

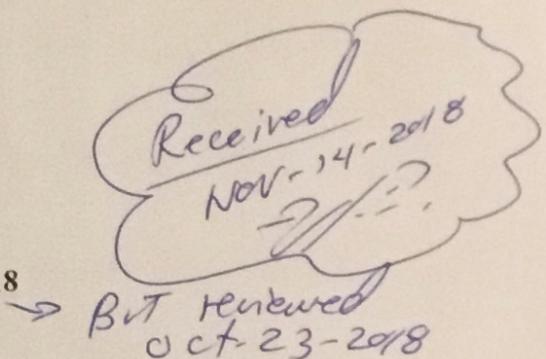
**POLYTECHNIC UNIVERSITY OF PUERTO RICO CAPSTONE DESIGN COURSE**

**G1: 1<sup>st</sup> Annual Honeywell Puerto Rico Navigation Challenge (2018-2019)**

Wence López

**Professor in Charge Capstone Design Course**

María De León- Project Team Leader  
Amaris Vélez



**PROGRESS REPORT #10 - WEEK ENDING October 23, 2018**

**Task Completed:**

Amaris Vélez

- Finished final Capstone presentation and Report
- Realized the Honeywell Preliminary Design presentation

**María De León**

- Finished final Capstone presentation and Report

**Agenda:**

Amaris Vélez

- Work on the Honeywell Critical Design Review

**María De León**

- Work on the Honeywell Critical Design Review

**Pending issues to discuss with Professor**

No pending issues at the moment

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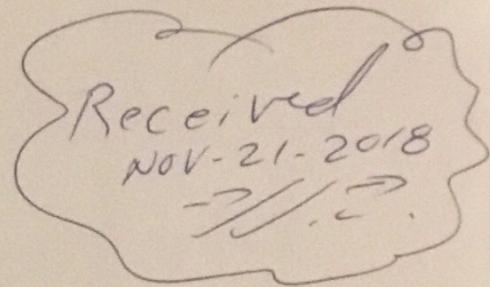
### G1: 1<sup>st</sup> Annual Honeywell Puerto Rico Navigation Challenge (2018-2019)

Wence López

**Professor in Charge Capstone Design Course**

María De León

Amaris Vélez - Project Team Leader



### **PROGRESS REPORT #11 - WEEK ENDING November 19, 2018**

#### Task Completed:

**Amaris Vélez**

- Identified components to facilitate wireless communication between MATLAB/Arduino
- Identified necessary tests to evaluate communication methods
- Created template for Capstone II documentation

**María De León**

- Finished BOM draft
- Installed and reviewed Robotics System Toolbox
- Researched on possible communication methods

#### Agenda:

**Amaris Vélez**

- Capstone Documentation: Alternatives Considered
- Capstone Documentation: Mathematical Justification
- Review MATLAB RF Toolbox
- Execute identified tests
- Continue developing Simulink Model

**María De León**

- Capstone Documentation: Alternatives Considered
- Capstone Documentation: Mathematical Justification
- Review MATLAB RF Toolbox
- Execute identified tests
- Continue developing Simulink Model

#### Pending issues to discuss with Professor

No pending issues at the moment

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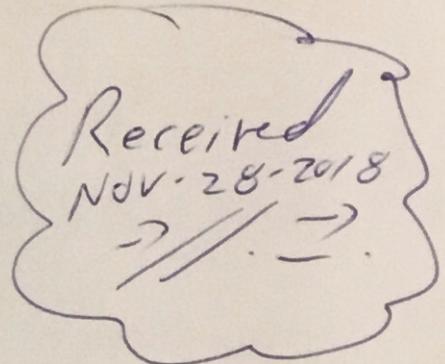
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Wence López

**Professor in Charge Capstone Design Course**

María De León - Project Team Leader

Amaris Vélez



**PROGRESS REPORT #12 - WEEK ENDING November 26, 2018**

**Task Completed:**

**Amaris Vélez**

- Identified Arduino MKR1000 as better alternative for wireless communication between MATLAB/Arduino
- Revision of tests identified to evaluate communication methods as per new alternatives selected
- Draft Capstone Documentation: Alternatives Considered
- Continue developing Matlab/Simulink Model

**María De León**

- Updated BOM with latest changes
- Revised plan for Capstone II
- Identified necessary data that ME team must provide for the Simulink model
- Draft Capstone Documentation: Mathematical Justification
- Continue developing Matlab/Simulink Model

**Agenda:**

**Amaris Vélez**

- Capstone Documentation: Alternatives Considered
- Capstone Documentation: Mathematical Justification
- Execute identified tests
- Continue developing Simulink Model

**María De León**

- Capstone Documentation: Alternatives Considered
- Capstone Documentation: Mathematical Justification
- Execute identified tests
- Continue developing Simulink Model

**Pending issues to discuss with Professor**

No pending issues at the moment

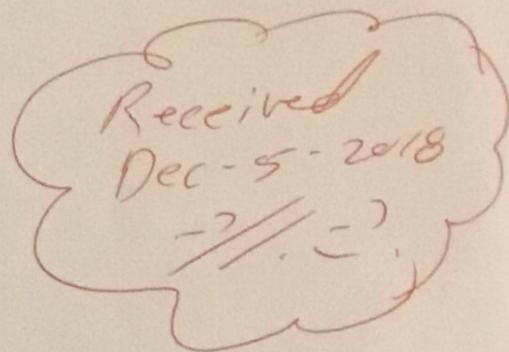
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Professor in Charge Capstone Design Course

Maria De León  
Amaris Vélez - Project Team Leader

**PROGRESS REPORT #13 - WEEK ENDING December 3, 2018**



**Task Completed:**

**Amaris Vélez**

- Worked on Capstone documentation
- Updated Arduino MKR1000 WiFi firmware
- Tested Arduino MKR1000 WiFi connection

**María De León**

- Analyzed UAV's equations of motion

**Agenda:**

**Amaris Vélez**

- Document Considered Alternatives
- Honeywell Deliverables: Power, Timing, and Interface Analysis
- Implementation Simulink Models with Arduino (wired and wireless)

**María De León**

- Document Mathematical Justification
- Honeywell Deliverables: Power, Timing, and Interface Analysis
- Implementation Simulink Models with Arduino (wired and wireless)

**Pending issues to discuss with Professor**

No pending issues at the moment

**POLYTECHNIC UNIVERSITY OF PUERTO RICO CAPSTONE DESIGN COURSE**

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**Professor in Charge Capstone Design Course**

María De León - Project Team Leader

Amaris Vélez

**PROGRESS REPORT #14 - WEEK ENDING December 10, 2018**

*Received  
Dec-12-2018  
J.W.*

**Task Completed:**

**Amaris Vélez**

- Worked on Capstone documentation
- Worked on communication schemes to test
- Documented considered alternatives

**María De León**

- Documented Mathematical justification
- Documented UAV Simulink basic model to implement modifications for Arduino

**Agenda:**

**Amaris Vélez**

- Develop first draft of report for review
- Honeywell Deliverables: Power, Timing, and Interface Analysis
- Implementation Simulink Models with Arduino (wired and wireless)

**María De León**

- Develop first draft of report for review
- Honeywell Deliverables: Power, Timing, and Interface Analysis
- Implementation Simulink Models with Arduino (wired and wireless)

**Pending issues to discuss with Professor**

No pending issues at the moment

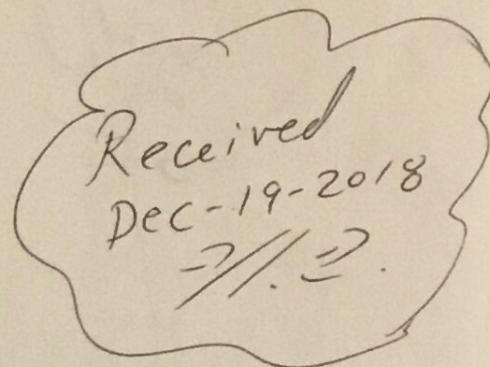
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Professor in Charge Capstone Design Course

Maria De León  
Amaris Vélez - Project Team Leader

**PROGRESS REPORT #15 - WEEK ENDING December 18, 2018**



**Task Completed:**

**Amaris Vélez**

- Worked on capstone documentation for electrical components
- Worked with mathematical justification for power supply
- Found possible navigator substitutes

**Maria De León**

- Studied Simulink Model and its parameters
- Worked with mathematical justification for motion

**Agenda:**

**Amaris Vélez**

- Honeywell Deliverables: Power, Timing, and Interface Analysis
- Implement Simulink Models with Arduino (wired and wireless)
- Establish final design for CDR (January 21)

**Maria De León**

- Honeywell Deliverables: Power, Timing, and Interface Analysis
- Implement Simulink Models with Arduino (wired and wireless)
- Establish final design for CDR (January 21)

**Pending issues to discuss with Professor**

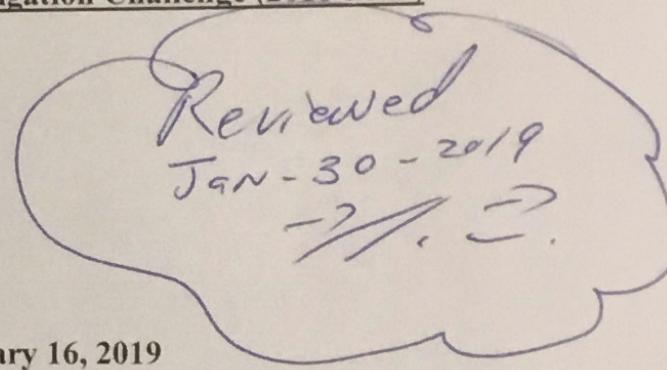
No pending issues at the moment

## POLYTECHNIC UNIVERSITY OF PUERTO RICO CAPSTONE DESIGN COURSE

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Wence López  
Professor in Charge Capstone Design Course

María De León- Project Team Leader  
Amaris Vélez



### **PROGRESS REPORT #16 - WEEK ENDING January 16, 2019**

#### **Task Completed:**

##### **Amaris Vélez**

- Worked on capstone documentation for required testing
- Implemented Simulink Models with Arduino (wired and wireless)
- Worked on Capstone presentation (January 17)

##### **María De León**

- Worked with mathematical justification for motion for the report
- Worked on Capstone presentation (January 17)

#### **Agenda:**

##### **Amaris Vélez**

- Honeywell Deliverables: Power, Timing, and Interface Analysis
- Establish final design for CDR (January 21)
- Realize the Simulink/Matlab tests with Arduino (wireless)

##### **María De León**

- Honeywell Deliverables: Power, Timing, and Interface Analysis
- Establish final design for CDR (January 21)
- Realize the Simulink/Matlab tests with Arduino (wireless)

#### **Pending issues to discuss with Professor**

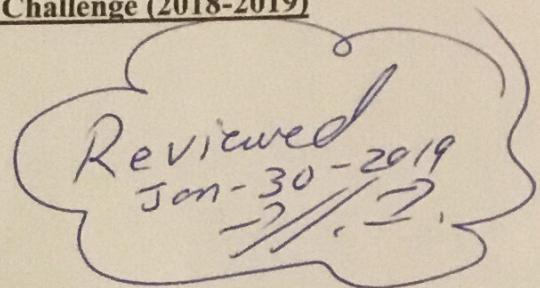
No pending issues at the moment

## POLYTECHNIC UNIVERSITY OF PUERTO RICO CAPSTONE DESIGN COURSE

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Professor in Charge Capstone Design Course

Maria De León  
Amaris Vélez - Project Team Leader



### **PROGRESS REPORT #17 - WEEK ENDING January 30, 2019**

#### **Task Completed:**

##### **Amaris Vélez**

- Completed content to be presented for CDR
- Presented CDR
- Identified navigation devices to be integrated into the Pixhawk
- Identified interface to monitor and control Pixhawk from MATLAB

##### **Maria De León**

- Completed content to be presented for CDR
- Adjusted Bill of Materials (BOM)
- Continued documentation on equations of motion
- Worked on implementing PID in Simulink model
- Reviewed the consideration on disturbances in Simulink model

#### **Agenda:**

##### **Amaris Vélez**

- Finalize BOM
- Determined power consumption for each component to be implemented
- Implement MatMav interface
- Modify and simulate control system to be integrated into Pixhawk
- Deploy Simulink model to the Pixhawk and evaluate execution
- Prepare deliverables for FRR

##### **Maria De León**

- Finalize BOM
- Determined power consumption for each component to be implemented
- Implement MatMav interface
- Modify and simulate control system to be integrated into Pixhawk
- Deploy Simulink model to the Pixhawk and evaluate execution
- Prepare deliverables for FRR

#### **Pending issues to discuss with Professor**

No pending issues at the moment

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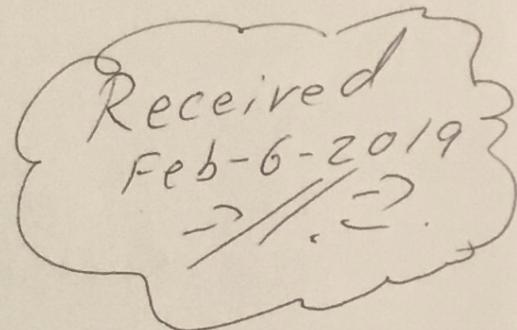
### G1: 1<sup>st</sup> Annual Honeywell Puerto Rico Navigation Challenge (2018-2019)

Wence López

**Professor in Charge Capstone Design Course**

Maria De León - Project Team Leader

Amaris Vélez



### **PROGRESS REPORT #18 - WEEK ENDING February 05, 2019**

#### Task Completed:

**Amaris Vélez**

- Completed the analysis and revision of the electrical requirements as result of the change to Pixhawk Cube 2
- Identified documentation adjustments
- Identified electronic components to be added to Pixhawk for telemetry
- Analyzed Pixhawk's power requirements

**María De León**

- Completed changes needed to Budget, BOM and documentation tables as result of the change to electrical components
- Worked on the transfer function definition needed for the PID controller definition
- Worked on the revision of the equation of motion since they are defined for a plus-style UAV instead of a cross-style UAV which is the final design of the team

#### Agenda:

**Amaris Vélez**

- Revised and realize changes required to the test plan as result of the change to Pixhawk Cube 2 with GNSS GPS+RTK
- Realize the Simulink/Matlab tests with Pixhawk Cube 2
- Continue documentation changes as result of the change to Pixhawk Cube 2

**María De León**

- Realize changes to the equation of motions already identified since they are for a plus-style UAV and the design of our UAV is cross-style
- Realize the changes to the equations used in the Simulink/Matlab model to ensure the design is for a cross-style UAV

#### Pending issues to discuss with Professor

No pending issues at the moment

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Wence López  
**Professor in Charge Capstone Design Course**

Maria De León  
Amaris Vélez - Project Team Leader

Received  
Marzo-6-2019  
J.J.D.

**PROGRESS REPORT #19 - WEEK ENDING February 13, 2019**

**Task Completed:**

**Amaris Vélez**

- Identified key tools to implement Simulink model to Pixhawk hardware
- Revised BOM to be sent to Honeywell

**Maria De León**

- Worked with equation of motions for UAV cross-style
- Revised transfer functions to be used in Simulink model

**Agenda:**

**Amaris Vélez**

- Continue documentation changes as result of the change to Pixhawk
- Revise Simulink model
- Upload model to Pixhawk and execute physical tests

**Maria De León**

- Continue documentation changes as result of the change to Pixhawk
- Revise Simulink model
- Upload model to Pixhawk and execute physical tests

**Pending issues to discuss with Professor**

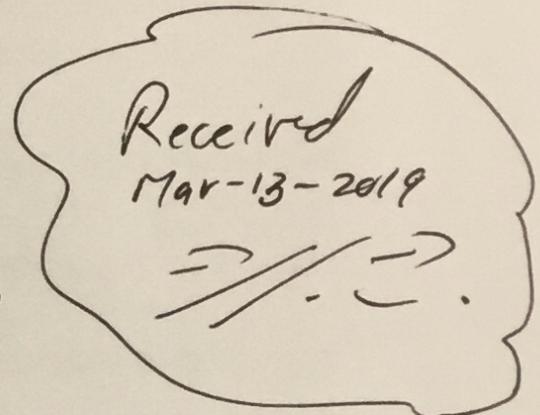
No pending issues at the moment

## POLYTECHNIC UNIVERSITY OF PUERTO RICO CAPSTONE DESIGN COURSE

### G1: 1<sup>st</sup> Annual Honeywell Puerto Rico Navigation Challenge (2018-2019)

Wence López  
Professor in Charge Capstone Design Course

Maria De León - Project Team Leader  
Amaris Vélez



### **PROGRESS REPORT #20 - WEEK ENDING March 13, 2019**

#### **Task Completed:**

##### **Amaris Vélez**

- Worked on the test plan for the physical properties, sensing, power and control system for the Honeywell FRR presentation
- Worked on the test plan for the MatMav Matlab interface to control the Pixhawk

##### **Maria De León**

- Worked on the test plan for the physical properties and control system for the Honeywell FRR presentation
- Worked on Matlab flyer Plot3 for a Quadcopter to integrate the code in the Matlab/Simulink Quadcopter final model

#### **Agenda:**

##### **Amaris Vélez**

- Continue documentation revision and changes as required
- Upload model to Pixhawk and execute physical tests
- Revise Simulink model as per test results and realize changes required

##### **Maria De León**

- Continue documentation revision and changes as required
- Realize Simulink model changes required and as per tests results
- Execute physical tests

#### **Pending issues to discuss with Professor**

No pending issues at the moment

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Wence López  
Professor in Charge Capstone Design Course

María De León  
Amaris Vélez - Project Team Leader

**PROGRESS REPORT #21 - WEEK ENDING March 20, 2019**

**Task Completed:**

Amaris Vélez

- Finished and presented FRR presentation
- Evaluated tuning methods and control techniques
- Continued documentation on "Alternatives Considered" section

María De León

- Finished FRR presentation
- Worked with three Simulink models and the relation between them
- Continued documentation describing blocks in Simulink models

**Agenda:**

Amaris Vélez

- Revise tests per customer requirements and derived requirements
- Start testing phase
- Describe test plan in "Testing" section

María De León

- Revise tests per customer requirements and derived requirements
- Start testing phase
- Describe test plan in "Testing" section

**Pending issues to discuss with Professor**

No pending issues at the moment

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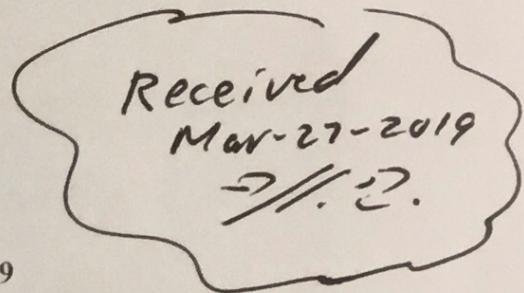
### **G1: 1<sup>st</sup> Annual Honeywell Puerto Rico Navigation Challenge (2018-2019)**

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**Professor in Charge Capstone Design Course**

María De León - Project Team Leader

Amaris Vélez



### **PROGRESS REPORT #22 - WEEK ENDING March 26, 2019**

#### **Task Completed:**

**Amaris Vélez**

- Revised the mechanical, electrical, and computer requirements and their respective derived requirements to ensure that the proper testing plan is devised
- Started testing phase: completed test #1: verify the motors power consumption

**María De León**

- Revised work schedule
- Installed and started configuration of Eclipse IDE (for Pixhawk test)
- Started testing phase: completed test #1: verify the motors power consumption

#### **Agenda:**

**Amaris Vélez**

- Continue testing phase: tests #2 and #3 (Sensing system and Physical Properties)
- Evaluate and document test results plan in “Testing” section accordingly
- Configure Eclipse IDE to upload the Simulink model in Pixhawk

**María De León**

- Continue testing phase: tests #2 and #3 (Sensing system and Physical Properties)
- Evaluate and document test results plan in “Testing” section accordingly
- Configure Eclipse IDE to execute the Pix4 Simulink model and continue analysis with other similar models

#### **Pending issues to discuss with Professor**

No pending issues at the moment

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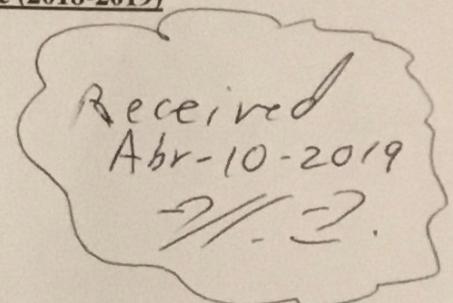
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María De León

Amaris Vélez - Project Team Leader



**PROGRESS REPORT #23 - WEEK ENDING April 3, 2019**

**Task Completed:**

**Amaris Vélez**

- Continued evaluating possible testing procedures
- Identified important parameters to be inserted into the Simulink model
- Identified additional Simulink models that function as reference for UAV's control system Simulink model

**María De León**

- Continued evaluating possible testing procedures
- Identified additional Simulink models that function as reference for UAV's control system Simulink model
- Continued evaluating UAV Simulink model

**Agenda:**

**Amaris Vélez**

- Continue testing phase: Power demand from PX4 test, insulation test, dynamometer test, and Wi-Fi telemetry module test
- Finalize Control System design to start physical flight tests

**María De León**

- Continue testing phase: Power demand from PX4 test, insulation test, dynamometer test, and Wi-Fi telemetry module test
- Finalize Control System design to start physical flight tests

**Pending issues to discuss with professor**

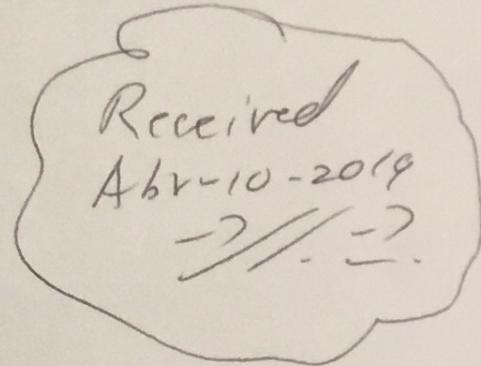
No pending issues at the moment

## **POLYTECHNIC UNIVERSITY OF PUERTO RICO CAPSTONE DESIGN COURSE**

### **G1: 1<sup>st</sup> Annual Honeywell Puerto Rico Navigation Challenge (2018-2019)**

Wence López  
**Professor in Charge Capstone Design Course**

María De León - Project Team Leader  
Amaris Vélez



### **PROGRESS REPORT #24 - WEEK ENDING April 10, 2019**

#### **Task Completed:**

##### **Amaris Vélez**

- Continue testing phase: dynamometer test
- Reviewed papers and videos on PID control and tuning to effectively adjust and tune the PIDs in our Simulink model

##### **María De León**

- Continue testing phase: dynamometer test
- Reviewed papers and videos on PID control and tuning to effectively adjust and tune the PIDs in our Simulink model

#### **Agenda:**

##### **Amaris Vélez**

- Continue testing phase: Power demand from PX4 test, insulation test, and Wi-Fi telemetry module test
- Finalize PID tuning using Simulink simulations to start physical flight tests

##### **María De León**

- Continue testing phase: Power demand from PX4 test, insulation test, and Wi-Fi telemetry module test
- Finalize PID tuning using Simulink simulations to start physical flight tests

#### **Pending issues to discuss with professor**

No pending issues at the moment

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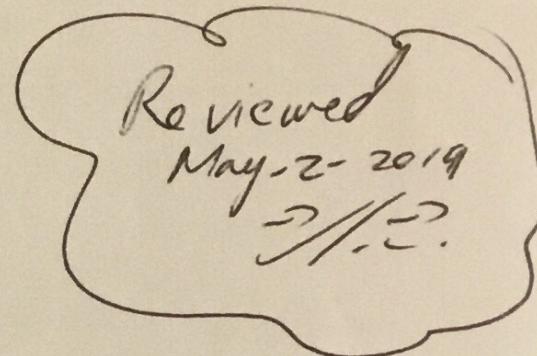
### G1: 1<sup>st</sup> Annual Honeywell Puerto Rico Navigation Challenge (2018-2019)

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**Professor in Charge Capstone Design Course**

Maria De León

Amaris Vélez - Project Team Leader



### **PROGRESS REPORT #25 - WEEK ENDING April 17, 2019**

#### Task Completed:

**Amaris Vélez**

- Started working with telemetry modules
- Continued working with Simulink models

**Maria De León**

- Started working with telemetry module
- Continued working with Simulink models

#### Agenda:

**Amaris Vélez**

- Ensure implementation of telemetry module (April 22)
- Finalize Simulink models (April 22-26)
- Execute manual flight test (April 22-26)
- Execute autonomous flight test (April 22-26)

**Maria De León**

- Ensure implementation of telemetry module (April 22)
- Finalize Simulink models (April 22-26)
- Execute manual flight test (April 22-26)
- Execute autonomous flight test (April 22-26)

#### Pending issues to discuss with professor

Failed to connect Wi-Fi telemetry module

Failed to connect radio telemetry module

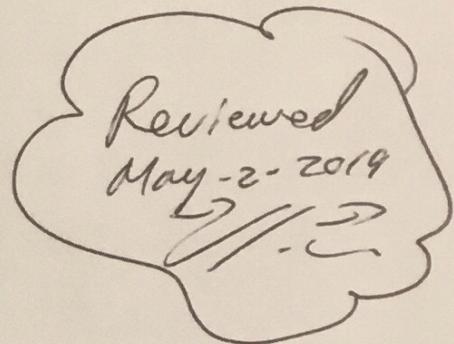
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**Professor in Charge Capstone Design Course**

María De León - Project Team Leader  
Amaris Vélez



### **PROGRESS REPORT #26 - WEEK ENDING April 24, 2019**

#### **Task Completed:**

**Amaris Vélez**

- Continued working with telemetry modules (radio)
- Continued working with Simulink Control models tuning

**María De León**

- Continued working with telemetry modules (radio)
- Continued working with Simulink Control models tuning

#### **Agenda:**

**Amaris Vélez**

- Ensure implementation of Simulink models (April 26)
- Continue troubleshooting telemetry connectivity issues
- Execute manual flight test (April 26-30)

**María De León**

- Ensure implementation of Simulink models (April 26)
- Continue troubleshooting telemetry connectivity issues
- Execute manual flight test (April 26-30)

#### **Pending issues to discuss with professor**

Failed to connect Wi-Fi telemetry module

Failed to connect radio telemetry module

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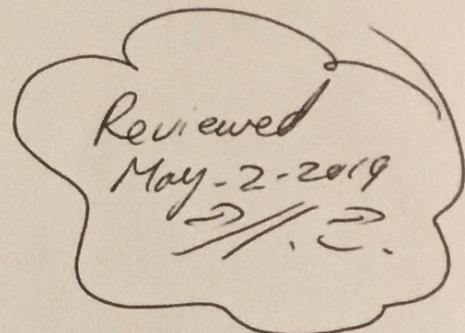
### **G1: 1<sup>st</sup> Annual Honeywell Puerto Rico Navigation Challenge (2018-2019)**

Wence López

**Professor in Charge Capstone Design Course**

María De León

Amaris Vélez - Project Team Leader



### **PROGRESS REPORT #27 - WEEK ENDING May 01, 2019**

#### **Task Completed:**

**Amaris Vélez**

- Worked on the deployment (uploading) of Pixhawk Simulink Control model without autonomy parameters
- Worked on Ardupilot Simulink Control model for the tuning of the PID control parameters in Mission Planner
- Continued working with telemetry modules (radio)

**María De León**

- Worked on the deployment (uploading) of Pixhawk Simulink Control model without autonomy parameters
- Worked on Ardupilot Simulink Control model for the tuning of the PID control parameters in Mission Planner
- Continued working with telemetry modules (radio)

#### **Agenda:**

**Amaris Vélez**

- Ensure implementation of Simulink models (May 05)
- Continue troubleshooting telemetry connectivity issues
- Honeywell competition (May 03)
- Complete documentation (May 07)

**María De León**

- Ensure implementation of Simulink models (May 05)
- Continue troubleshooting telemetry connectivity issues
- Honeywell competition (May 03)
- Complete documentation (May 07)

#### **Pending issues to discuss with professor**

Debugging Simulink model

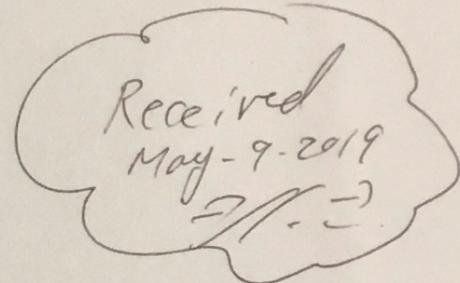
## **POLYTECHNIC UNIVERSITY OF PUERTO RICO CAPSTONE DESIGN COURSE**

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Wence López

**Professor in Charge Capstone Design Course**

María De León - Project Team Leader  
Amaris Vélez



### **PROGRESS REPORT #28 - WEEK ENDING May 09, 2019**

#### **Task Completed:**

**Amaris Vélez**

- Presented remotely controlled drone at Honeywell Competition
- Worked on Simulating Quadrotor Autonomous Flight with Simulink

**María De León**

- Presented remotely controlled drone at Honeywell Competition
- Worked on Simulating Quadrotor Autonomous Flight with Simulink

#### **Agenda:**

**Amaris Vélez**

- Finalize Flight Simulation model
- Implement telemetry with mission planner
- Finalize documentation and presentation

**María De León**

- Finalize Flight Simulation model
- Implement telemetry with mission planner
- Finalize documentation and presentation

#### **Pending issues to discuss with professor**

TBA