



U.S. NAVAL ACADEMY SAILING PROGRAM



Offshore



Intercollegiate



CSNTS



P-100

To ensure safety at sea, the best that science can devise and that naval organization can provide must be regarded only as an aide and never as a substitute for good seamanship, self reliance, and a sense of ultimate responsibility which are the first requisites in a seaman and naval officer

Fleet Admiral Chester W. Nimitz
Letter to the Pacific Fleet
1945

Navigation 2

LCDR Neil Covington
Training Officer, Naval Academy Sailing



Why are we here?

The Navy Comes Ashore At Wasque

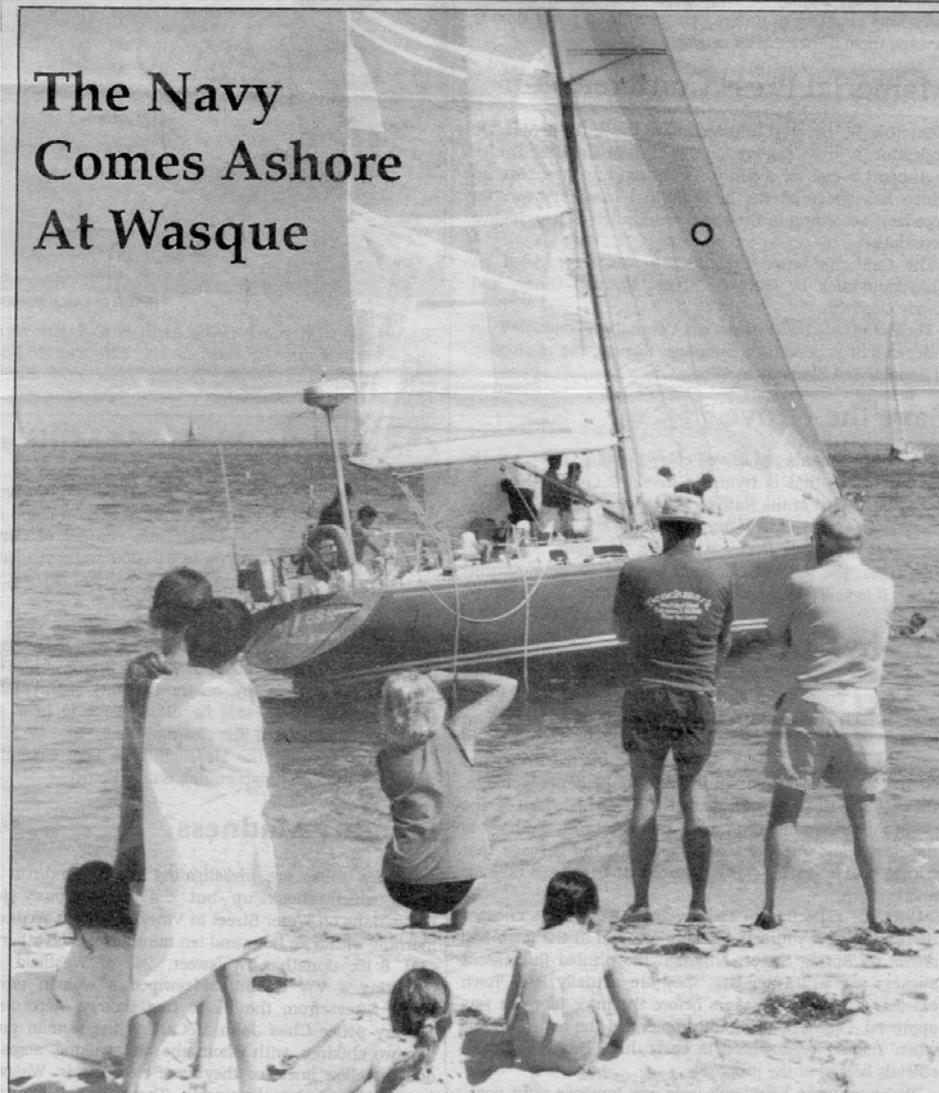


PHOTO BY NELSON SIGELMAN

The sloop *Fearless* from the Naval Academy at Annapolis, racing in the Edgartown Regatta, ran aground on a sandbar off Wasque Point, and there it stuck. Whoops.



Course Overview...

- The Chart
 - Primary emphasis on chart preparation
- The Fix
 - Visual & Electronic
 - Accuracy and errors
- The DR
 - The most important thing on the chart
- Navigation Party
 - Organization, procedures & philosophy
- Making landfall
 - The Navigation Brief
- Navigation Practical



Principles & Practice of Navigation

- Fix taking
- Fix evaluation
- “Minimum Cyclic Routine”
 - Plot, Label, DR.. Plot, Label, DR.. Plot, Label, DR...
- Situational Awareness & “Gut Feel”
- Watch Captain involvement
- Midshipman Navigator involvement
- Officer in Charge involvement



The Handouts...

Tenth Edition

Fundamentals of

Naval Science

NS 100

An inset photograph showing a fleet of USNavy ships, including several frigates, moving through a harbor. The ships are white with dark hulls and are leaving wakes in the water. In the background, a city skyline is visible across the water.

United States Naval Academy
Annapolis, Maryland



The Fix...

The Fix is:

WHERE YOU WERE

And...

It's hardly ever really where you were



The Fix...

The Fix is:

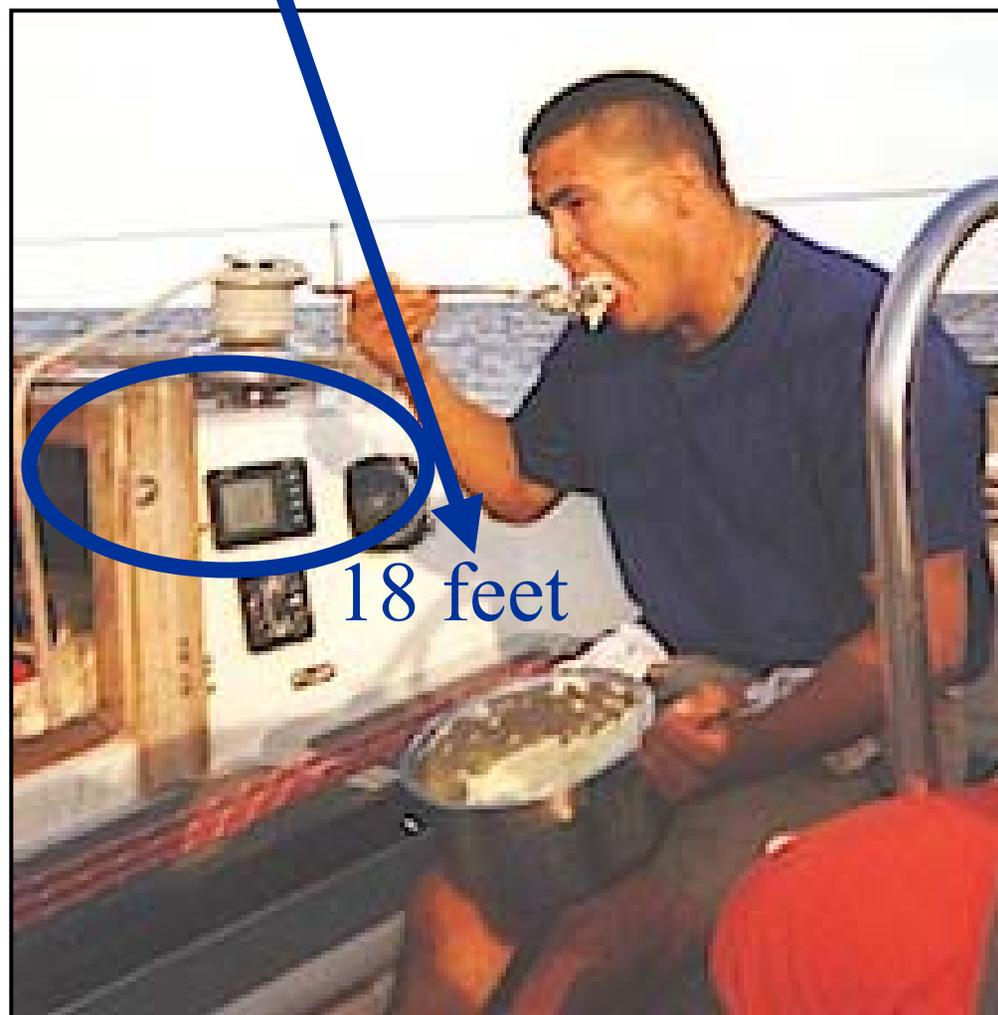
THREE DIMENSIONAL

“Sounding – Checks with chart”



The Fatho....

Write the “No Go Sounding” In Grease Pencil Here





The Fix...

Fix Interval

Whatever you do, establish and maintain
a consistent fix interval

Need to be able to step back and see the
trend, and respond if the trend changes



The Fix...

- What interval is required?
 - Hourly?
 - Half hourly?
 - Fifteen minutes?
 - Ten Minutes?
 - Five Minutes?
- It depends
 - However, it should be obvious when looking at the chart when it changes – and why
- The OIC determines Fix Interval!



The Fix...

- Open ocean – outbound
 - 1 hour maximum
- Open ocean – inbound
 - Frequently enough so you can see your approach develop
- The Bay
 - Where are you???
- Remember – these are fully crewed yachts
 - Whose mission is to train on navigation



The Fix...

Treat Every Fix With

Suspicion



Electronic Fixes

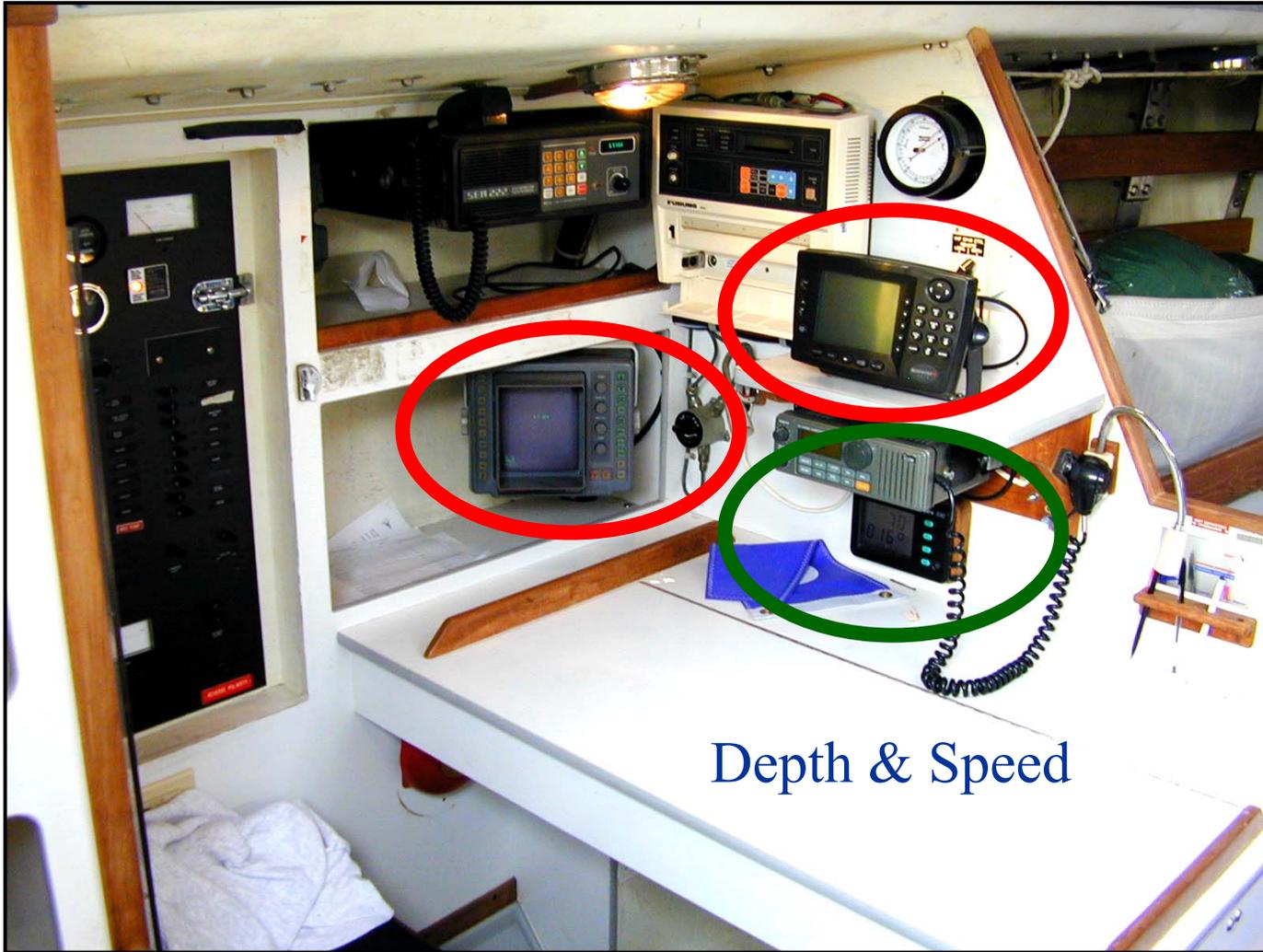
Global Positioning System

Loran C

Radar

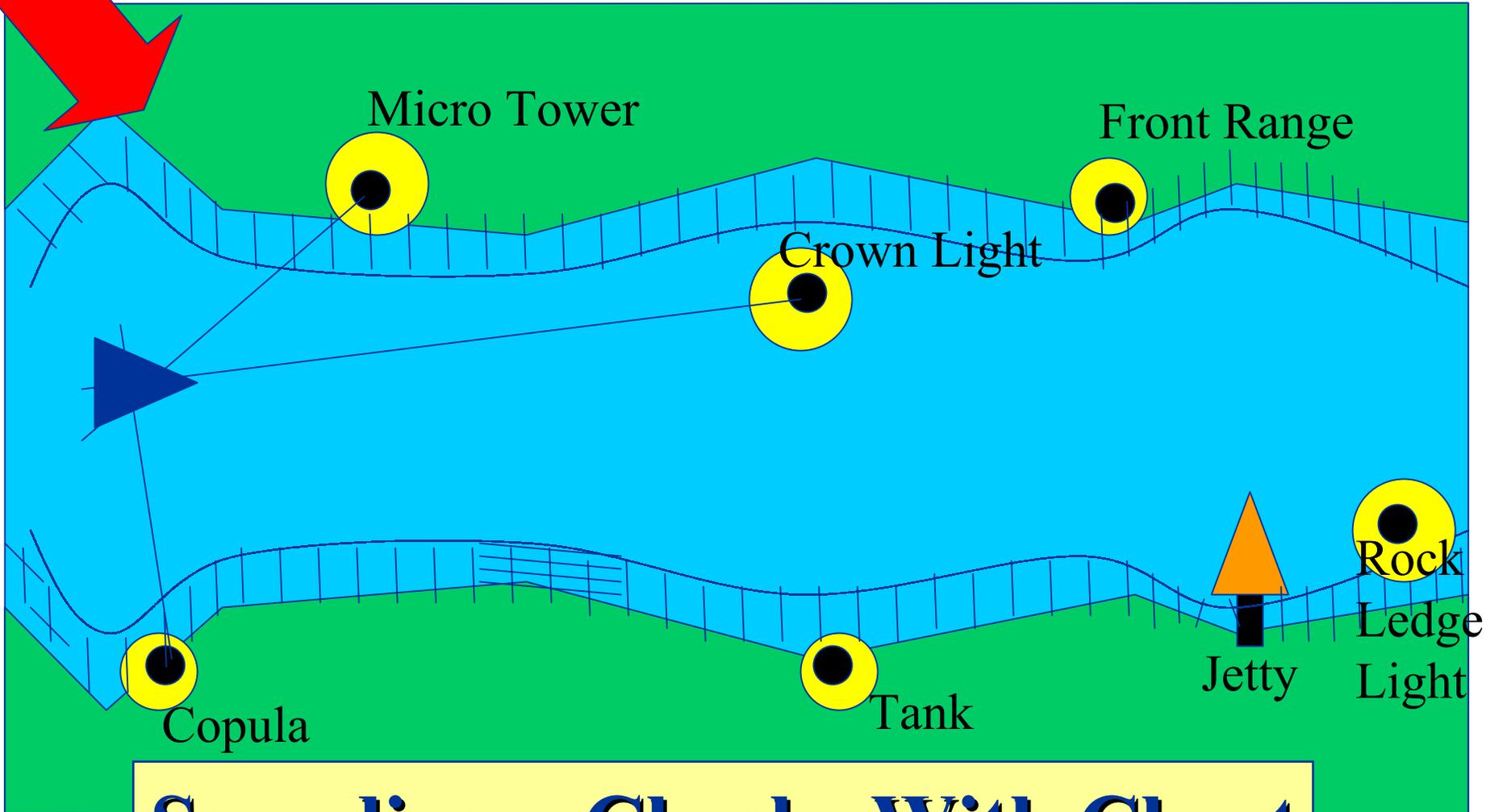
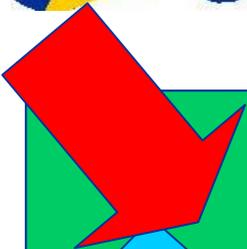


How Do You Take A Fix?





Visual Fixes...



Sounding – Checks With Chart



“Taking A Round Of Bearings”

- The Mids are taught to shoot the most rapidly changing bearing first
 - Typically the beam bearing
 - May not be...
 - Why - Shooting at a given time
- In the sail training craft context, shoot the most rapidly changing bearing last
 - Mark the time
 - Why – Most up to date information



The Hand Bearing Compass...



Key elements:

- Almost Midshipman Proof
- Susceptible to deviation errors
- They come with a Lanyard – Use it!!!





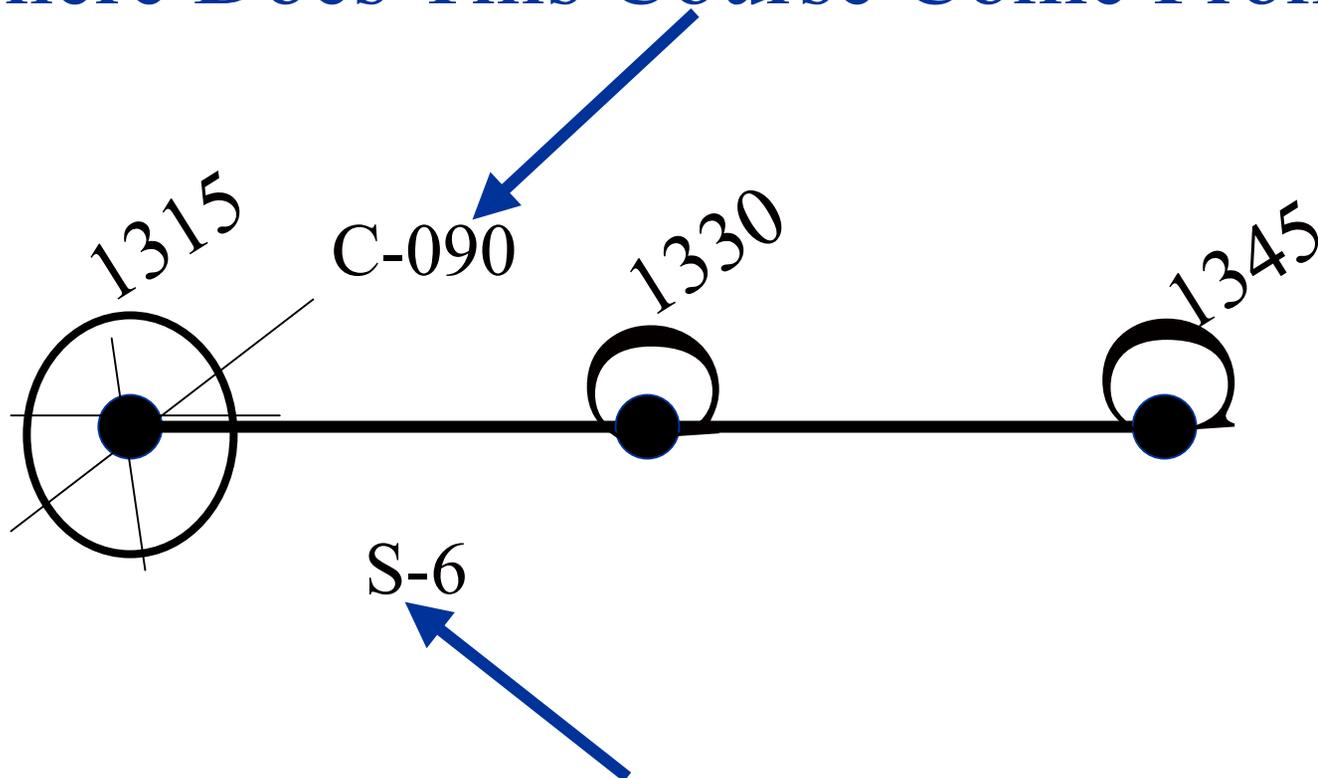
Note - These Are Not... Hand Bearing Compasses!!!





Plot, Label, DR... Plot, Label,
DR... Plot, Label, DR...

Where Does This Course Come From???



Where Does This Speed Come From???

Sounding – Checks With Chart



The Fix & The DR...

The DR Is Based on Onboard Instrumentation



Do Not Use Loran C or GPS
Course Over Ground/Speed Over Ground

“Weighted Averages...”



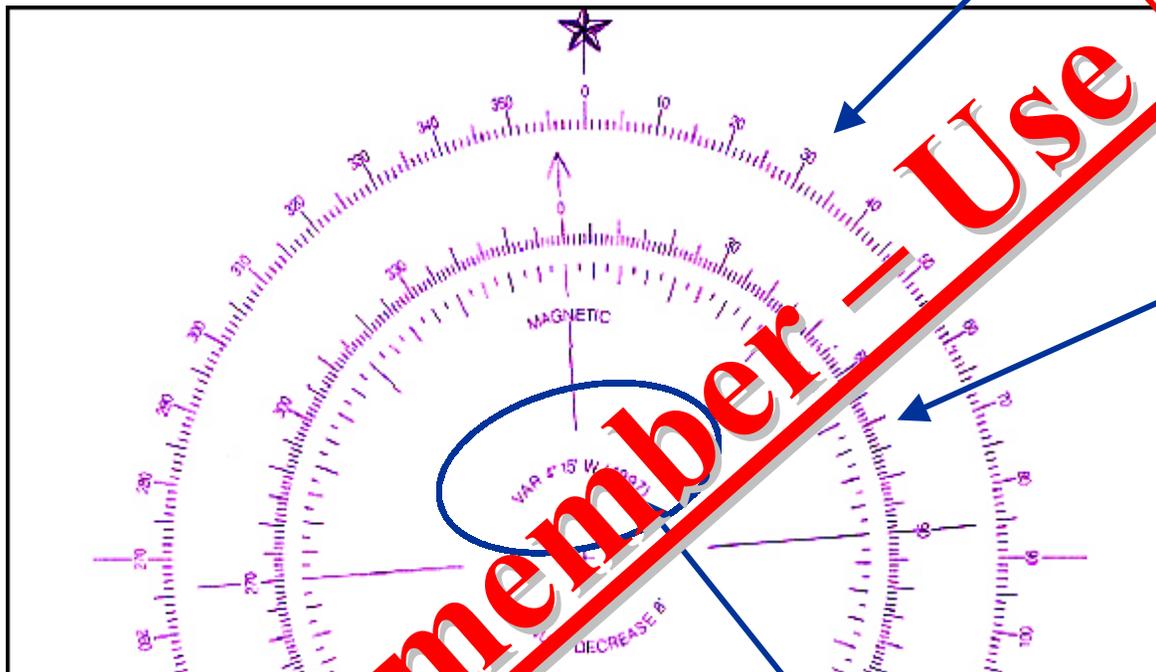
The Compass Rose...

Degrees True

- Don't use this one...

Degrees Magnetic

- Use this one!!!

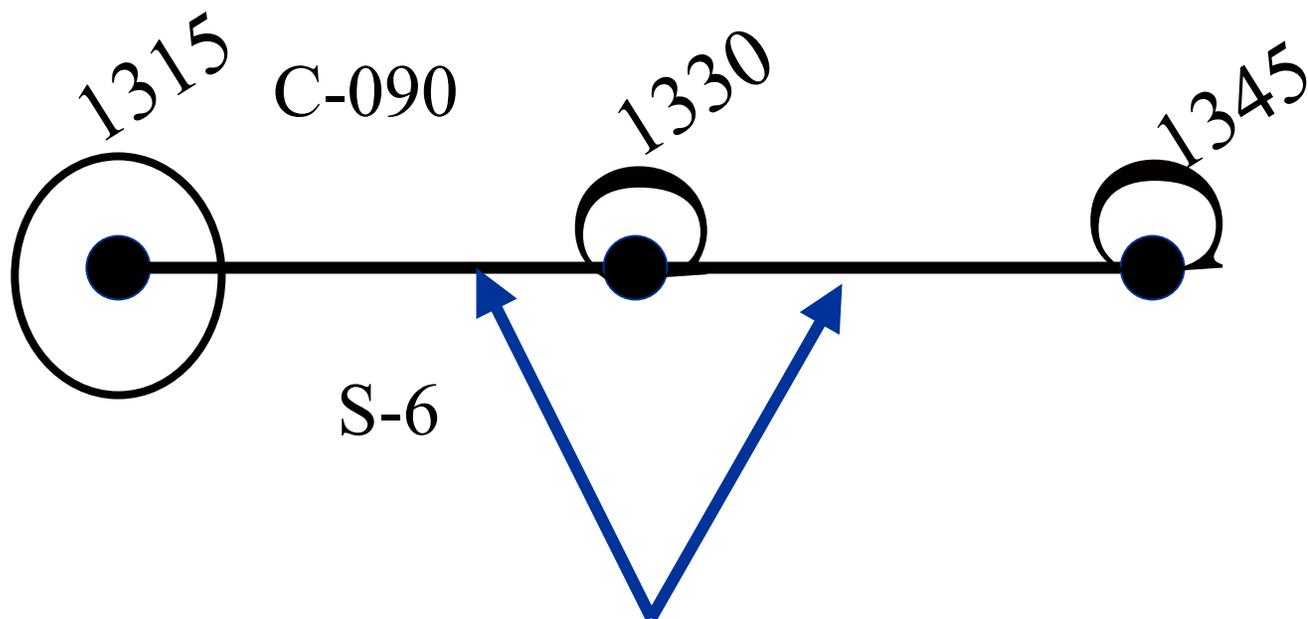


Variation...

- What do you need to know?



The Fix & The DR...



How Long Are These Segments???



How Far Can You Go... Before You Plot A Fix Again?



The Nautical Slide Rule

$$\underline{\text{Speed X Time = Distance}}$$



The Six Rules Of Deduced Reckoning

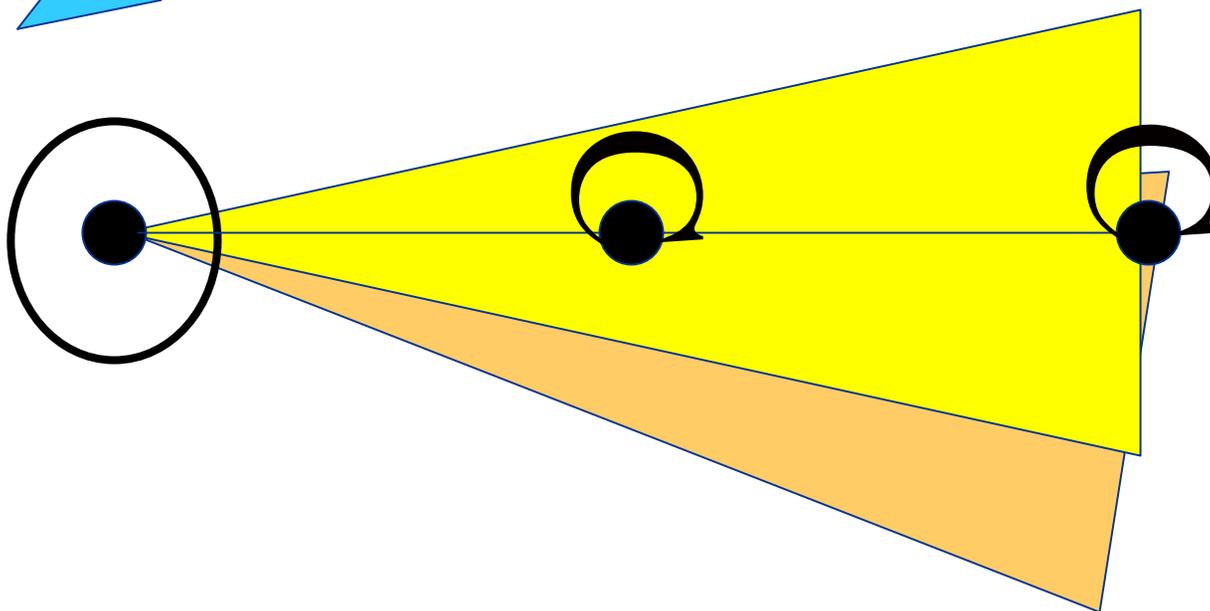
1. Every hour on the hour
2. At the time of every course change
3. At the time of every speed change
4. At the time of obtaining a single line of position
5. At the time of obtaining a fix or running fix
6. A new course line shall be drawn from each fix or running fix as soon as it is determined

YOU MUST KNOW THESE!!!

You Must Know How To Apply These!!!



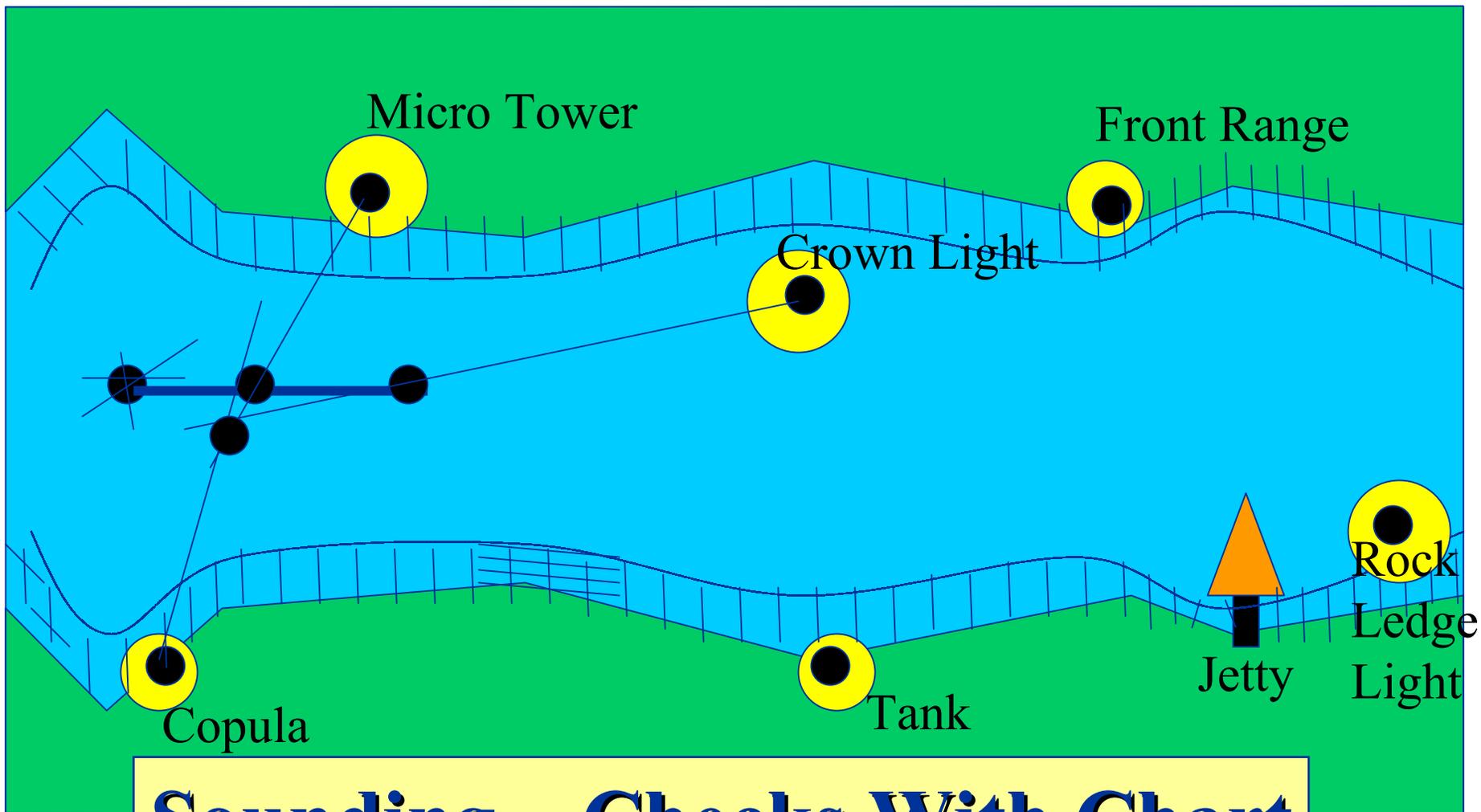
The Fix & The DR... Uncertainty!!!





The Fix & The Dr...

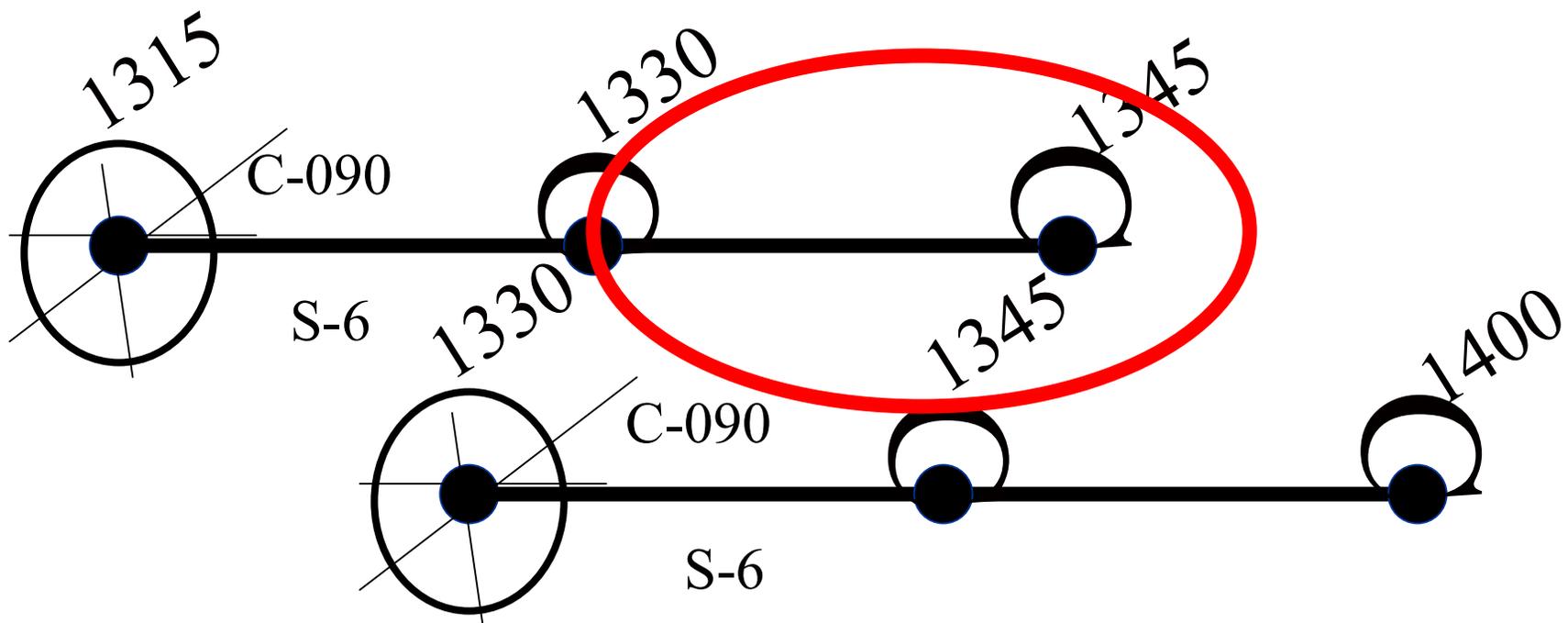
The Process



Sounding – Checks With Chart

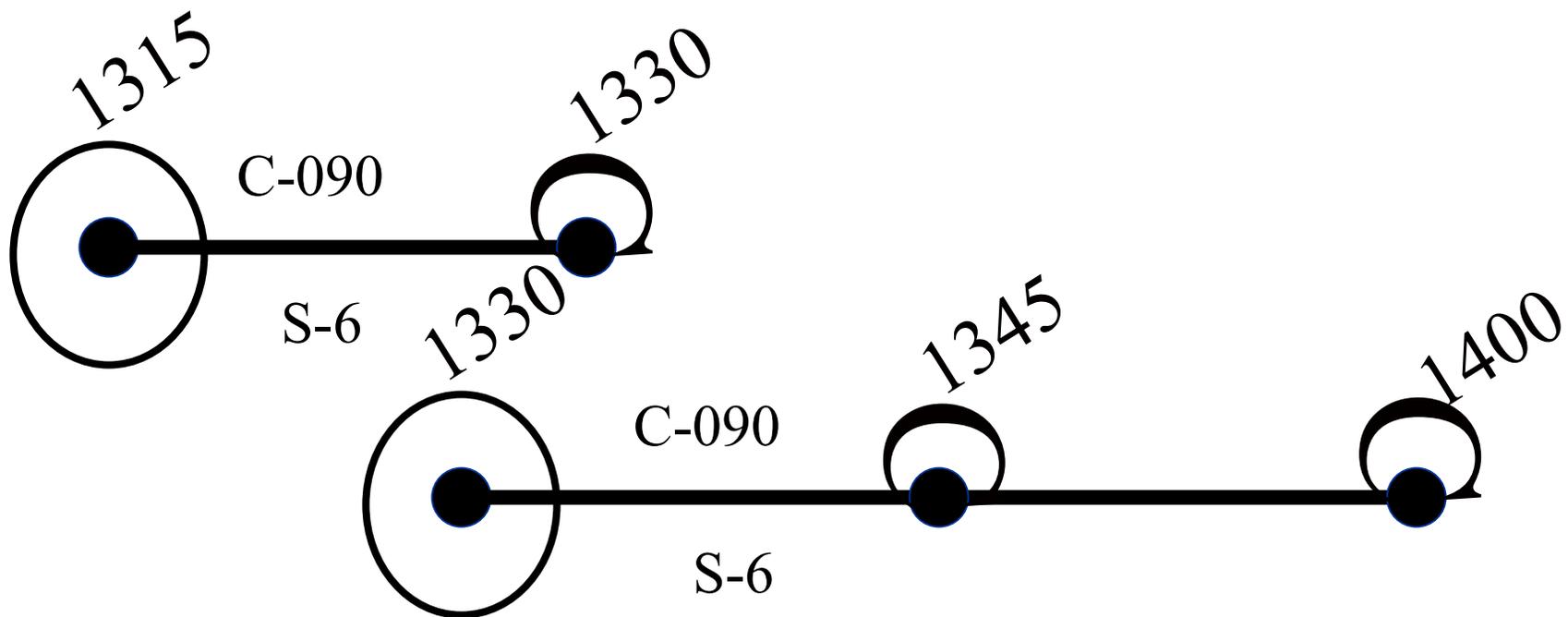


The Fix & The DR...



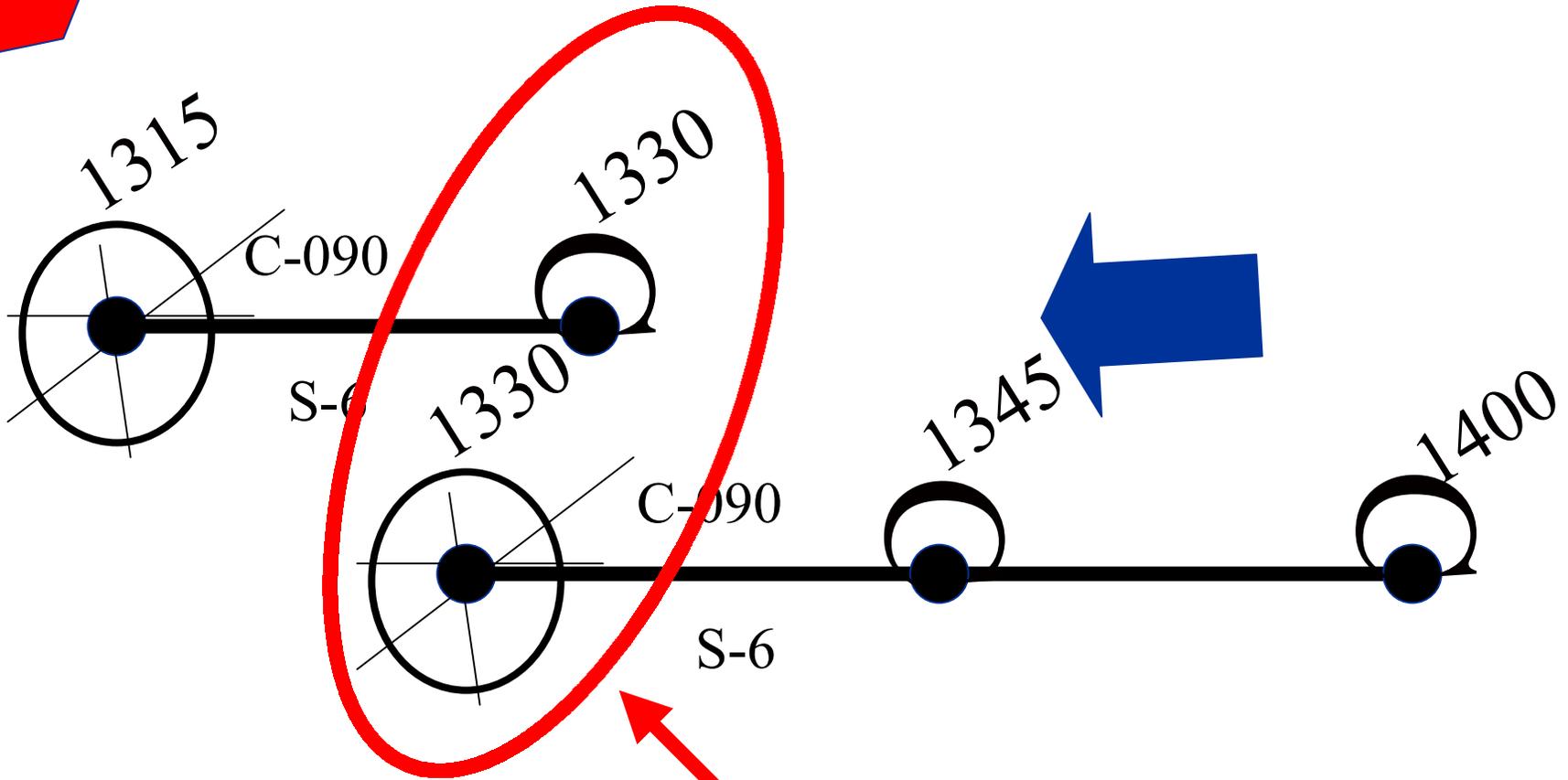
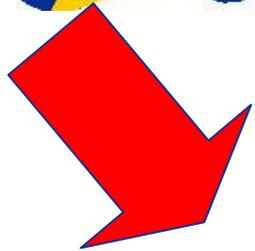


The Fix & The DR...





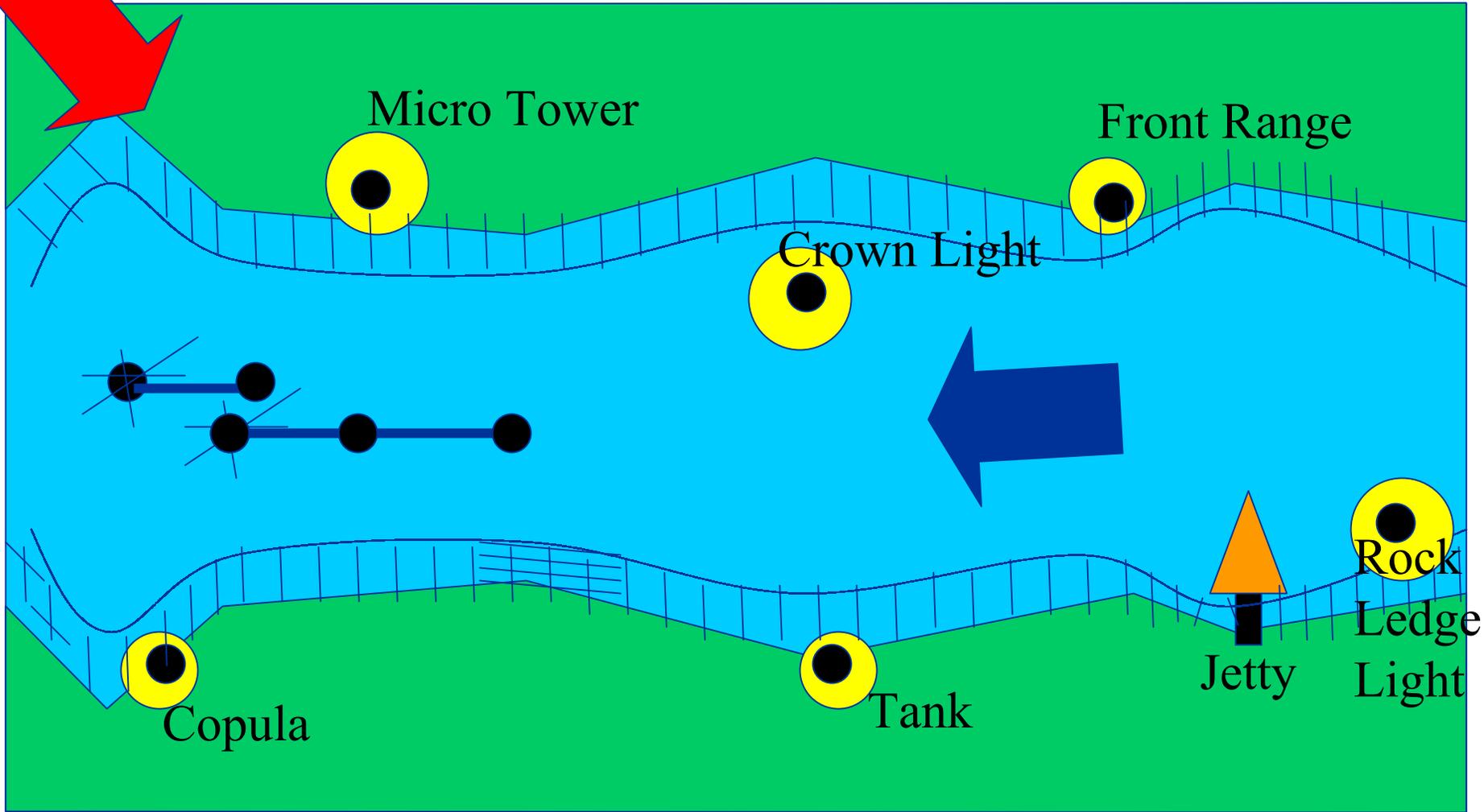
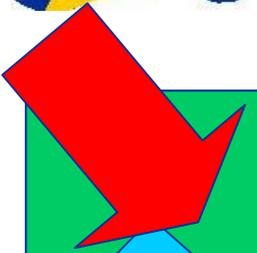
The Fix & The DR...



Does This Make Sense???

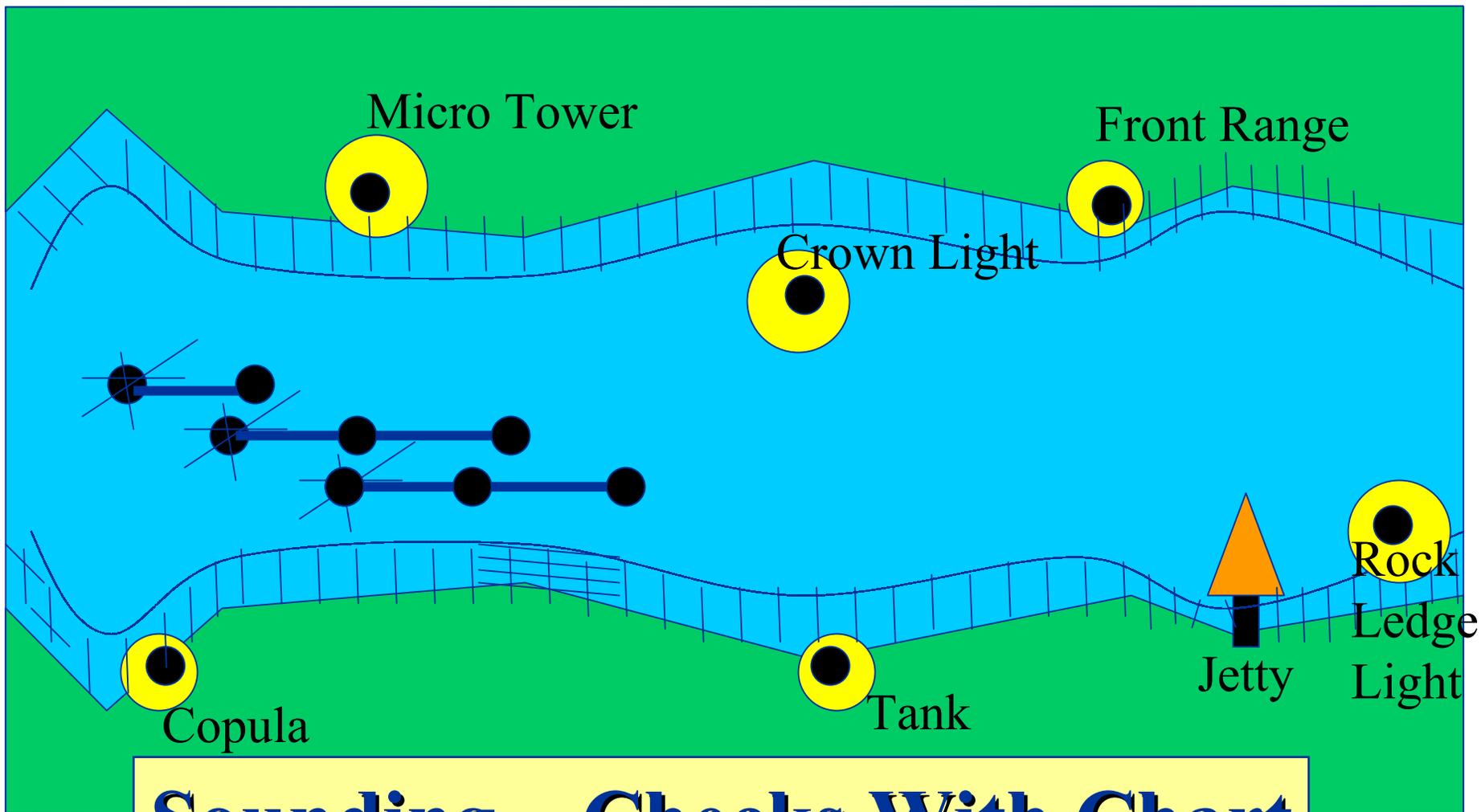


The Fix & The Dr... The Process





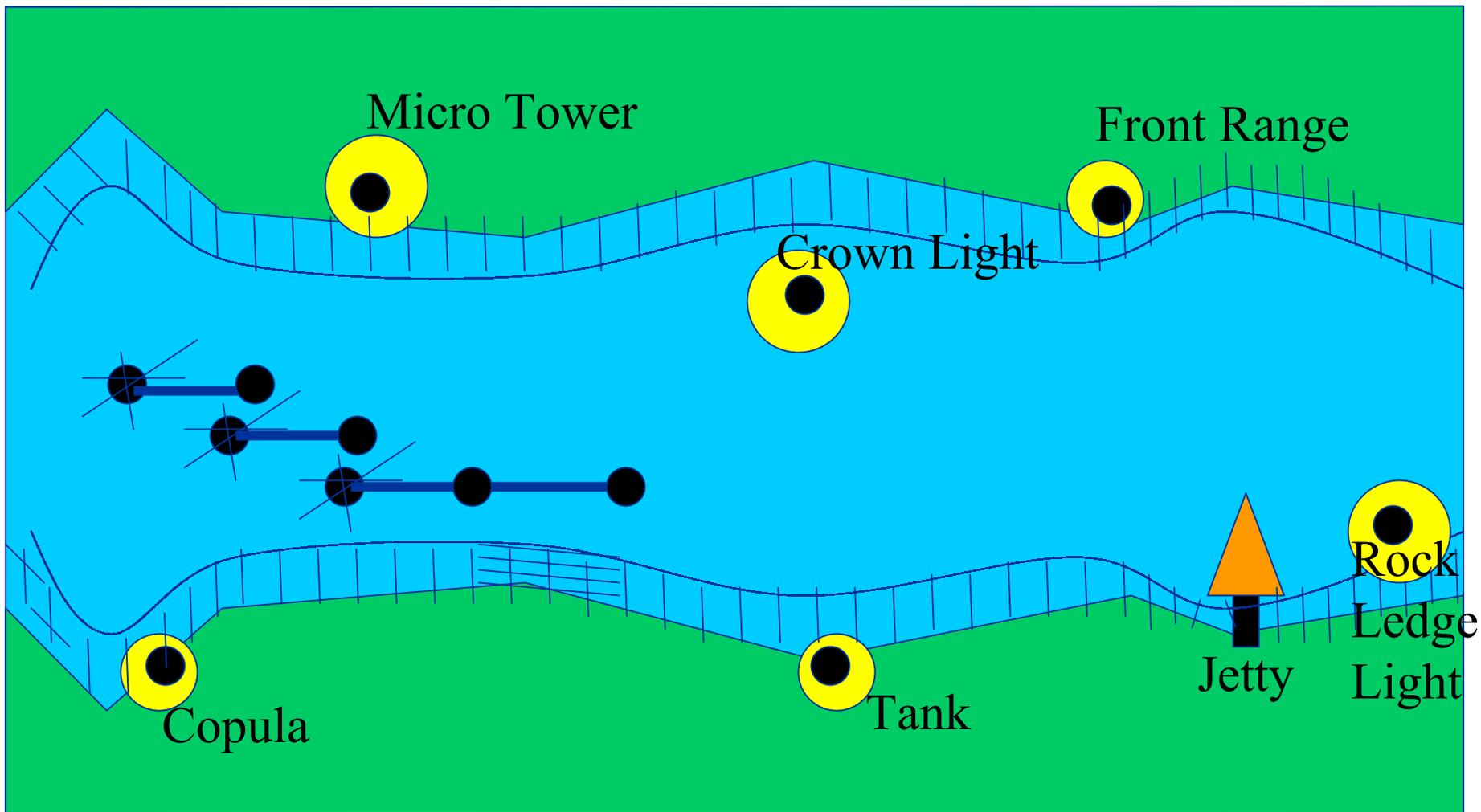
The Fix & The Dr... The Process



Sounding – Checks With Chart

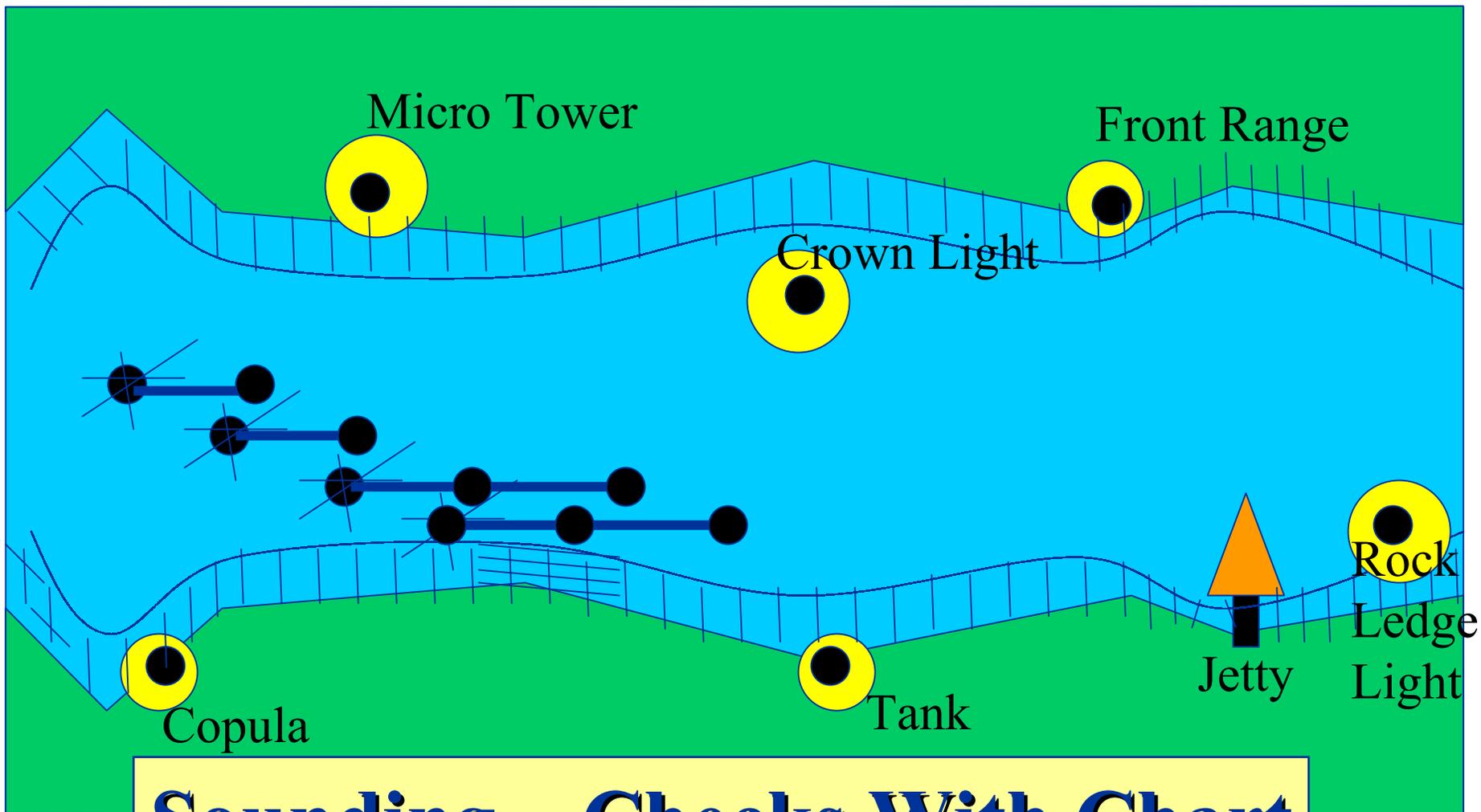


The Fix & The Dr... The Process





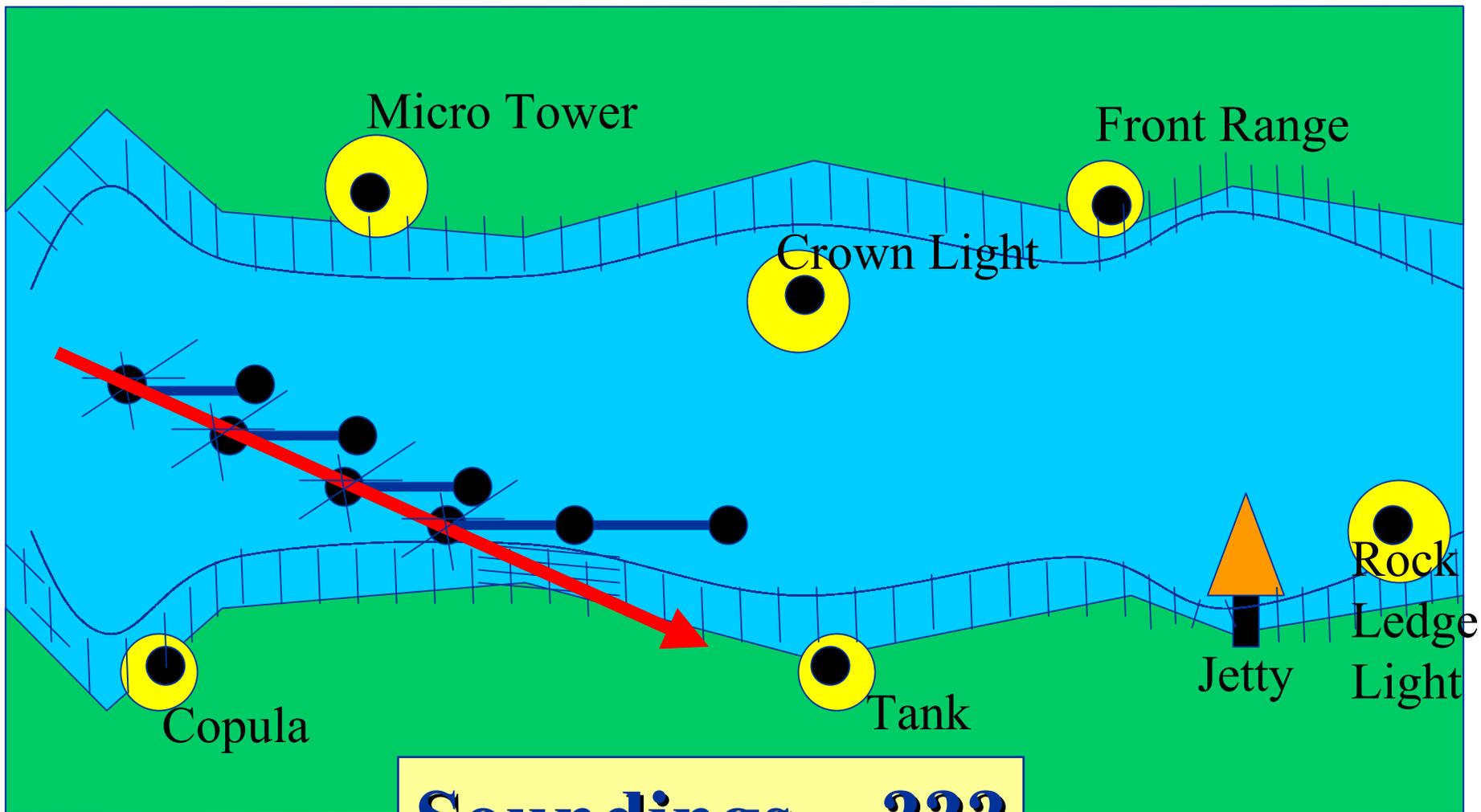
The Fix & The Dr... The Process



Sounding – Checks With Chart



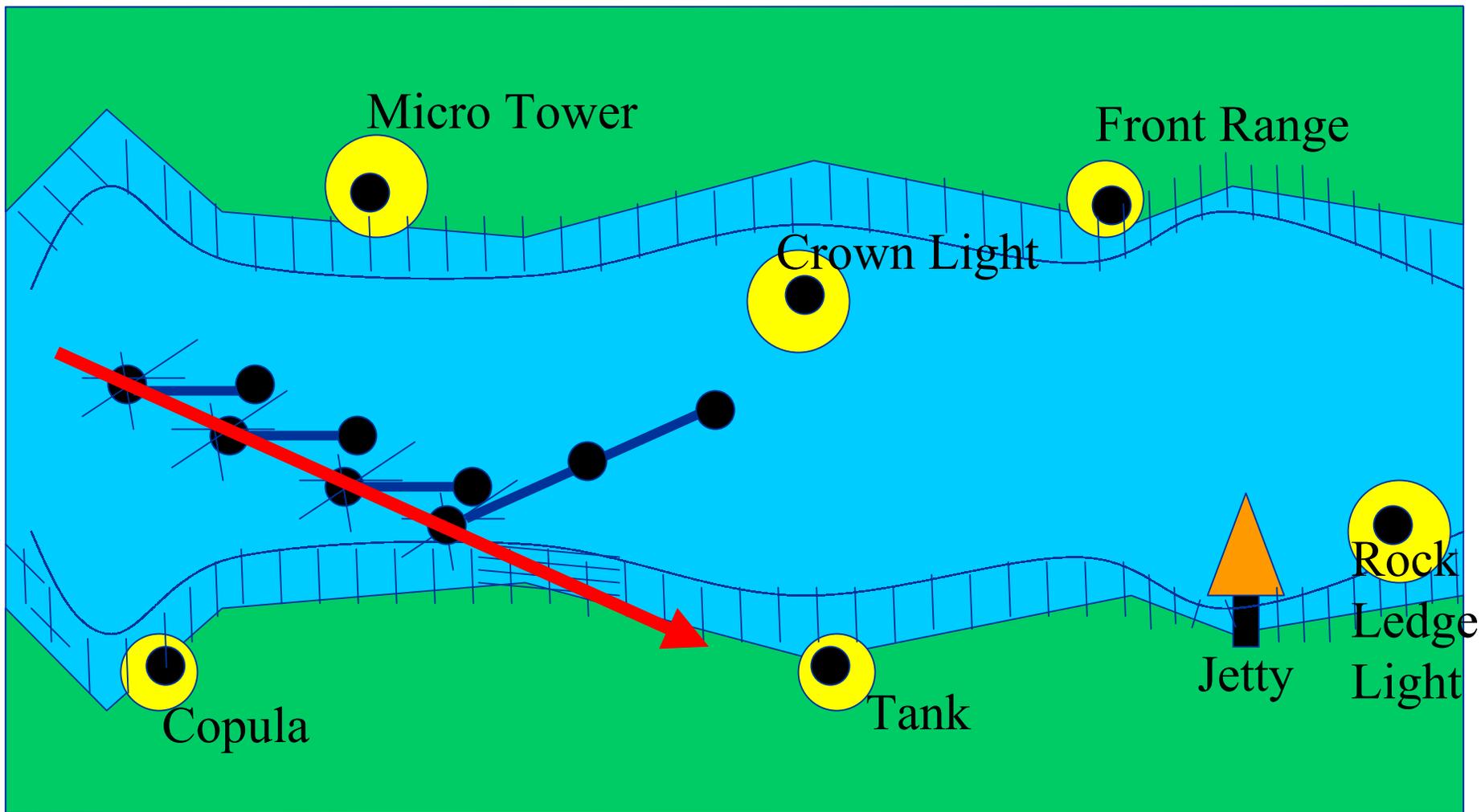
The Fix & The Dr... The Process



Soundings – ???



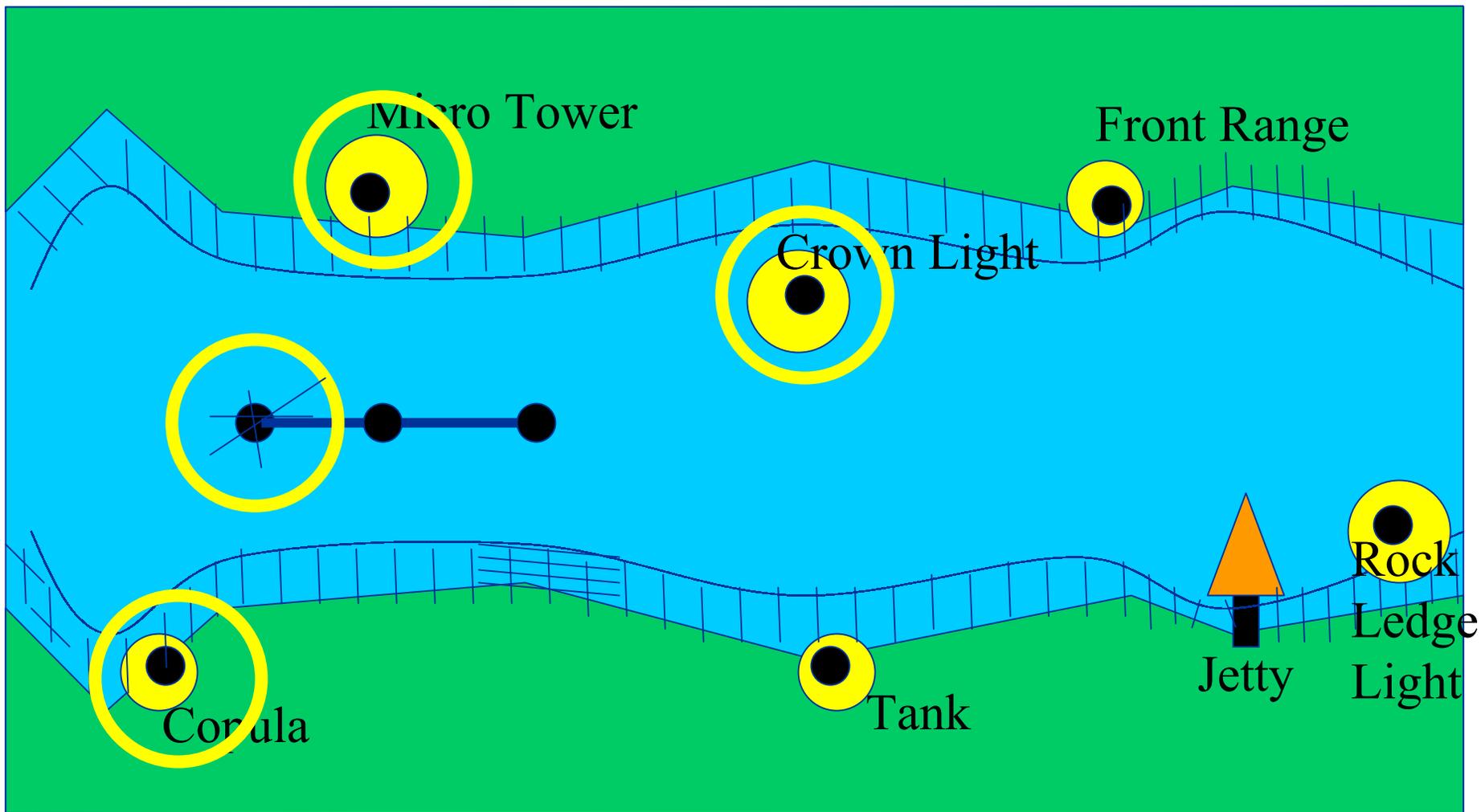
The Fix & The Dr... The Process





We Move...

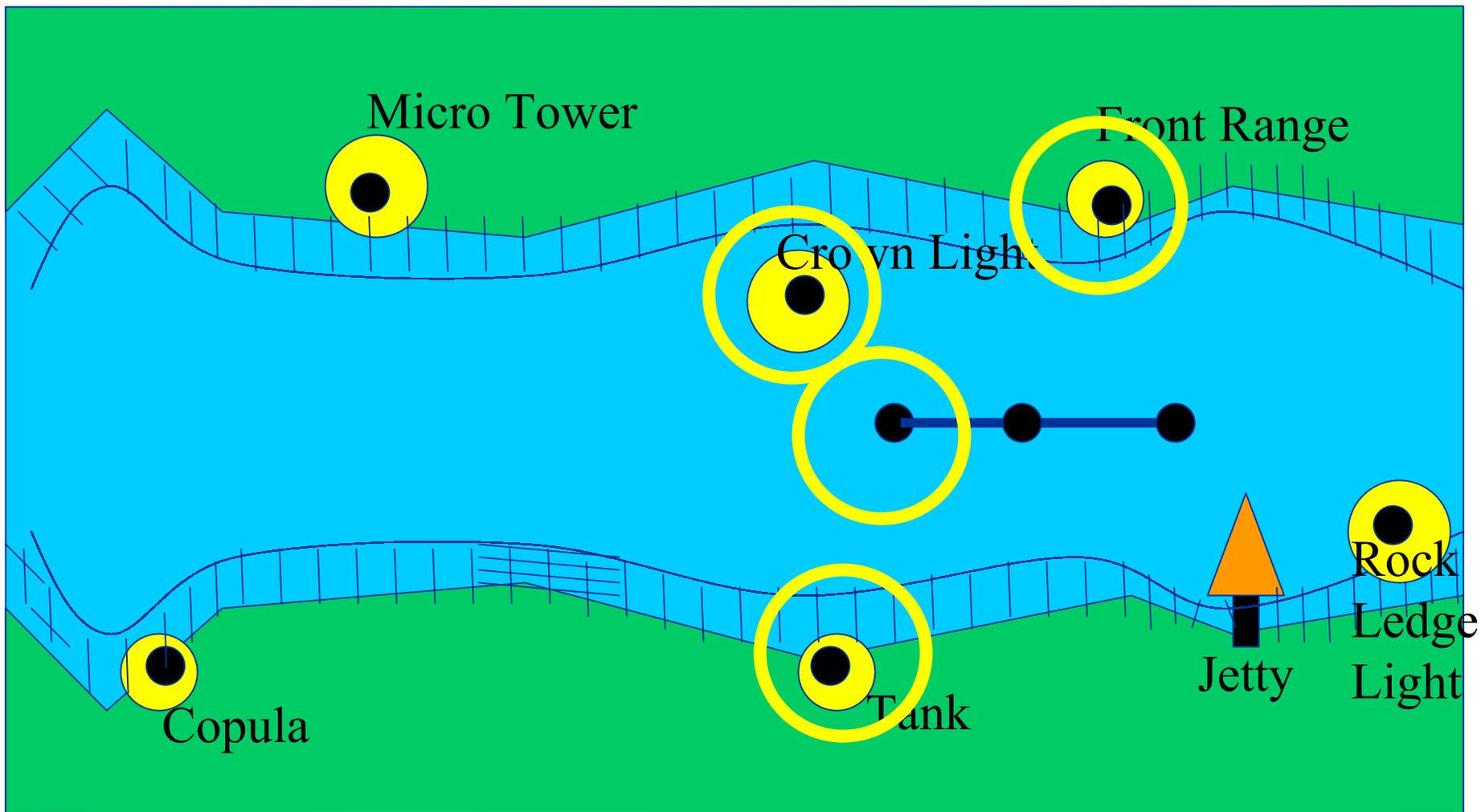
Gaining and Dropping Nav Aids





Skip Ahead...

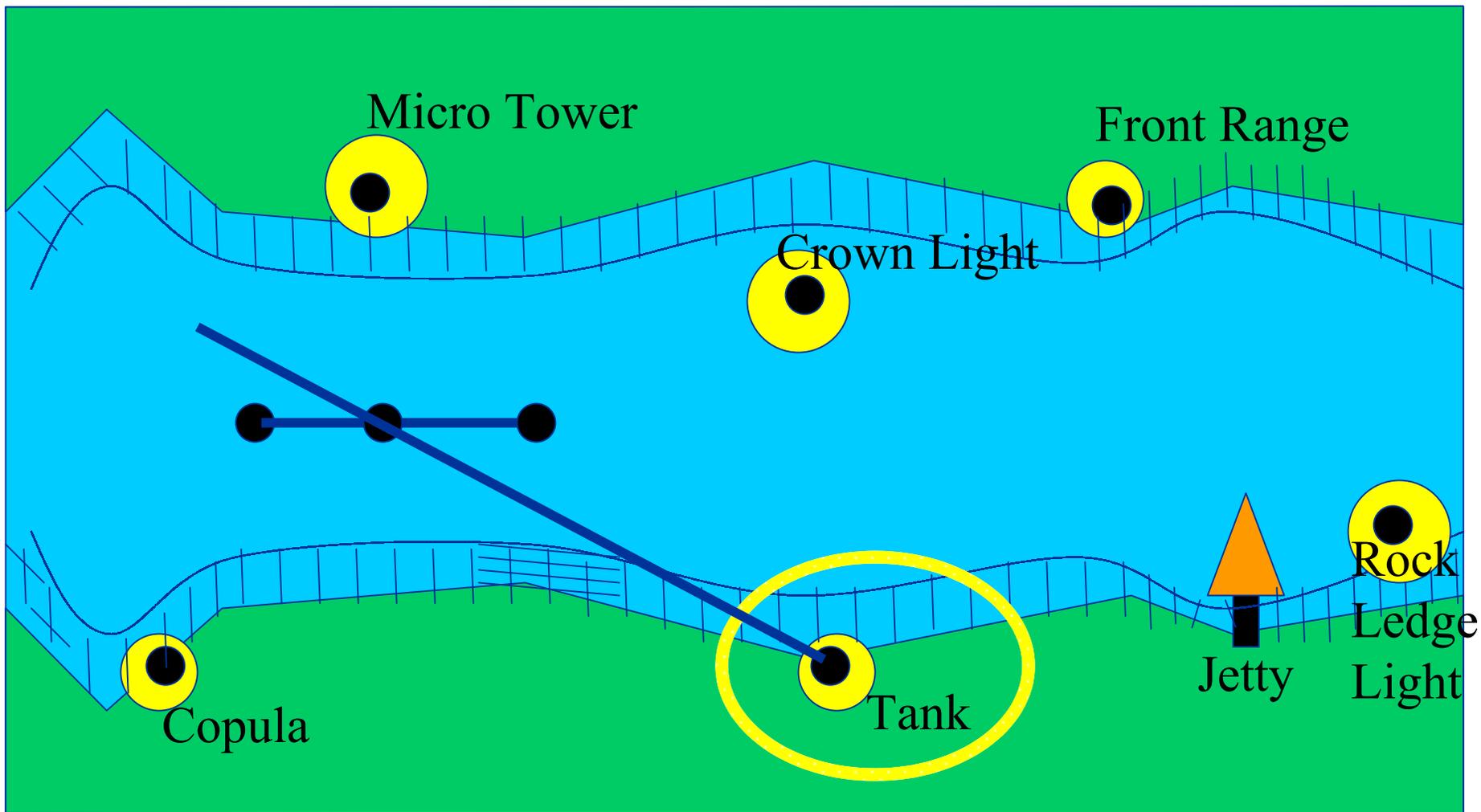
Gaining and Dropping Nav Aids





Gaining & Dropping Nav Aids...

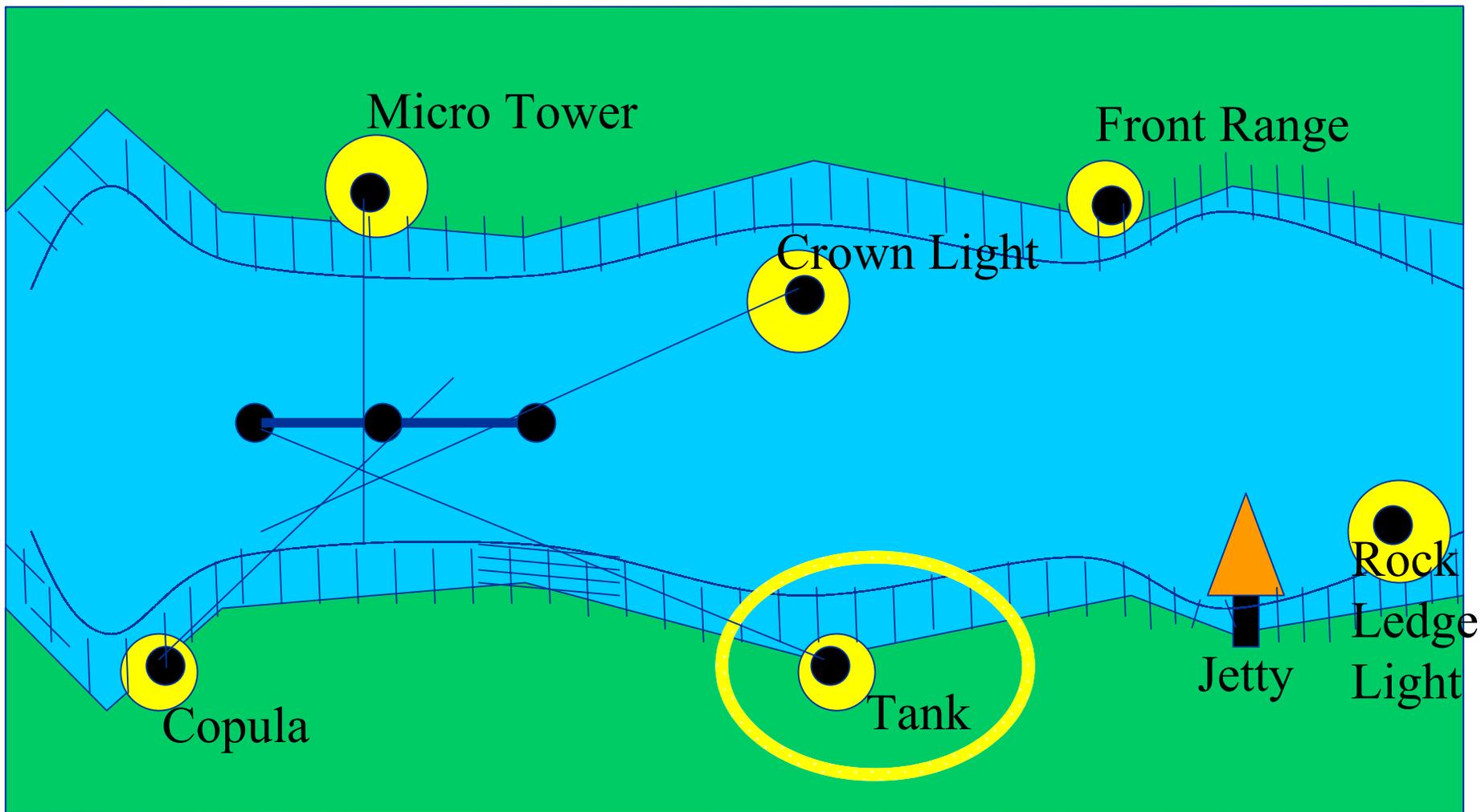
Step 1: Sight & Identify





Gaining & Dropping Nav Aids...

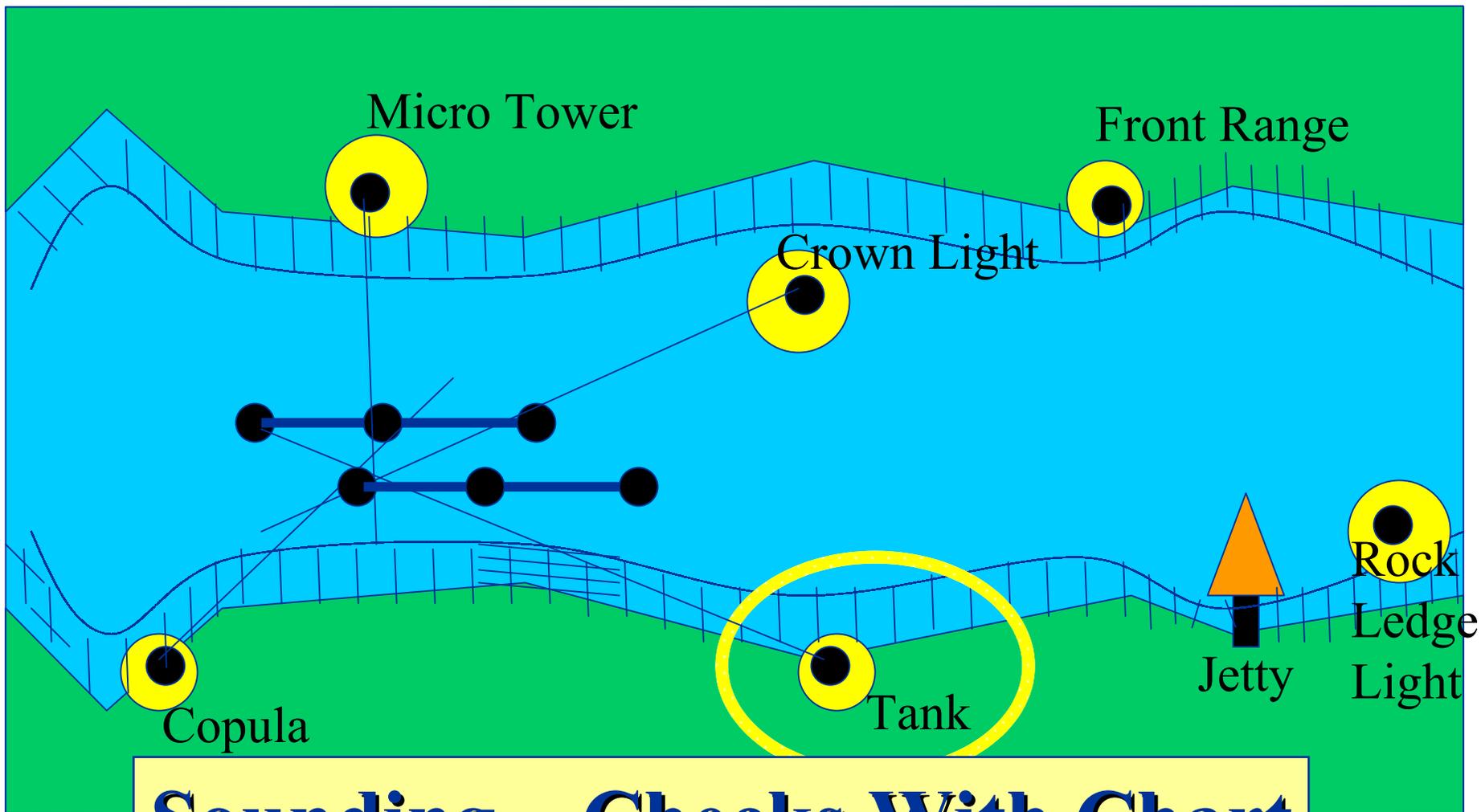
Step 2: Confirm With Fix





Gaining & Dropping Nav Aids...

Step 2: Confirm With Fix

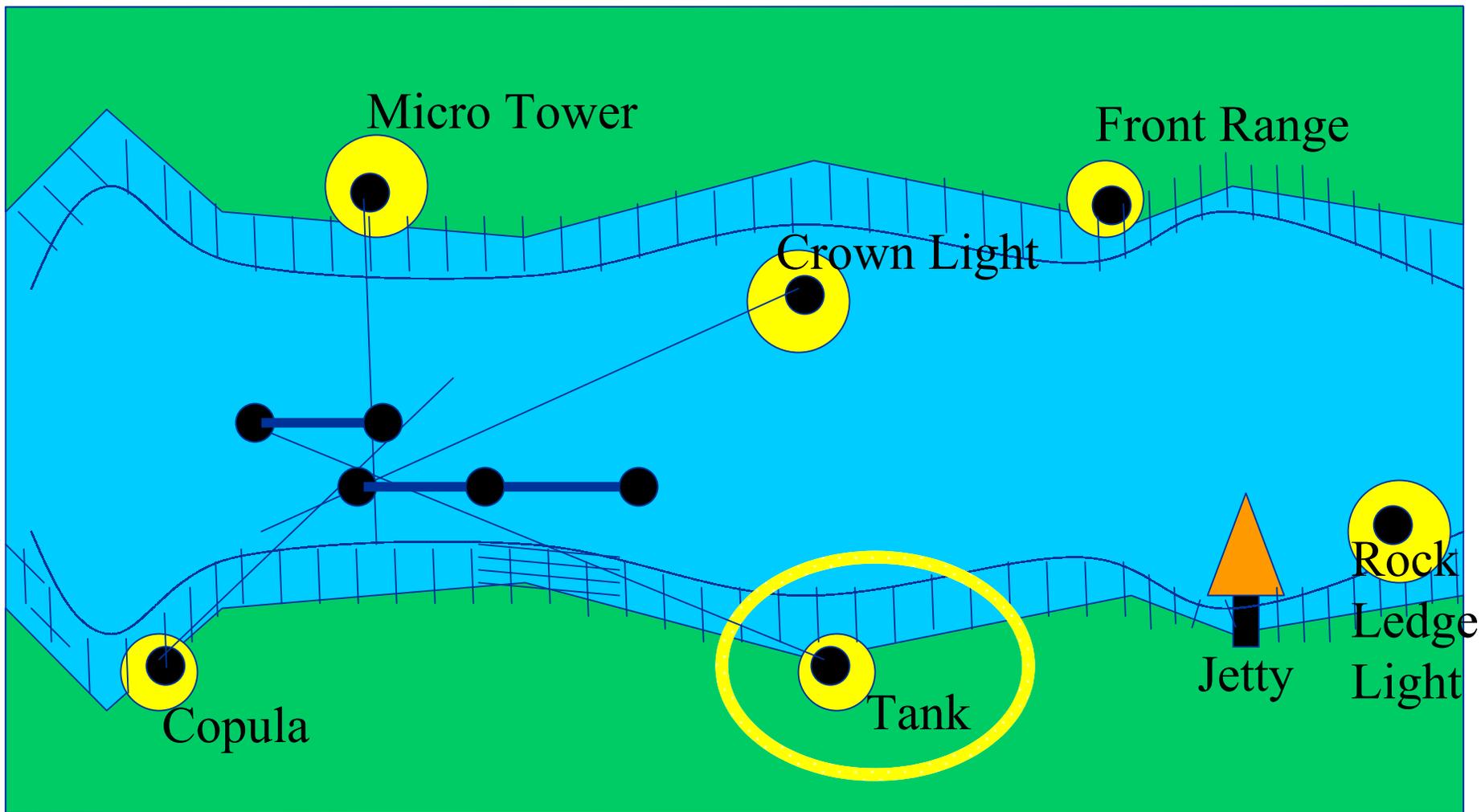


Sounding – Checks With Chart



Gaining & Dropping Nav Aids...

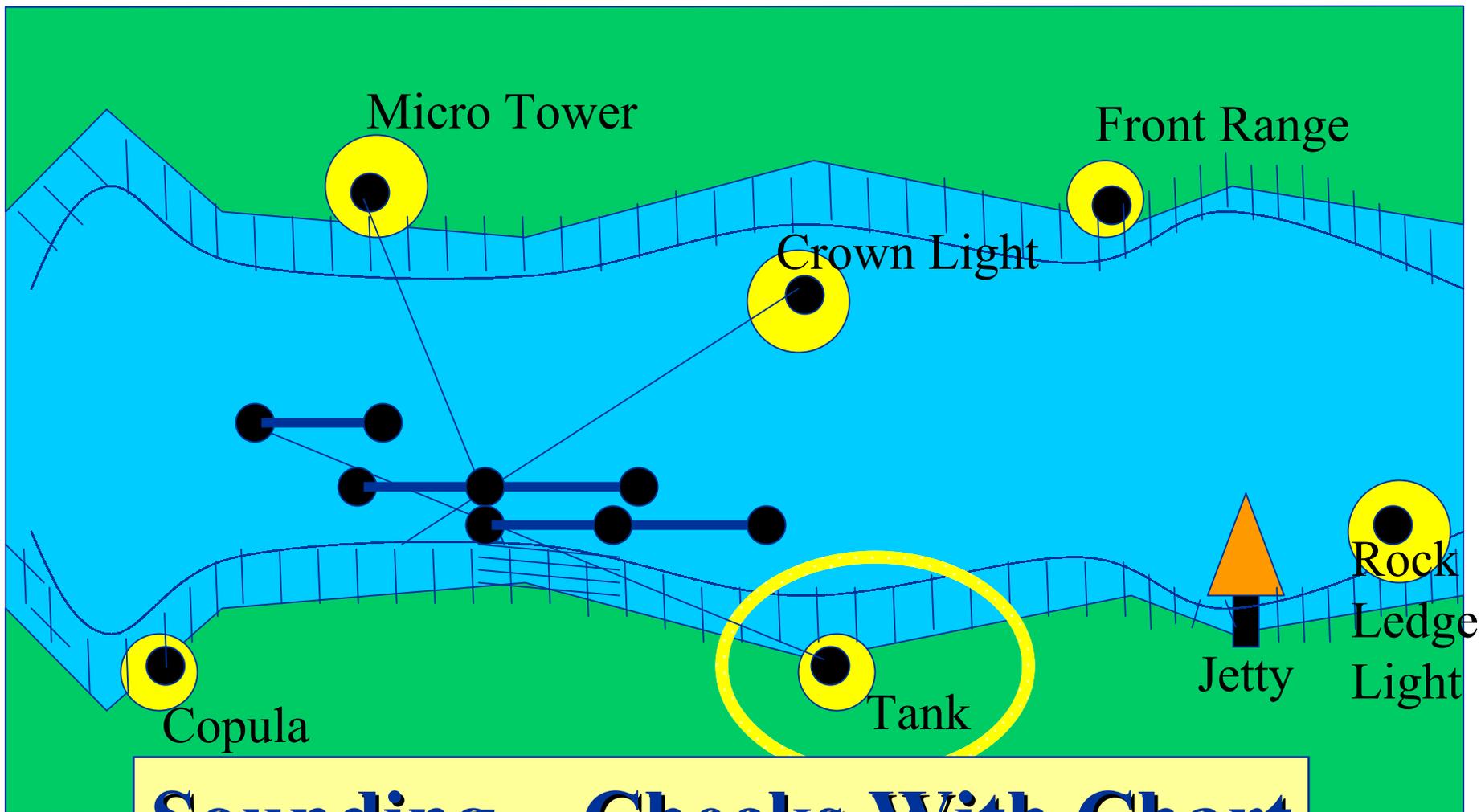
Step 2: Confirm With Fix





Gaining & Dropping Nav Aids...

Step 3: Gain & Drop



Sounding – Checks With Chart



The Bottom Line...

The DR is:

The Single Most Important Thing On the Chart



Course Overview...

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Homework

- Read and Study the Handout
- Take the Practice Nav Practical
 - Located on the CSNTS Website
www.usna.edu/SailingTeam/csnts/lectures.htm



Backup Slides



Running Fix

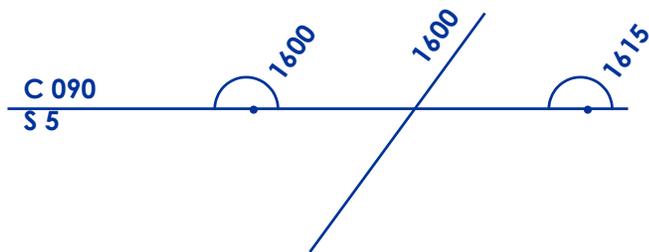
- Advancing LOP with no course change





Running Fix

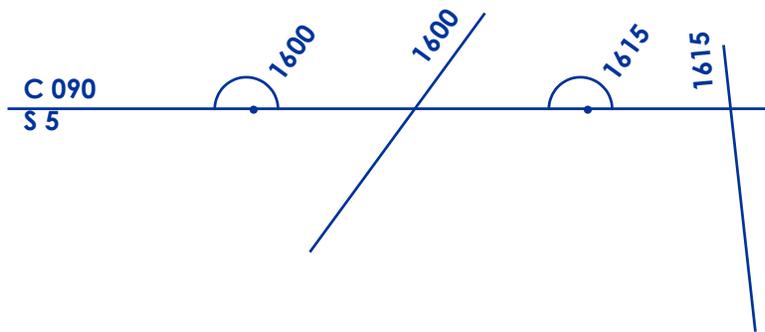
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Running Fix

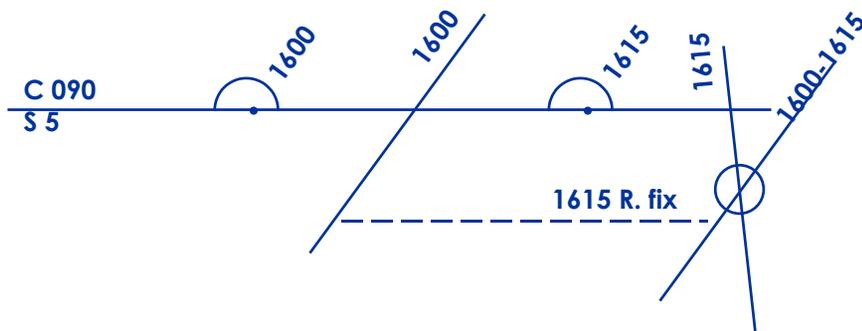
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Running Fix

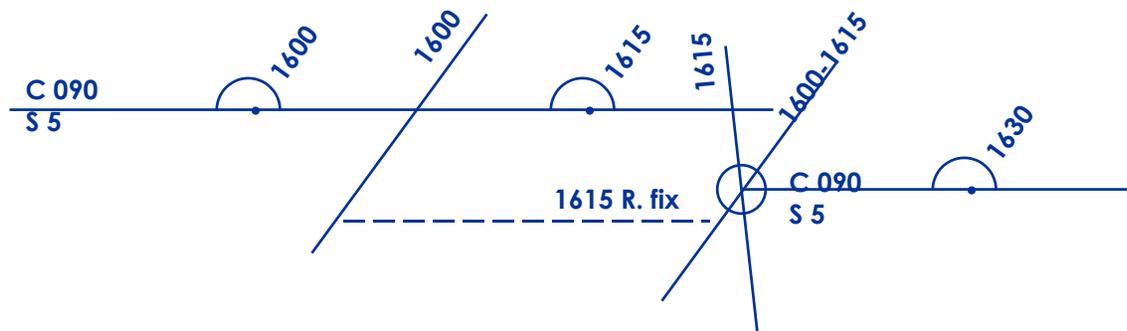
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Running Fix

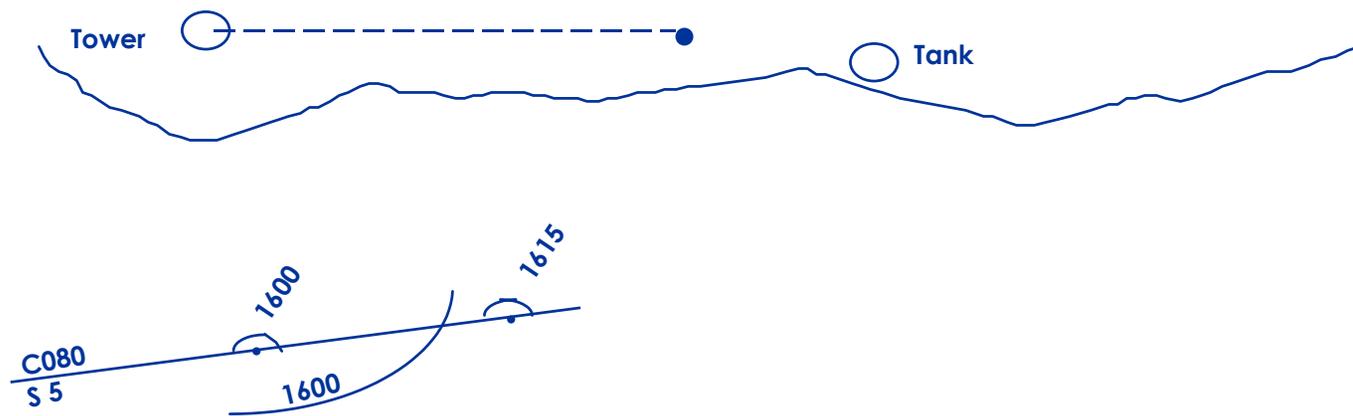
- Advancing LOP with no course change





Running Fix

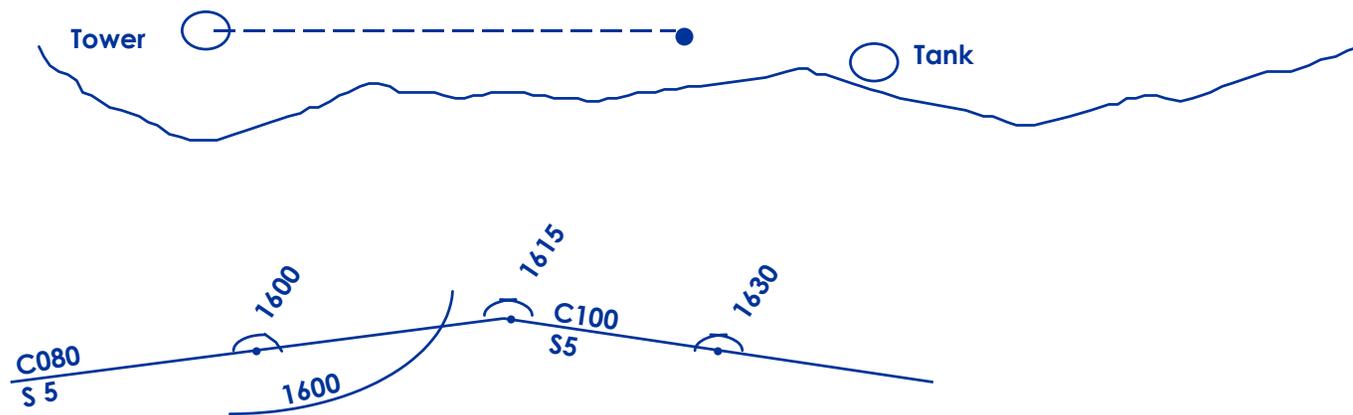
- Running Fix with course change & range LOP





Running Fix

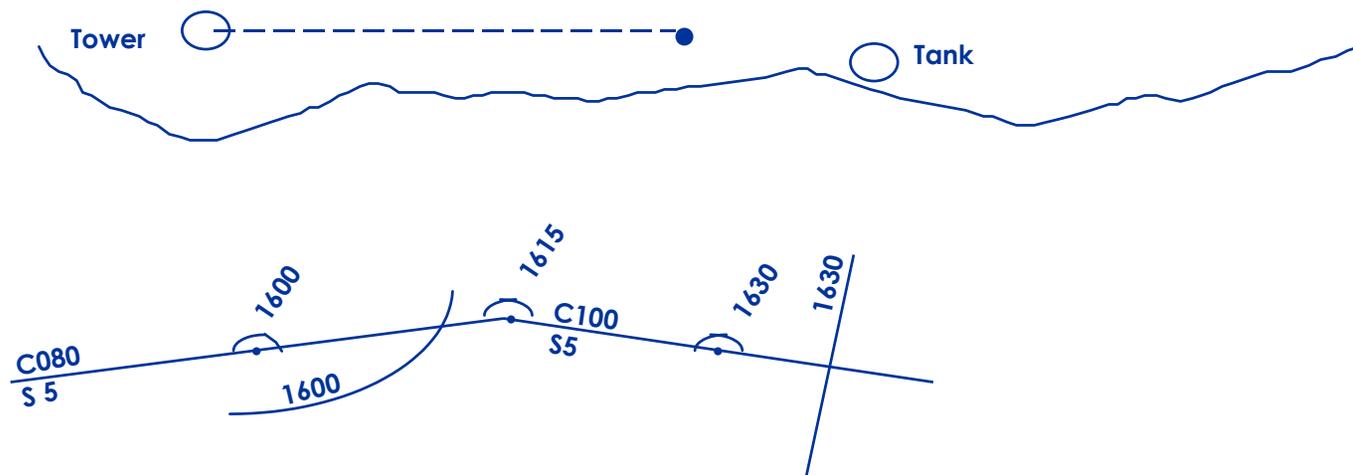
- Running Fix with course change & range LOP





Running Fix

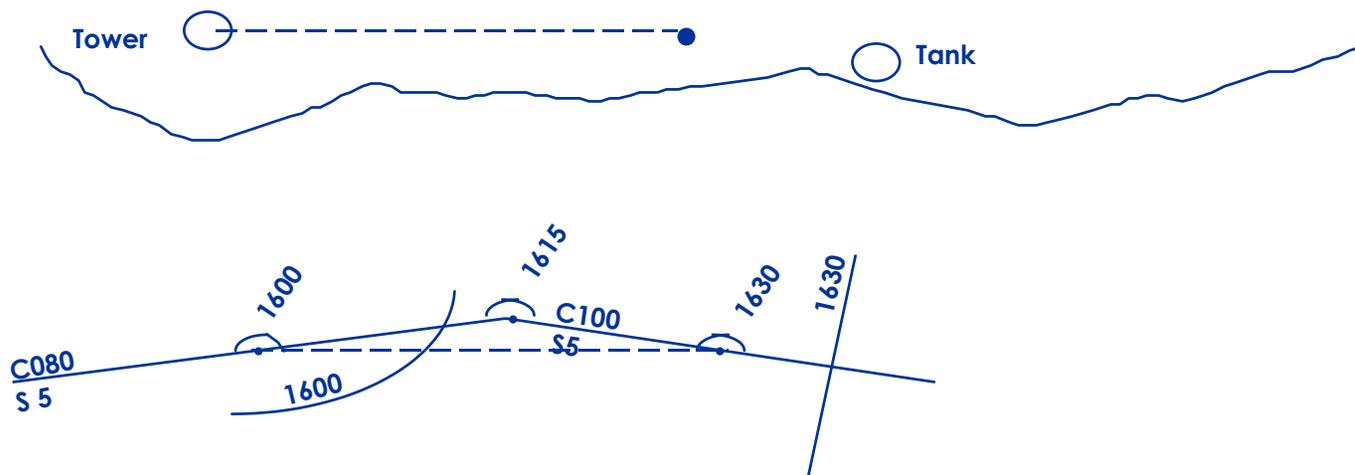
- Running Fix with course change & range LOP





Running Fix

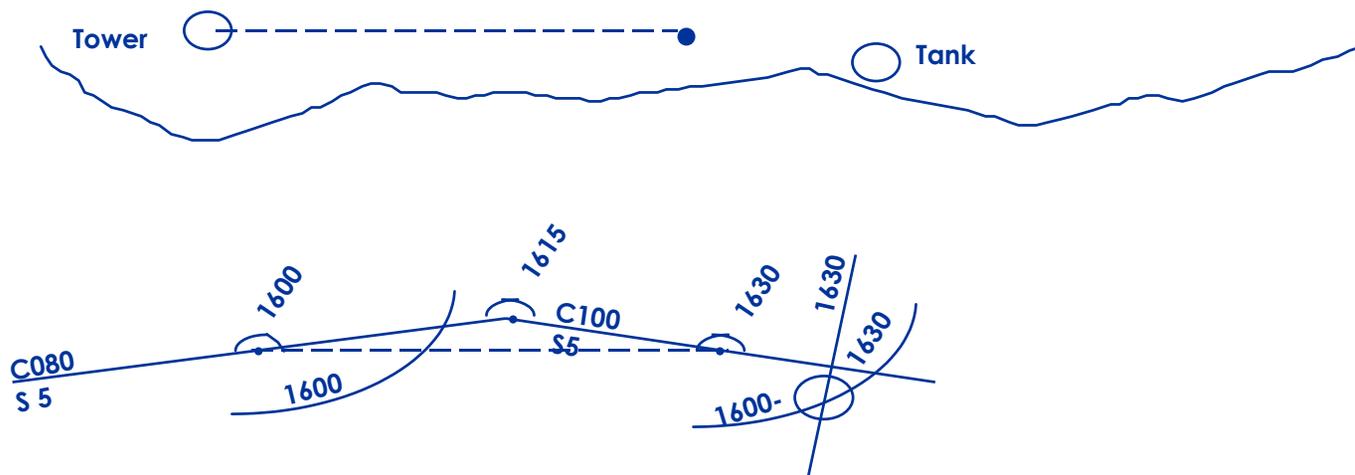
- Running Fix with course change & range LOP





Running Fix

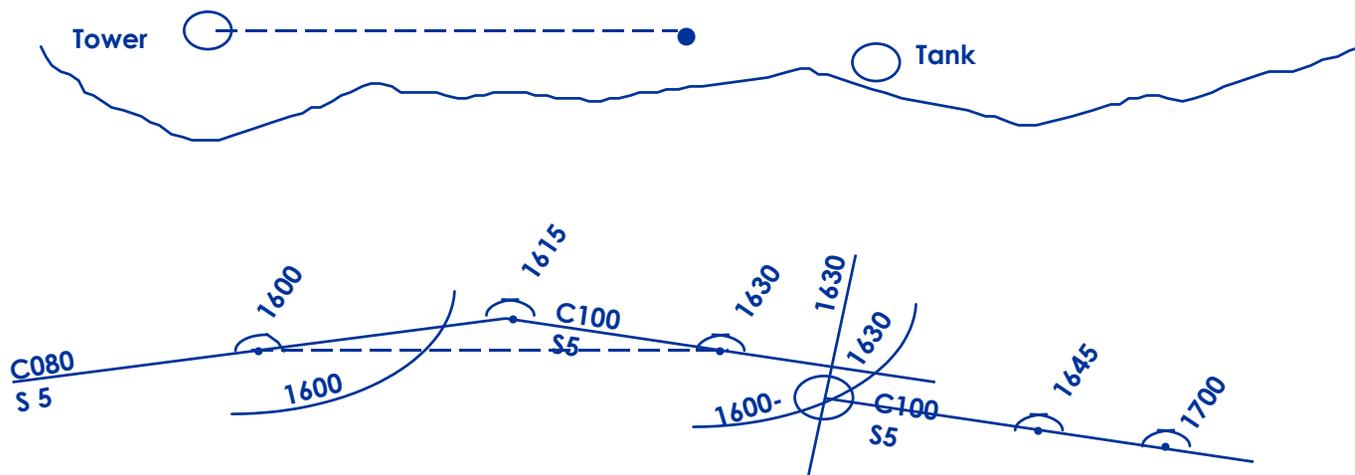
- Running Fix with course change & range LOP





Running Fix

- Running Fix with course change & range LOP





What Should You Remember About Reduced Visibility

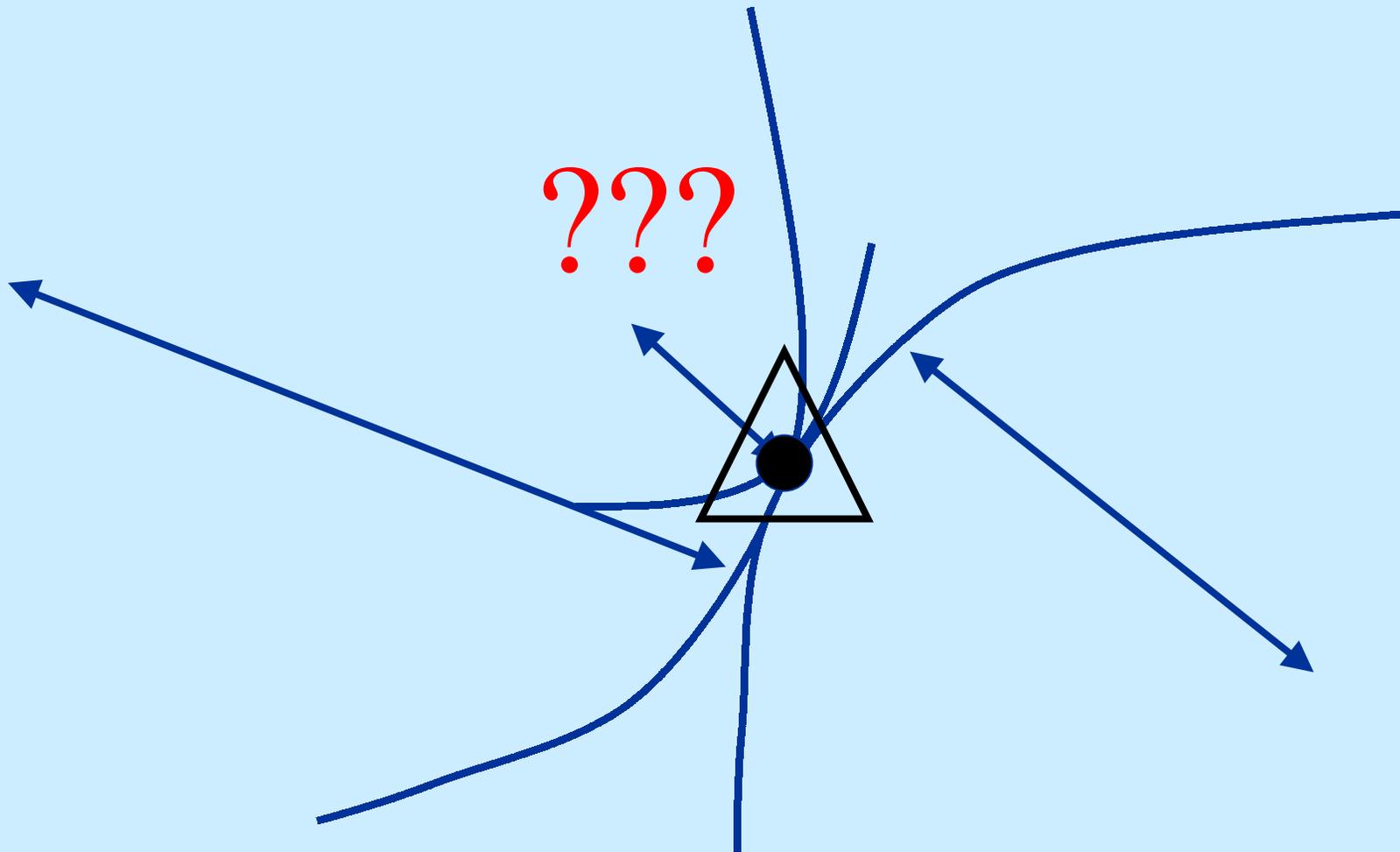
- Rotate and radiate first in clear weather
- Tune the radar and verify you can get radar returns from the coast and other vessels
- Have all hands memorize the pot settings!!!



What Do I Mean By Pot Settings???



???



www.usna.edu/SailingTeam/training.htm