Hardware/software co-design

Figure out what to do
System definition $\rightarrow$ capabilities & requirements
System $\rightarrow$ Software
  $\begin{align*}
  \text{Electrical Hardware} & \quad \text{Mechanical Hardware} \\
  \text{Standards} & \quad \text{Box: Instructions, charger, carbide}
  \end{align*}$
  \text{Marketing, supply chain, Mfg}

Design & requirements phases are very small parts of the life cycle.

Example: Automobile designed in 3 years, can last 20 years
1.0 Requirement: map the water so that with GPS you can identify the depth of the water.

1.1 Requirement: the measurement will also record the current tide levels.

1.2 Requirement: The location via GPS will be recorded every 1 second.

1.3 Req't: The embedded device will be 3 x 3 x 3 meters and be waterproof.

1.4 Req't: The device shall need 12V or less and draw no more than 1A.

1.5 Req't: The depth shall be measured with an OTS fish/depth finder every 1 second.

1.6 Req't: The GPS & sonar shall communicate via RS-232C at 4800 bps.

1.7 Req't: The device shall record the wind speed & direction.

1.8 Req't: The device shall collect a minimum of 512 K bytes of DATA Flash.
Architecture design
Flow chart → detailed design

Testing
black box
white box
Acquire Objectives
Acquire Constraints
Acquire Alternatives

Evaluate product
Plan the next cycle
Continue or stop

Evaluate the risk using prototyping
Evaluate the risk aversion approach.
Build the product of the cycle