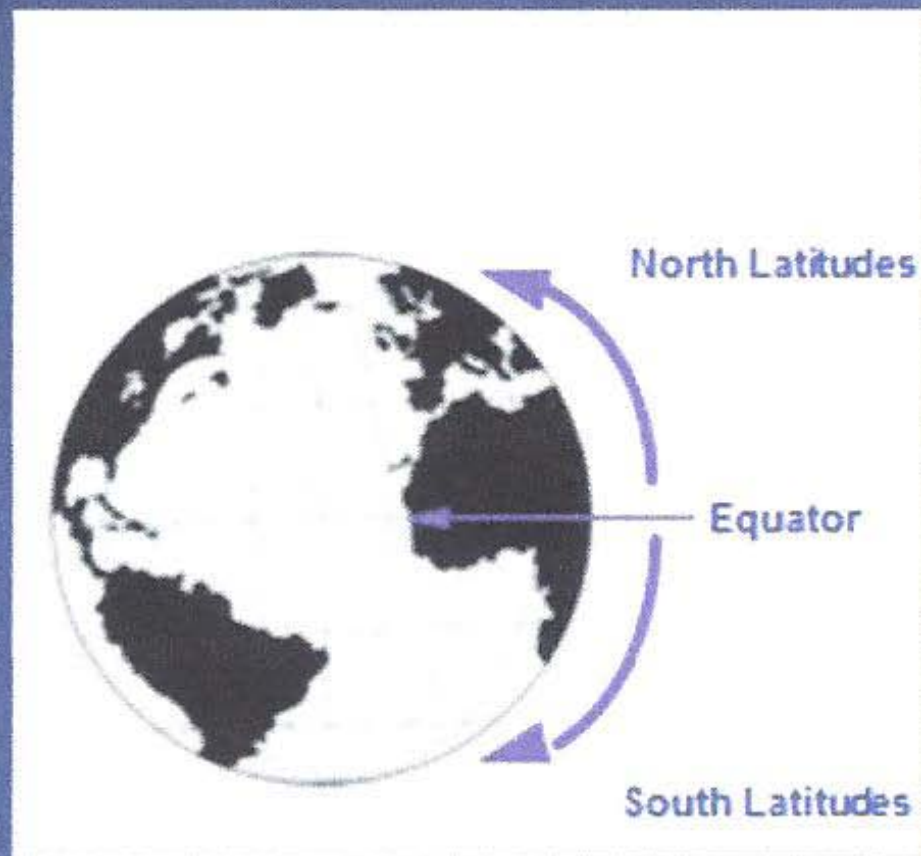
# The Basics

- Latitude & Longitude
- Clock Reference for communication of position
- Map Options
- Datum, Datum, Datum.....



# Latitude

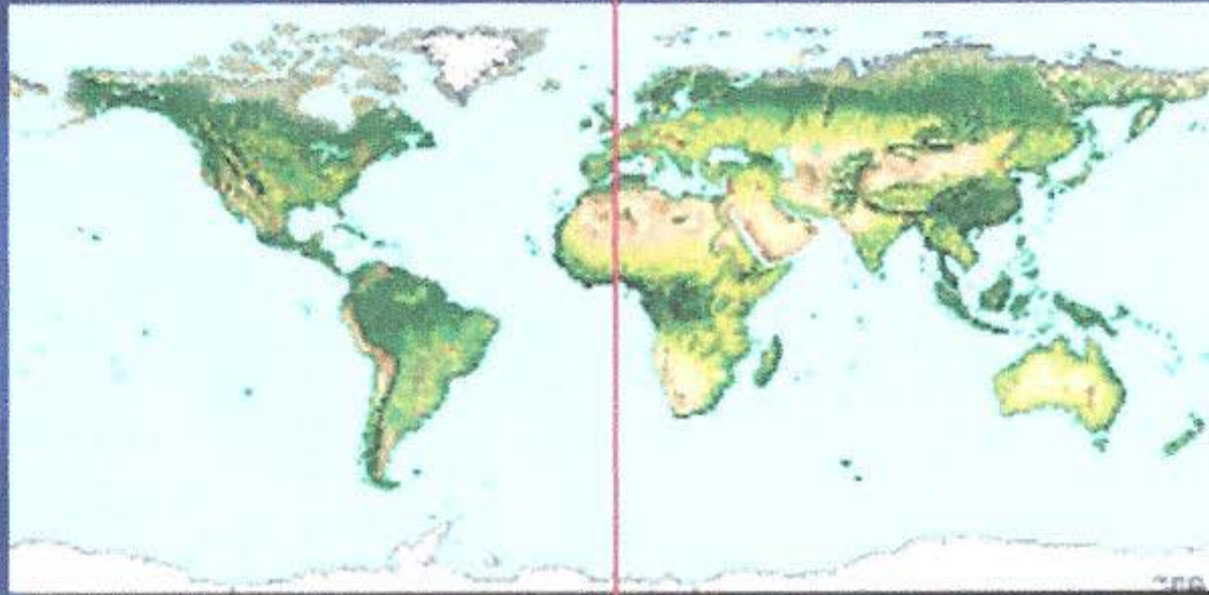
- Parallels
- Measure How Far North or South of Equator
- Zero Degrees is Equator
- “90 Degrees North” is the North Pole
- “90 Degrees South” is the South Pole





# Longitude

West Longitude Prime Meridian East Longitude



- Half Great Circles Intersecting at the Poles
- Measure How Far East or West of England
- Zero Degrees is Prime Meridian (England)
- Numbers between 0 and 180 are either East or West Longitude
- 180 Degrees is opposite side of globe from England
  - near international date line in Pacific Ocean





# How Big is One Degree

- Degrees of Latitude are always the same distance apart, about 60 Nautical miles.
- Degrees of Longitude vary in distance- near the poles the lengths are quite small.



# Dividing Degrees into Smaller Units

- A ( Minute ) :  $1/60^{\text{th}}$  of a degree
  - roughly a mile in size
- Minutes are usually broken down into tenths of a minute
  - Alternatively, a Second is  $1/60^{\text{th}}$  of a minute





# Describing Locations

- The seconds vs. decimal minutes question is a big source of confusion.

Some erroneously say “seconds” when they mean hundredths of a minute.

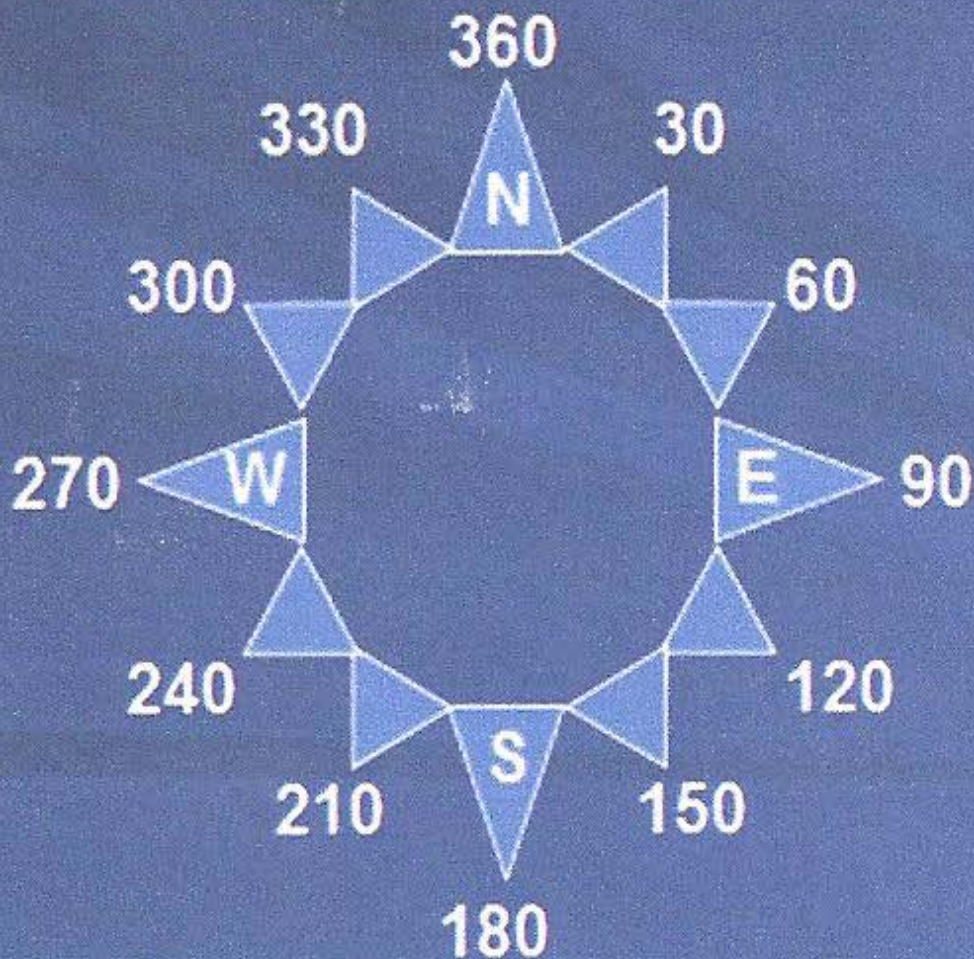
Some say “point” or “decimal” when they should have said “minutes” and “seconds”.

Be accurate and clear when giving information.





# Expressing Direction: The Compass Rose

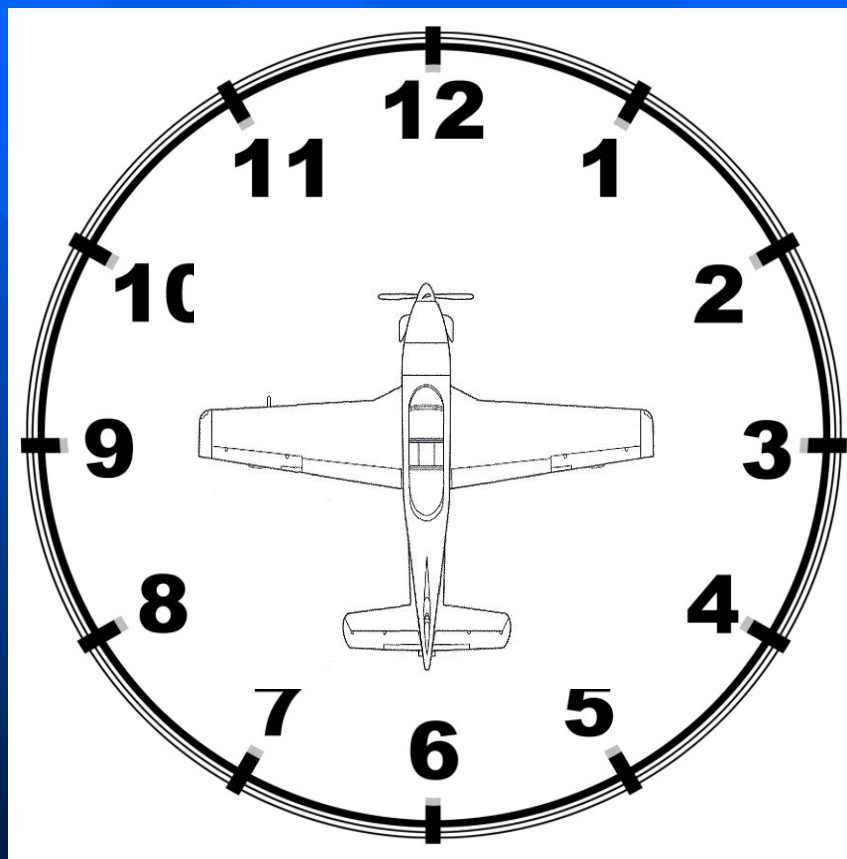


Directions are expressed as a number from 001 to 360



# Communicating sightings to crew

Nose of aircraft  
12:00 O Clock



Left wing  
9:00 O Clock

Right wing  
3:00 O Clock

Tail of aircraft  
6:00 O Clock





# Maps Available

- Aviation Sectional map-San Francisco\*
- Aviation VFR Terminal Area Charts\*
- NOAA Marine Maps-planning only
- Commercial Marine Map-working map
- Commercial Fishing Map-working map

\*Already on Aircraft



# Objectives

Given a sectional chart, discuss the information found on the legend.

On the sectional chart, locate and discuss:

Physical features such as topographical details

•

Towns and cities

Highways and roads

Airways and radio aids to navigation

Airports and airport data





Sectional Aeronautical Charts are the primary navigational reference used by the VFR pilot community. The 1:500,000 scale Sectional Aeronautical Series is designed for visual Navigation of slow to medium speed aircraft. The topographic information featured consists of the relief and a judicious selection of visual checkpoints used for flight under visual flight rules. The checkpoints include populated places, drainage patterns, roads, railroads, and other distinctive landmarks. The aeronautical information on Sectional Charts include visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data. These charts are updated every six months, most Alaska Charts annually.



## USING A SECTIONAL AND A FISHING MAP

Given a sectional locate a datum

Given a fishing locate the same datum on it

Using the fishing map makes things more detailed, compared to the

sectional maps have geographical and names of certain

locations that sectionals do not have in detail

Fishing maps have GPS coordinates making it easier

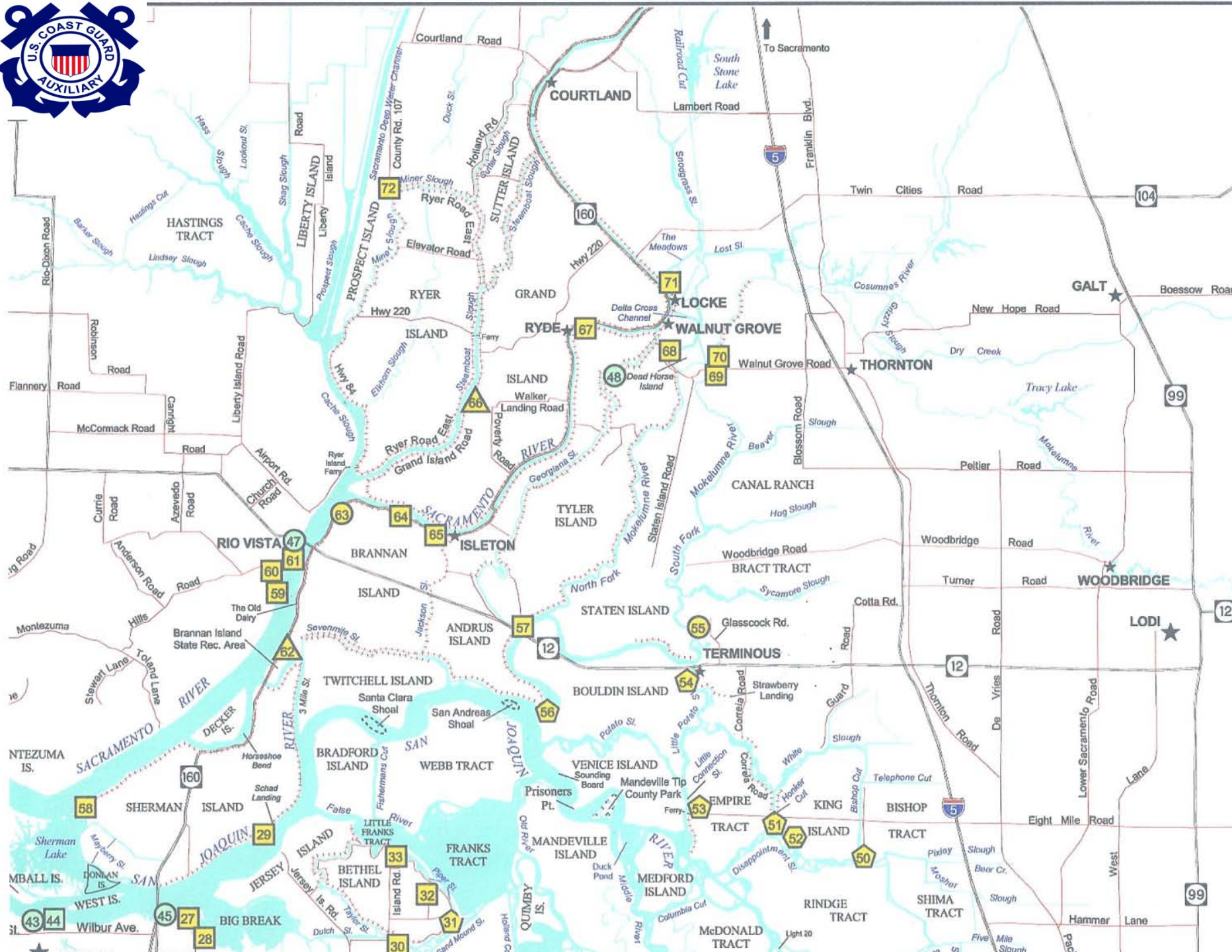
to find a datum when comparing to a sectional

Ask the pilot or observer to determine position using GPS

and or VOR/DME, to maintain positional awareness if

necessary

Example of fishing map on next slide





# Transfer of a DATUM

- Sectional
- Terminal Chart
- Marine Chart
- Fishing Map





# San Francisco Sectional Chart

← H1105 SAN FRANCISCO SECTIONAL SECTIONAL AERONAUTICAL CHART SCALE 1:500,000 NORTH →

FEDERAL AVIATION ADMINISTRATION  
Federal Aviation Administration

91<sup>ST</sup> EDITION EFFECTIVE 0901Z 22 AUG 2013  
TO 0901Z 6 MAR 2014

Includes airspace amendments effective 22 AUG 2013  
and all other aeronautical data received by 27 JUN 2013

Information on this chart will change; consolidated updates of chart changes are available every 56 days in the AIRPORT/FACILITY DIRECTORY Chart Bulletin section (online at <http://aeronav.faa.gov>). Also consult appropriate NOTICES TO AIRMEN (NOTAMS) and other FLIGHT INFORMATION PUBLICATIONS (FLIPs) for the latest changes.

Terminal Area Chart

PUBLISHED IN ACCORDANCE WITH INTERAGENCY AIR CARTOGRAPHIC COMMITTEE SPECIFICATIONS AND AGREEMENTS, APPROVED BY: DEPARTMENT OF DEFENSE \* FEDERAL AVIATION ADMINISTRATION

Warning: Refer to current foreign charts and flight information publications for information within foreign airspace.

FAA Product ID: SSF  
NSN 7641014100159  
NGA REF. NO. SECXXFRISCO

EFF. DATE 13234







# San Francisco Sectional Chart



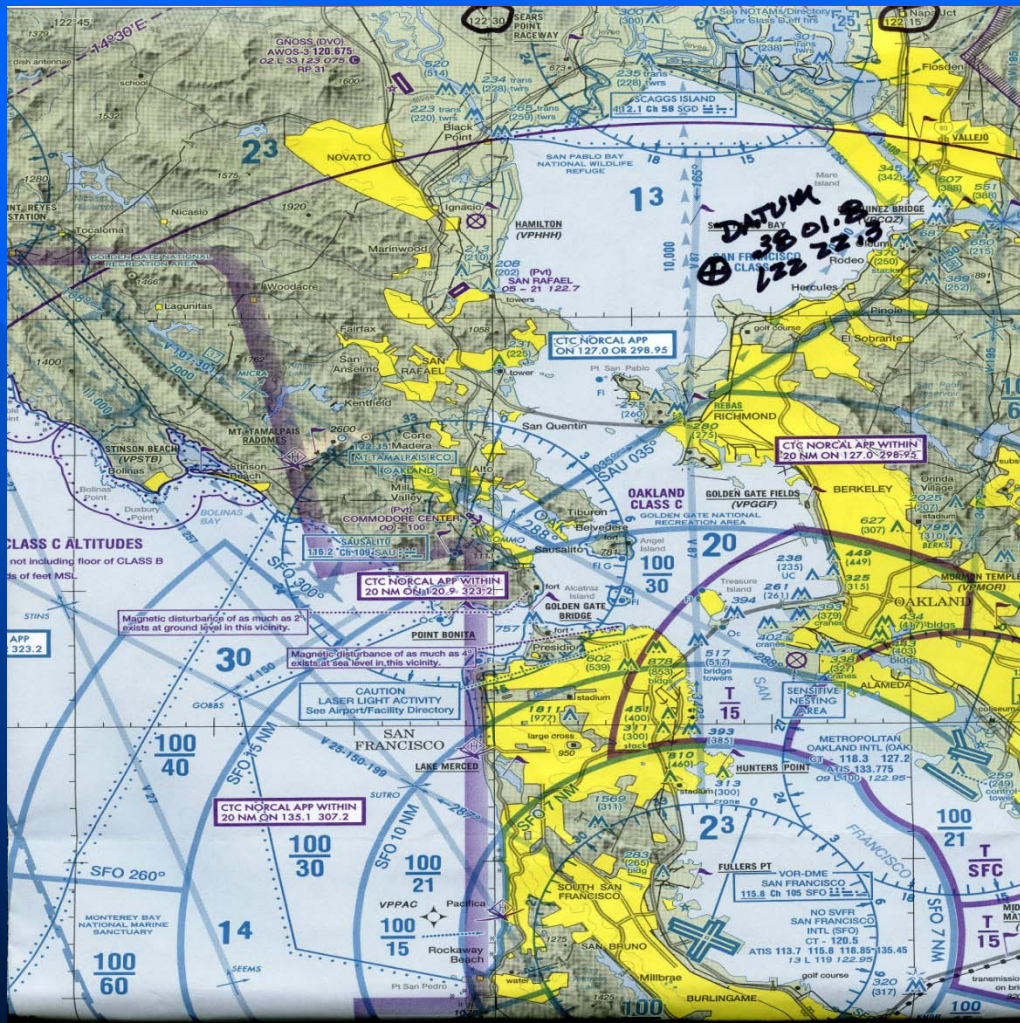
4/06/2002

Scale 1:500,000





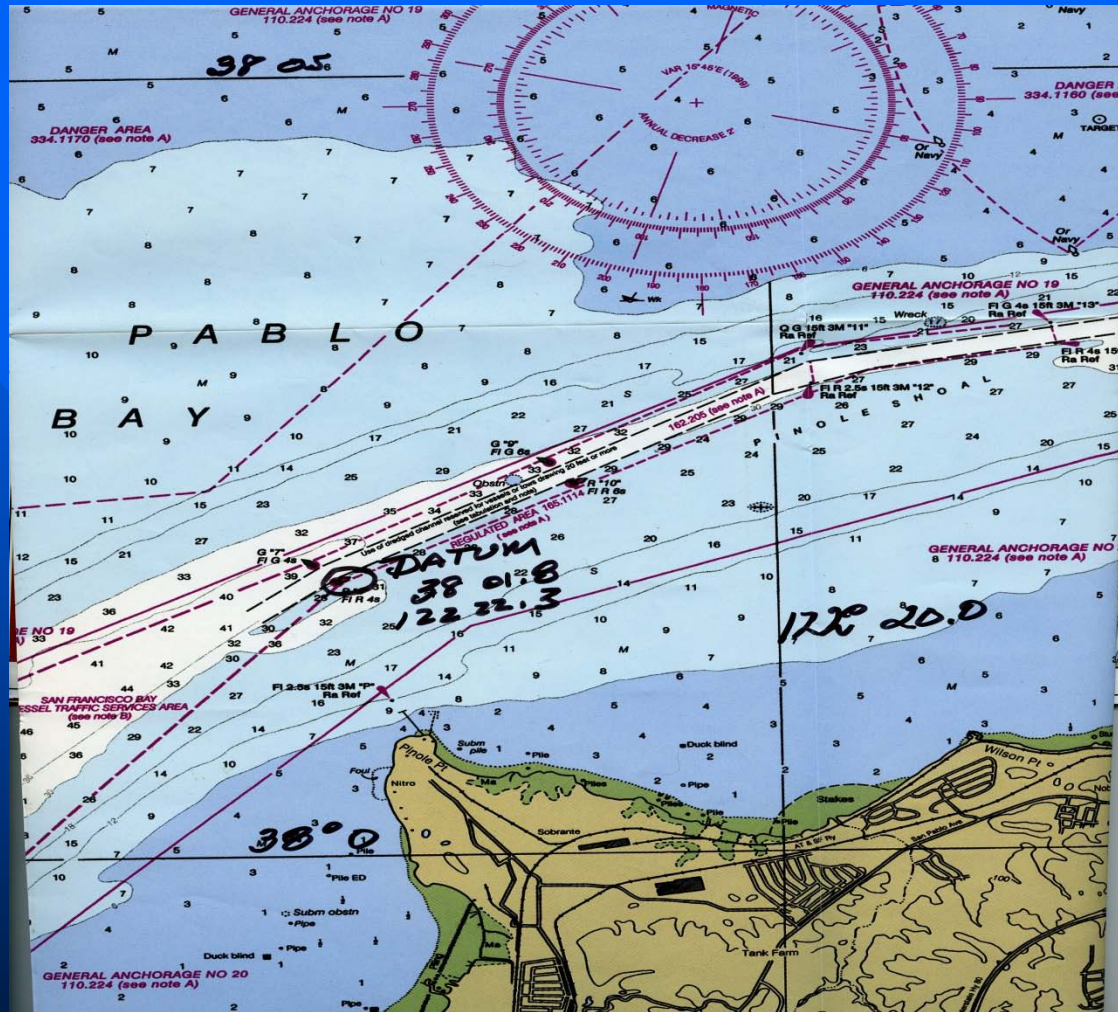
# San Francisco VFR Terminal Area Chart







# Marine Navigation Chart







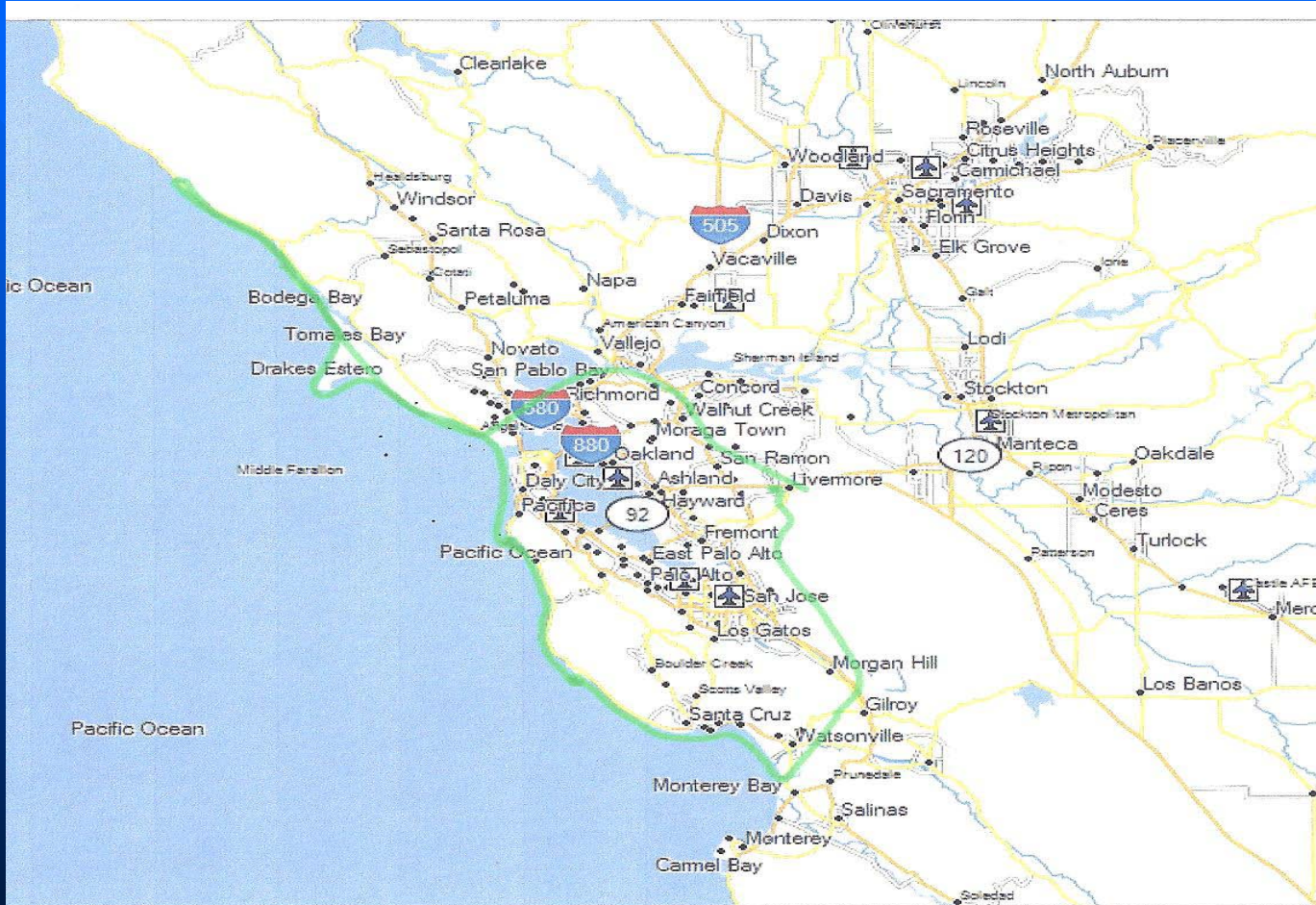
# Patrol Sectors Bravo & Delta

- Typical Flight Routes, not depicted Alpha and Charlie sectors
- Green or RED Lines are GPS traces of actual patrols





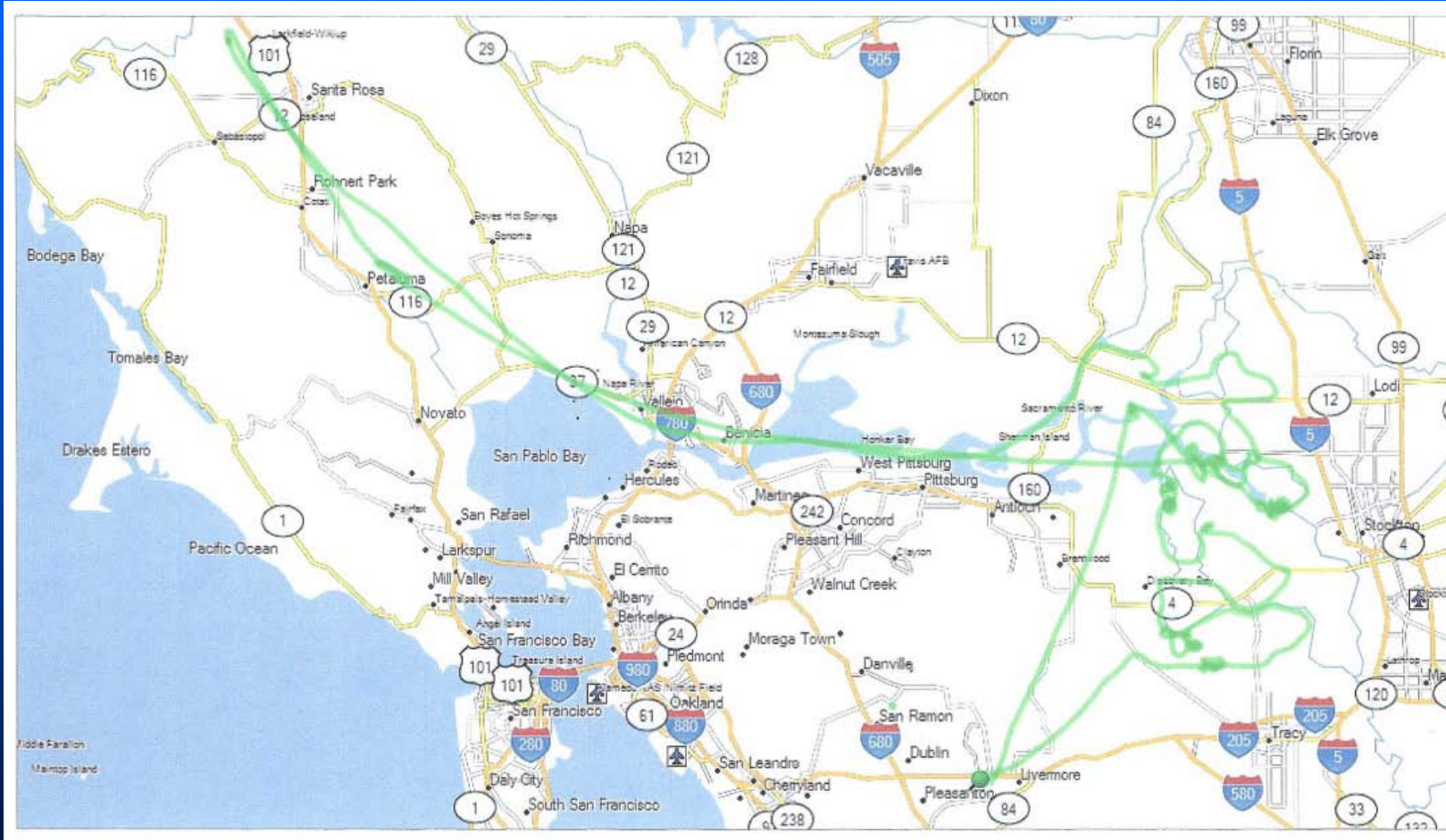
# Bravo Patrol







# Delta Patrol









# Describing Locations: Communicating with Others

- The seconds vs. decimal minutes question is a big source of confusion even within single organizations
  - Some people erroneously say “seconds” when they mean “hundredths of a minute”
  - Some people say “point” or “decimal” when they should have said “minutes” and “seconds”
  - Take nothing for granted when getting information
  - Be accurate and clear when giving information
- Especially when working with other-agencies, triple-check all coordinates to make sure we’re all speaking the same language
  - Some organizations normally uses Degrees-Minutes-Seconds as their standard way of describing positions, but they will use the word “decimal” or “point” to separate the three parts of the coordinate