

## Seafloor Search with Remote Sensing Instrumentation: Lessons Learned

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### **Idealized Search Technique**

- Preparation
  - Interviews
  - Historical Data
  - Operational Conditions
  - Search Planning
  - Resource Planning
  - Stage Equipment
  - Assemble/Interview Search Team and Crew
- Mobilization
- Execution
  - Nested Searches the collection of increasingly higher resolution data over smaller and smaller areas.
  - Processing real-time versus post-processing.
  - Multi-sensor Approach.
  - Prioritize Targets.
- ∠ Verification

... there is a disconnection between theory and real-world application.

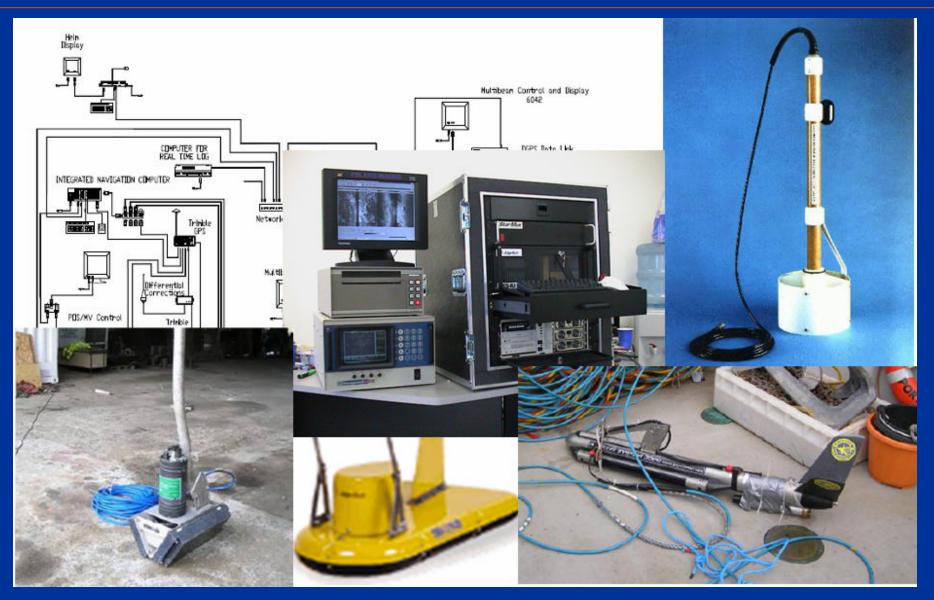


### **Stage Equipment**



### Learn Equipment Operation and Maintenance in Advance

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### **Include Sensor Limitations in Planning**

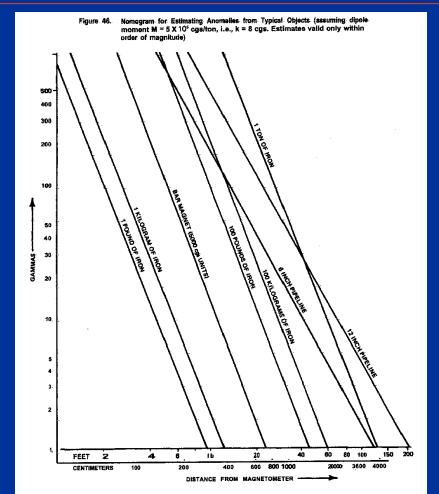
#### For 1 Kg. Iron

- 50 Gammas at 4 feet
- 10 Gammas at 8 feet

### For 100 Kg. Iron

- 50 Gammas at 24 feet
- 10 Gammas at 38 feet

Example: At a line spacing of 10 meters and a tow altitude of 10 meters, 100 lbs. of iron could have an anomaly < 5 gamma.



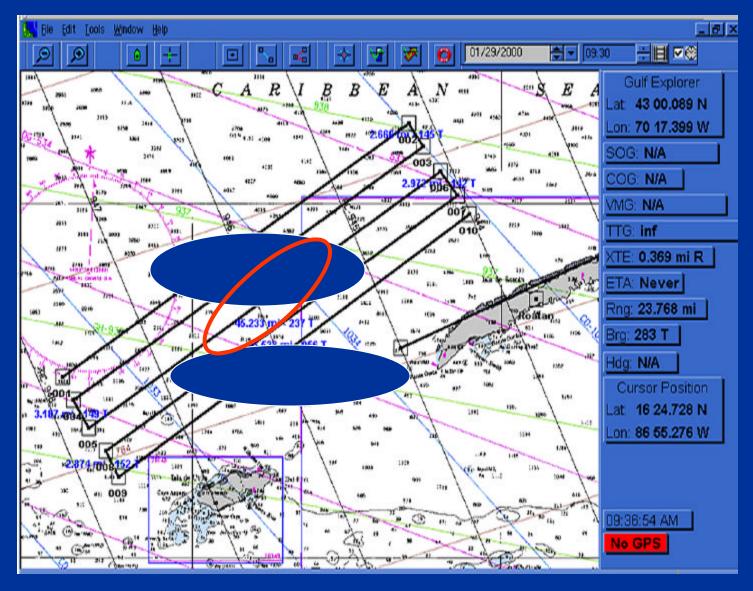
#### INSTRUCTIONS FOR USE:

To use the nomogram, select a given weight or type of object from among the diagonal labeled lines. Then choose a distance along the bottom line (abacksas) of the graph and follow a vertical line upwards from that distance until it intersects the diagonal line of the selected object. At that point, move horizontally to the left to a value on the vertical axis (ordinate) of the graph and read the intensity in gammas.

At a given distance, the intensity is proportional to the weight of the object. Therefore, for an object whose weight is not procisely that of the labeled lines, simply multiply the intensity in gammas by the ratio of the desired weight to the insbeled weight on the graph. If the distance desired does not appear on the graph, remember that for a typical object the intensity is inversely proportional to the cube of the distance sand for a long pipeline the intensity is inversely proportional to the square of the distance between magnetometer sancer and object. Due to the many uncertainties described herein, the estimates derived from this nonceram may be larger or sameler by a factor of 2 to 5 or perhaps more.

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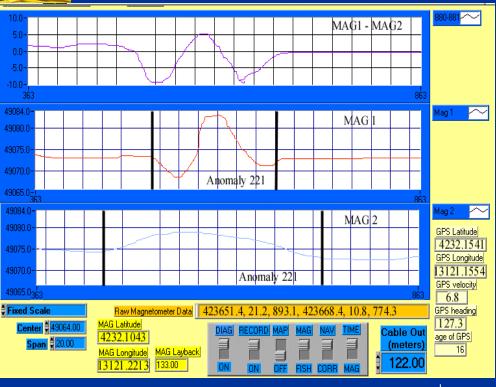
# Plan Search and Evaluate Constraints in Advance



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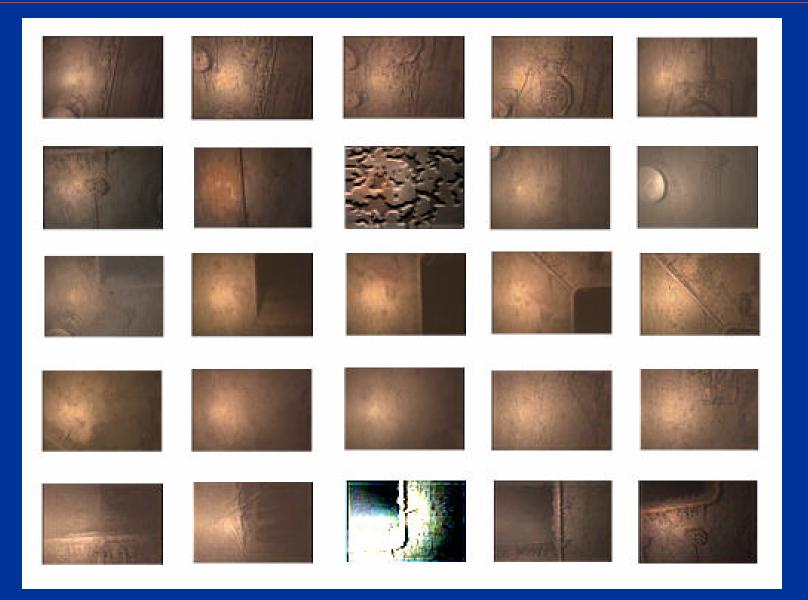
### **Leverage Concurrent Data Collection**







### Verify Data Quality in Real Time



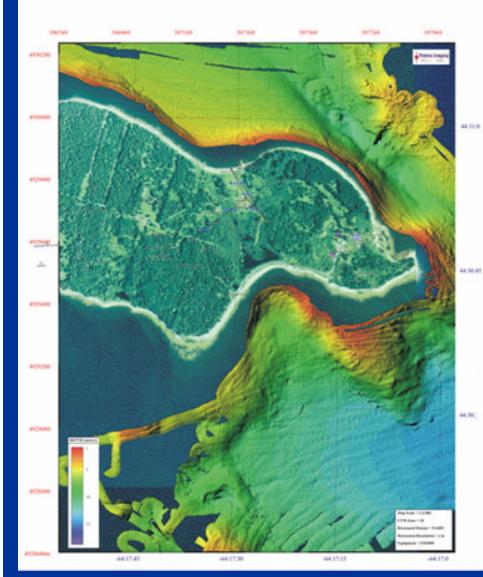
### Verify Coverage in Real TIme

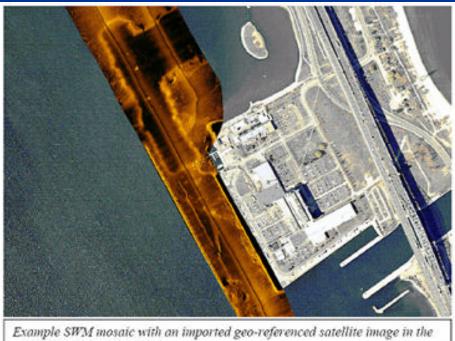
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### **Exploit multi-sensor data products**





Example SWM mosaic with an imported geo-referenced satellite image in the background as a base map. Courtey stores Kand.

Area #2 View From Northeast X>100500 to -99500 Y:69000 to 70000



### **Prepare for the Worst Case.**



## Top Ten Tips for Executing a Successful Seafloor Search

- 1. Prepare for the worst case scenario.
- 2. Never delete data.
- 3. Spares, especially spare cables.
- 4. Stage search and test equipment and test before using.
- 5. Learn all system functions before deployment.
- 6. Use a known target to calibrate the systems on the boat each day of the search.
- 7. Record plenty of notes daily. Use a chart as a working incident/target log.
- 8. Post-process data daily. Verify quality and coverage.
- 9. Leverage concurrent data collection and exploit multi-sensor data products.
- 10. Be prepared to cancel operations.



### **Questions?**