

MMA Navigation Series – Detailed Curriculum

This expanded 4-page curriculum proposal provides detailed structure and activities for the Navigation Series envisioned by Lt. Jordan. It builds progressively from timekeeping fundamentals through mapping, AI-assisted navigation, global radio, and historical fieldwork.

Class 1 – Time & Position Fundamentals

Objective: Understand precise time and degraded GPS navigation.

- GPSNTP tested ARRL class (1 hour). Cadets see how GPS signals can discipline local clocks.
- Seat-of-the-pants game: Android/iOS 'two-integer' navigation (North/South and East/West deltas only).
- Cadets walk a 30-ft circle using crude 5-ft sticky smoothing data.
- Prize incentive: jar of pennies; find two with matching dates/mint marks.

Takeaway: Contrast between precision vs approximation. Feel drift and teamwork under degraded accuracy.

Class 2 – Mapping & Motion

Objective: *Visualize collective paths through coordinate logging.*

- Cadet pairs stationed at football field corners.
- Record timestamp + integer positions while walking criss-cross paths.
- Overlay paths in color to create large-scale collective artwork.

Takeaway: Data logging, coordinate transformations, emergence of big pictures from small errors.

Class 3 – ChatGPT-as-Navigator

Objective: *Learn to use AI as a navigation assistant.*

- Pose a navigation problem: e.g., find the point 266,708 ft north and 12,345 ft west of the MMA wind turbine.
- Convert feet into latitude/longitude deltas with ChatGPT's help.
- Export to KMZ/KML, open in Google Earth.
- Variants: White House, Empire State Building, nautical landmarks.

Takeaway: Cadets learn to phrase questions precisely, harnessing AI for problem-solving without losing judgment.

Class 4 – Radio Navigation & World Signals

Objective: *Explore the global reach of low-power radio signals.*

- Build a \$4 Pico WSPR beacon (1/100 W, 2×AA batteries).
- Upload signals to PSKReporter; observe global reception.
- Explore KIWI SDR network; listen to WWV time signals.

Takeaway: Whispering across the globe. Learn about propagation, SNR, and real-world signal reach.

Class 5 – History, Fieldwork, and the Future

Objective: *Connect past innovations with today's AI future.*

- Field trip to Marion: see Marconi's 300 kW spark station, build a coherer with piezo spark.
- Field trip to Chatham Marconi: learn about the world's greatest coastal station.
- Wrap-up session: LLMs in navigation – cadets reflect on their experience using ChatGPT.

Takeaway: Cadets recognize the lineage from Marconi to WSPR to AI copilots, and their role in the continuum.