

# ***Ipod Holder***

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## ***Project Design Specification***

### **Problem statement/Function:**

Our client, Mr. Jonathan Rubin, is affected by multiple sclerosis (MS) who regularly commutes by car. Because of his condition, he has to maintain his focus while driving. This is especially crucial as he has to multi-task by navigating and using his iPhone 3GS simultaneously. Currently, he has the iPhone mounted on the steering wheel. However, this creates a problem every time the steering wheel is turned because the iPhone turns with it. A device to securely mount his iPhone to the steering wheel and allow it to remain upright and independent of the steering wheel movement is required. This will help facilitate his ability to multi-task safely while driving. It should be versatile enough to incorporate other models of the iPhone should he decide to change to a newer model.

### **Client requirements:**

- Securely attach the iPhone to the steering wheel
  - o Be at a convenient angle and elevation for him so he does not get disoriented
  - o Be at a suitable distance for him to access the iPhone
- Maintain the iPhone at a vertical or horizontal position regardless of the steering wheel position
  - o Position of the iPhone chosen by him
- Allow complete access to the iPhone and the steering wheel while mounted
- Allow charging of the iPhone if required
- Aesthetically pleasing
- Can accommodate a variety of iPhone models
- Can accommodate iPhone protective covers
- Storable under normal car conditions
  - o Temperature between 0°C and 30°C
  - o Humidity between 50% and 75%
- Dimensions not exceeding 15cm x 10cm x 1.5cm
- Weight under 150g
- Under \$300 budget

## **1. Physical and Operational Characteristics**

*a. Performance Requirements:* The iPhone holder must hold the device in position on the steering wheel and should be able to be spun freely by the driver if wanted. While in operation, the

device should be able to stay in the desired horizontal/vertical position regardless of steering wheel motion or positioning. During use, the electronic device being held should not rotate more than 20° in either direction about the axis coming out of the steering wheel while the steering wheel is being turned. The mechanism for attaching the electronic device to the design must be able to last as long as the rest of the parts.

b. *Safety*: The product should not pose a safety risk to the client and potentially other drivers. While it is useful to have maps, a phone, etc. a short distance away while driving, the device should not be a distraction to drivers. A warning should be placed on the device to ensure that drivers focus on the road and do not operate the device while the car is in motion.

c. *Accuracy and Reliability*: The model should successfully stay in place and in the right orientation on the steering wheel as the driver turns the wheel. The device should not be significantly larger than 11.52 x 5.86 cm, which is the size of the iPhone and similar products. The model should not protrude out from the steering wheel such that the driver feels that it is too close to them. The client wishes to be able to switch the orientation of the iPhone from vertical to horizontal and have each orientation stay stable as he turns the wheel. The adhesive used to hold the model on the wheel should be strong but removable should the client need to take it off. The client wants a thin adhesive rather than a foam double side tape. The model should ultimately be function for various models of iPhones and potentially other brands of smart phones as well.

d. *Life in Service*: The model should not break while the driver is operating it, nor should it fall off the steering wheel as the driver tries to touch the device. The model should be able to withstand all temperature conditions in the car, such as extreme cold during the winter and heat in the summer. The adhesive should not change in such conditions, nor should any parts freeze up and stop working. The holder must be able to withstand at least one year's worth of driving or 50,000km of driving distance, the bearings and rotating mechanism should handle hundreds of possible turns during every use.

e. *Shelf Life*: Because there are not biodegradable parts in the model, it should theoretically have an infinite shelf life. Unless a type of double stick tape is used, in which case the shelf life will depend on the shelf life of the tape. Once installed on the steering wheel, the device should last at least 6 months of driving under normal conditions or until the client decides to remove it.

f. *Operating Environment*: The device will be used on the steering wheel of a car. Therefore, it must be able to handle the range of temperatures found inside a car during any season. However, if the model can prove to be more versatile, it can work for other vehicles such as bikes or scooters provided the operating conditions are similar to what one would find inside of a car. Adapting the design to outside environments is an option we can look into later on.

g. *Ergonomics*: The device holder should allow for easy access to the entire touch screen of any iPhone and should allow for headphone usage. It should also allow the device to be plugged into power if desired and designed in a way that ensures the cords do not pose a safety issue. The devices should be held at an angle that allows the entire screen to be viewed easily. The holder must not protrude too far from the steering wheel; this ensures that it won't catch on the user's clothes or other items. It

should be stable enough that the operator can use the dialpad/buttons/touch screen without difficulty. Finally, the holder should allow for devices to be held stationary both vertically or horizontally.

*h. Size:* The base for the device should be no more than 5 cm wide and 8 cm tall. If the holder is detachable from the base, it should be no more than 1 cm thicker on any side than any device it's currently holding. The entire device including the electronic device being held, should not extend more than 4 cm from the steering wheel's center.

*i. Weight:* The total weight of the holder should be no more than 3 pounds. If there's a detachable holder piece for the electronic device, it should weigh no more than the device it's attached to.

*j. Materials:* Plastics and fibers should be all that's used in the main part of the holder. Only the metal necessary for bearings or small springs should be used. Glass, sharp metals, and toxic substances shouldn't be used. In addition, the materials used should be able to withstand the temperature range found in cars in North America.

*k. Aesthetics, Appearance, and Finish:* The final design should look durable and professional. Any plastic used should be all one color and have a glossy finish. It should resemble the iPhone it's designed to hold—black, curvy, slim, and simplistic. It should be smooth wherever it's intended to be touched.

## **2. Production Characteristics**

*a. Quantity:* At the present time our client has only asked for one iPhone holder, but in the future he wants to be able to market his idea; ease of production will come into effect at that time.

*b. Target Product Cost:* The manufacturing cost of our product will end up around \$20-\$25. Compared to the average cost of a stationary iPhone holder (\$14.97) our product will be about \$5-\$10 dollars more expensive which will be worth the added advantage of ease of use.

## **3. Miscellaneous**

*a. Standards and Specifications:* This model will not require any approval by the FDA because this product is not a medical device, food related, or a radiation emitting device. Only standards may include Wisconsin state law prohibiting any texting while driving or "being so engaged or occupied as to interfere with the safe driving of that vehicle." Therefore, we may be required to put a disclaimer on the packaging of the product and a warning label.

*b. Customer:* Our client has multiple sclerosis (MS) that causes easy disorientation by turning his head too much. The product must be able to be mounted onto the steering wheel of a car and gyrate as the wheel is turned, keeping the iPhone upright. Client wants a smooth movement rather than a wobble when the iPhone rotates.

c. *Patient-related concerns*: This product will not be in contact with any patient or research subjects.

d. *Competition*: There is no present model for a gyrating-iPhone/ iPod holder. Various stationary iPhone holders range from \$5-\$30 and can have an adjustable neck to move as you need. There was a stationary iPhone holder that could have been attached to the steering wheel of a car without being clunky and in the way.