# KAYAK NAV SYSTEM REQUIREMENTS:

## System Requirements (Functional and User):

**Navigation:**

- Dedicated Navigational Computer:
  - Inertial Measurement Unit (IMU): 3-axis Compass, 3-axis Accelerometer, 3-axis Gyroscope, and on-board Real-Time Clock. Provides heading and distance information, which can be used to compare to GPS for confirm or correction.
  - Global Positioning System (GPS): Multi-satellite GPS receiver module. Provides fairly accurate info (+/- 3m or ~10 feet) regarding one's physical location on earth at a specific point in time.
  - System memory to store real-time navigational data, Waypoints, and courses.

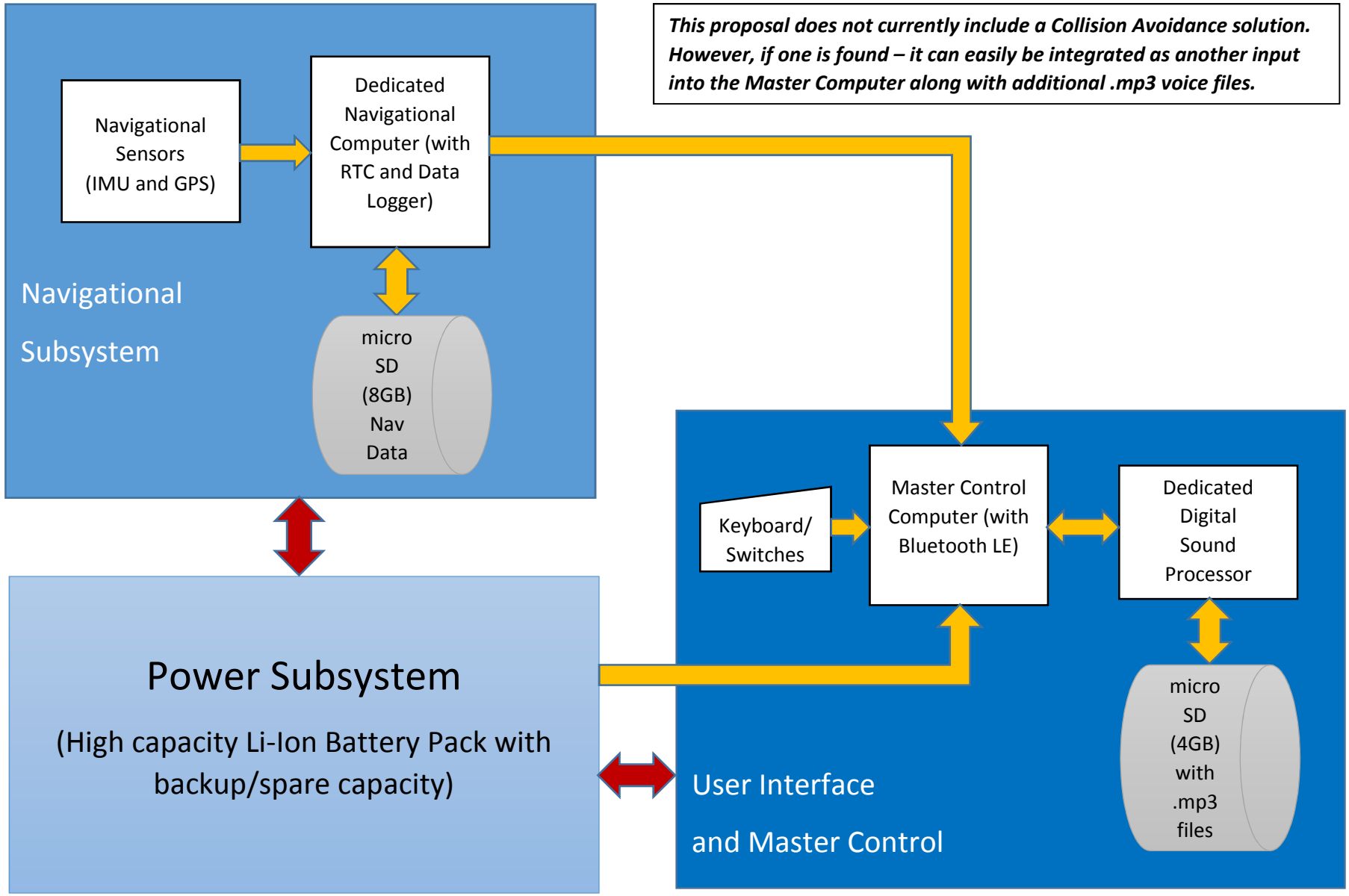
**User/System Communication:**

- Master Computer (with Bluetooth LE)
- On/Off Power/Reset Switch(es)
- 3 x 4 Keypad: Set/Add/Delete Waypoint(s):
  - Via Keypad Input (Long./Lat.)
  - Via current GPS location
- Create/Save/Delete/Access and begin a Course or Route:
  - Via Keypad Input
  - Via GPS – route/course/waypoints marked while being performed, and saved as a course.
- Dedicated Sound Processor:
  - System communicates via speech to user over Bluetooth:
    - While Programming/During Commands: System will walk user through steps to help ensure proper operation
    - During active navigation: Provide Speed, Heading, Course Correction Instructions, Waypoints (and proximity), distance completed, distance remaining, rowing time, estimated time remaining, etc., as well as system OK reports.
    - ***Collision avoidance system & warnings: The need is clear, however solution has not been determined.***

**Power (Source(s) and Consumption):**

- Hi-capacity (> ~22000mAh)
- Light weight (Li-ion)

# PROPOSED KAYAKNAV ARCHITECTURE (HIGH-LEVEL): CUSTOM HW AND SW SOLUTION




***This proposal does not currently include a Collision Avoidance solution. However, if one is found – it can easily be integrated as another input into the Master Computer along with additional .mp3 voice files.***

# PROPOSED KAYAKNAV ARCHITECTURE (HIGH-LEVEL): SMARTPHONE AND CUSTOM SOFTWARE SOLUTION

## Option #2:

Develop custom software which can be used on existing Android, Windows or iOS smartphones, enabling a visually impaired person to navigate, set waypoints, and set, plan, save and run through one or more preset courses.

***This proposal does not include a Collision Avoidance solution. Such a system would need to be compatible with integration into the smartphone solution (i.e. smartphone HW and SW), once available.***


Smartphones are equipped with the necessary navigational sensors (GPS, compass, gyros, and accelerometers) and base software to drive and access these sensors.

Smartphones have Bluetooth capability and Digital Signal Processors (DSPs), built right in.

Smartphones have good battery life and a spare battery pack can be used to ensure no loss of power.

Smartphones can make and accept phone calls – and can also store locally and send real-time data to a cloud database and application.

May be possible to adapt existing smartphone applications like Spyglass or MotionX-GPS (that allow for the setting of courses and waypoints) for use by the visually impaired by providing talking/verbal info instead of visual data (like a map).

Not a custom hardware solution means wider availability.