To: George Lamont
From: Rupakeerthana Vemulapalli
Subject: Update: Progress of 'Automatic volume control' (AVC) project

Introduction

This memo provides a detailed update regarding the Automatic volume control (AVC) project that our Concurrent engineering team is working on since the project launch: October 3rd 2018. Our AVC project targets users who drive/have cars. By reducing the risk of fatalities from distracted driving and adding a sleek and user-friendly interface, our AVC uses complex algorithms and product design, to adjust the volume on audio devices in cars, hence preserving the user's audibility of speech. Being the first to introduce this technology into the market, our company is expected to generate over $50 million in annual profits.

Referring to *Figure 1* below, 2 weeks preceding the launch, we have successfully surpassed **Phase 1: Planning** and are currently in Week 3- **Phase 2: Design.**
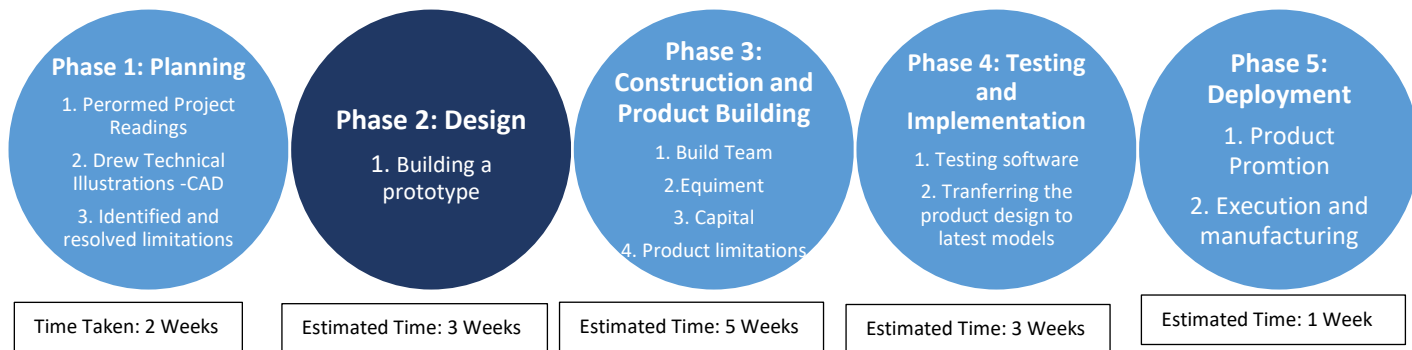

Figure 1: Visual Timeline indicating our key milestones for the project as well as our current status update

Work Completed

Synopsis: Despite all the attempts that our engineers have been making to complete the project, we are in need of an extension in time and budget in order to support project advancement

R &D team
- Performed accurate research regarding the circuit design and the 'control parts component layout' of the AVC.

Solution Design Team
- Successfully identified a method that consistently amplifies the signals in the AVC without distorting the dynamic compression (major flaw in most AVC designs).
- Conducted research and produced a schematic that details how the AVC design will be incorporated into our latest *2020 Supra* and *2018 C-HR* models.

CAD Designers
- Used Autodesk inventor to create multi-sheet schematics of the control circuit and used the schematic to conduct SPICE simulations, AC/DC sweep, and transient analysis simulation to identify circuit performance

Work Remaining

Synopsis: Since the AVC is still in its early stages of progress, we are still left to complete the design, building, testing and deployment.

In progress

- Currently working on the design of a miniature prototype of the model called the *AVC- Mini* that embodies all of the important algorithmic and structural components of the *SmartAVC*

Expected Completion: 4 days

To be Completed (in the near future)

- Construction/product building
- Testing and implementation
- Deployment

Problems

Problems-Resolved

Recently, our solutions design team realized that the research gathered by the R&D team still had limitations. The AVC design originally proposed in the reports overcompensates for high-frequency noise that doesn't significantly interfere with the user's ability to listen to their audio device. *Solution:* We evaluated for more effective methods of amplitude correlation by identifying the preferred speech interference level (PSIL)- isolates noise levels into 3 bands 500, 1000 and 2000 HZ to discriminate significant noise from insignificant noise.

Current Issues

Problem	*Why it matters*	*Suggestions*
Equipment/ Budget	We need to build selective voice microphones, and unidirectional microphones- for testing selective background noise more accurately. This makes our product precise and reliable.	Increase in monetary spending of $20k
Time	There are still some test cases that need to be accounted for, including surveying human constraints using the prototype (ie. listener preferences, and allowing for user customization) and taking our products to users and analyzing market data. If left undone, it will be inconvenient for users to use the product.	A Time extension of 2 weeks is necessary to complete the project and a team of data analyst would be beneficial

Changes in Requirements

- **Cost estimation :** Increase in $80K investment in the project
- **Timeline:** extension of 3 weeks

Conclusion

Despite the changes that need to be made, our product is definitely going to gain recognition in the market. Similar to noise reduction in cars, Bose headphones all of which have gained popularity today, my team and I are confident that this project will be a complete success.