

# EE/CprE/SE 491 - sddec22-13

## Simultaneous Call Transmission

### Week 1

Jan 25 - Feb 6

Client: Collins Aerospace

Faculty Advisor: Dr. Andrew Bolstad

#### Team Members:

- Hani El-Zein
- Sullivan Jahnke
- Tyler Mork
- Jason Rangel
- Austin Rognes

#### Project Kickoff Notes, Friday, February 4th, 2022

Project leads: Andrew Jeffrey, Marty Budrovic (Boo-drove-itch)

Project Faculty Adviser: Dr. Andrew Bolstad

**Andrew Jeffrey** - Project manager, lead contact, software background. Engineering manager for Collins Aerospace. Created the idea for this project. Education from Cornell

**Marty Budrovic** - Technical Expert, Digital Signal Processing (DSP) Engineer for Collins. Additional knowledge in FPGA and VHDL. Located in California

ED173 Specification, Goal is to output over ethernet and display message to traffic controller, such as, "Multiple aircraft transmitting," or something along those lines.

Primary focus is in MATLAB and Simulink.

- Generate 1 kHz tone
- Amplitude Modulation
- Machine learning, however, it is not the be-all-end-all

Collins Aerospace has their own in-house radio for testing. (7215)

We are the first ones working on it within Collins Aerospace. Blank slate. First contacts.

#### Research:

This is a good video demonstrating the issue we aim to solve.

<https://www.youtube.com/watch?v=Y983aZeIEkM>

Here is an existing patent on an algorithm to detect SCT

<https://www.freepatentsonline.com/y2017/0155460.html>

This website contains plenty of information on the problems that SCT creates  
<https://aviationenglish.com/radiotelephony/simultaneous-transmissions>

We will need to use MATLAB to detect when sound waves come from multiple sources on an AM radio transmission.

**Pending Issues:**

We have a ballpark picture of our project and we know who we should talk to to learn about waveforms because currently some to most of us know very little about them.

**Individual Contributions:**

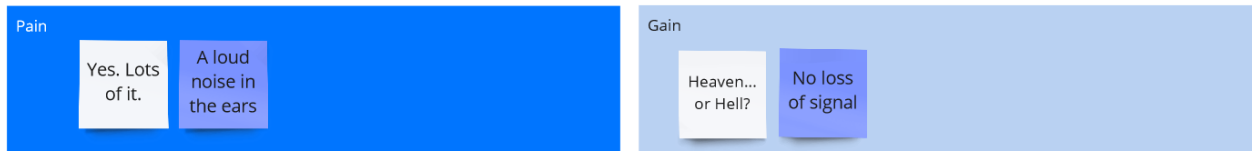
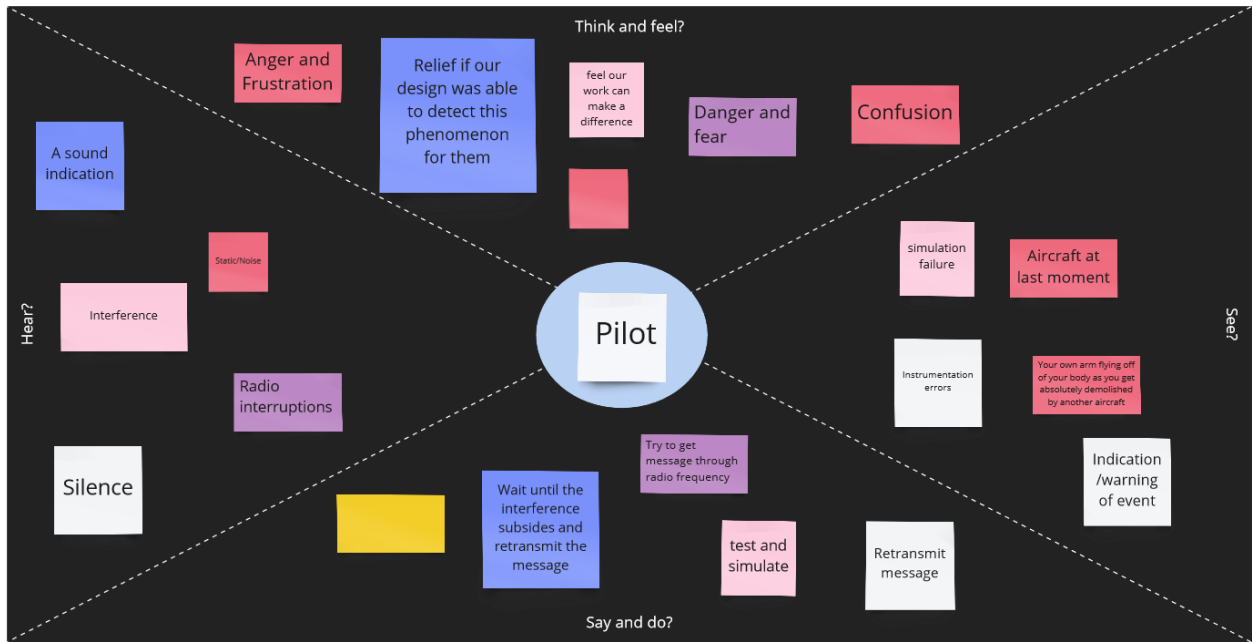
So far we have each been doing a little research on our own and doing our individual assignments. We gained a lot of information when we reached out to our client and we decided to install and learn MATLAB over the next few weeks. We all spoke to our client for 1 hour and also did our own research for at least another hour.

<b>Team Member</b>	<b>Contribution</b>	<b>Weekly Hours</b>	<b>Total Hours</b>
Hani El-Zein	Patent Research & Miro Board Work	3	3
Sullivan Jahnke	Patent Research, Email Communication w/ Client, and Miro Board Work	3.5	3.5
Tyler Mork	Patent Research & Miro Board Work	3	3
Json Rangel	Patent Research & Miro Board Work	3	3
Austin Rognes	Patent Research & Miro Board Work	3	3

**Plans for Next Week:**

Make a schedule of meetings, and a plan of goals/deadlines

**Week 1 Miro Board:**



Empathy Map



ATC needs (a way) to Be warned or notified of simultaneous call incident because he/she needs to act appropriately.

Collins Aerospace needs (a way) to Prevent Simultaneous Call Transmission between two radios because It is dangerous for airplanes when their communication line is interrupted.

Collins Aerospace needs (a way) to Detect Simultaneous Call Transmission because Then one radio may be allowed to speak while another is silenced.

### Users and User Needs



Tests

Simultaneous  
Call  
Transmission

Research

Algorithm

AI

Digital  
Signal  
Processing

Lotus Blossom

Decide on  
language  
for AI

Learn  
how to  
use AI

Learn  
about  
SCT

Learn  
about radio  
frequencies