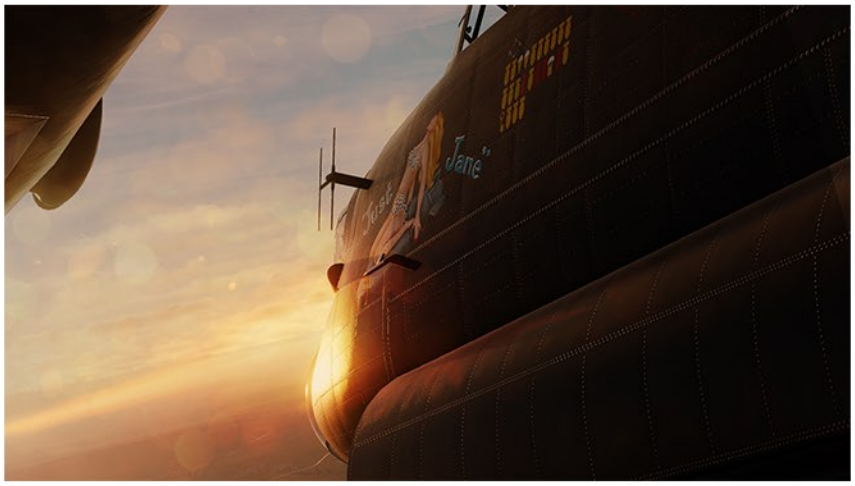
# JOSEPH SKILLEN

**Aeronautical Engineer | CAD & Reverse Engineering | Aircraft Research**

# LANCASTER PROJECT

## TALLBOY SIMULATIONS




Extensive research went into the project to validate the types of rivets used and different manufacturing processes different components went through to accurately portray them inside of the the simulator

The exterior of the aircraft was build using a combination of laser scans from the University of Calgary and was further backed up by data from technical drawings of the formers/stringers we recieved from the BBMF

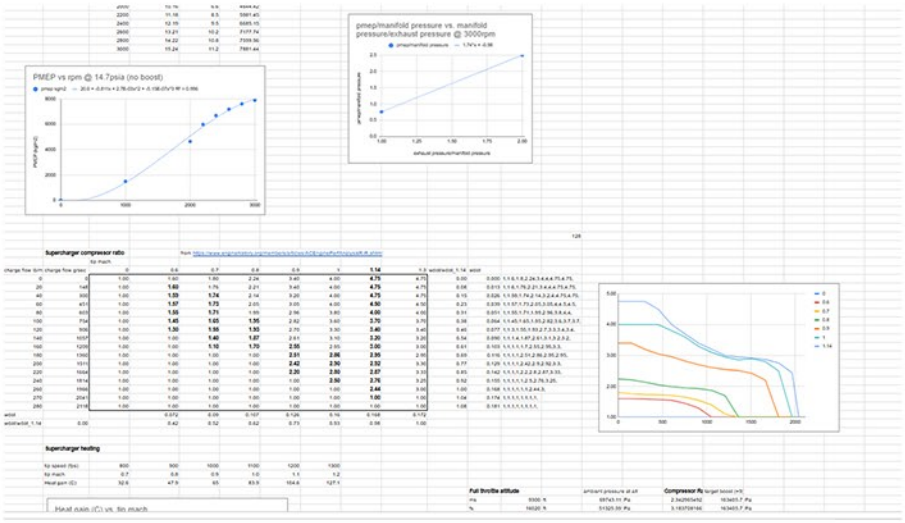


Work in progress modelling inside the cockpit and radio operators station



# LANCASTER PROJECT

## TALLBOY SIMULATIONS

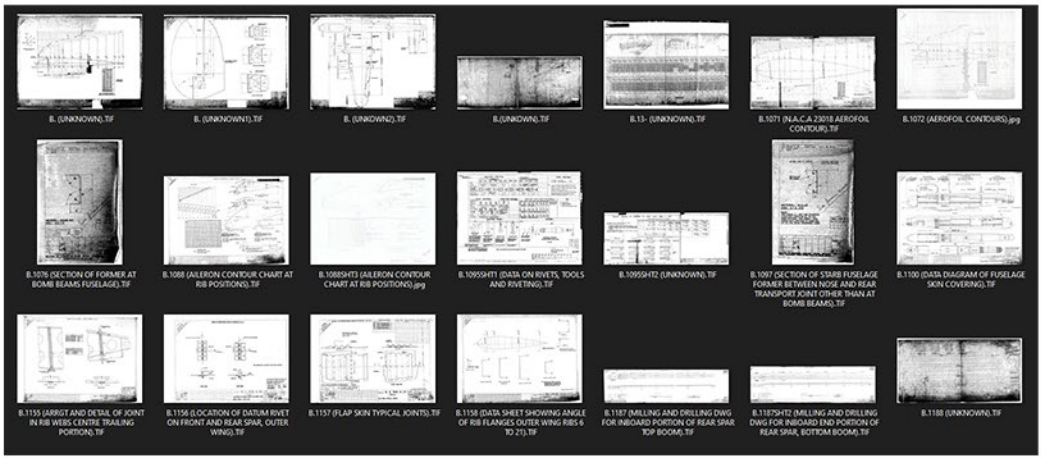


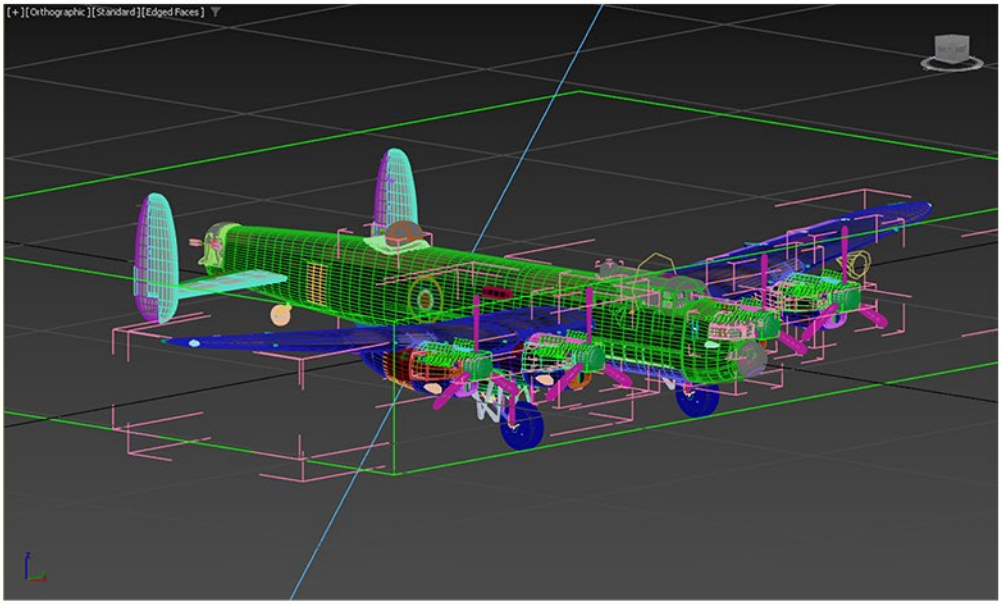

Flight model work is validated agains available real world test data and SME (Subject Matter Expert) Feedback to give the aircraft the authentic “feel” that you would get in the real deal.

The tables here specifically relate to the Lancaster’s Merlin engines performance and supercharger performance at different altitudes and pressures

The aircraft simulation works off of forces being fed into the simulator with no standard model so we have to rely on our own code to simulate everything

We have obtained more than 20,000 technical drawings of all parts of the Lancaster through various means in order to correctly and accurately represent it




The aircraft has more than 400 animation and growing, featuring details such as fully working suspension and tyre deformation based on pressure and full aircrew animations.

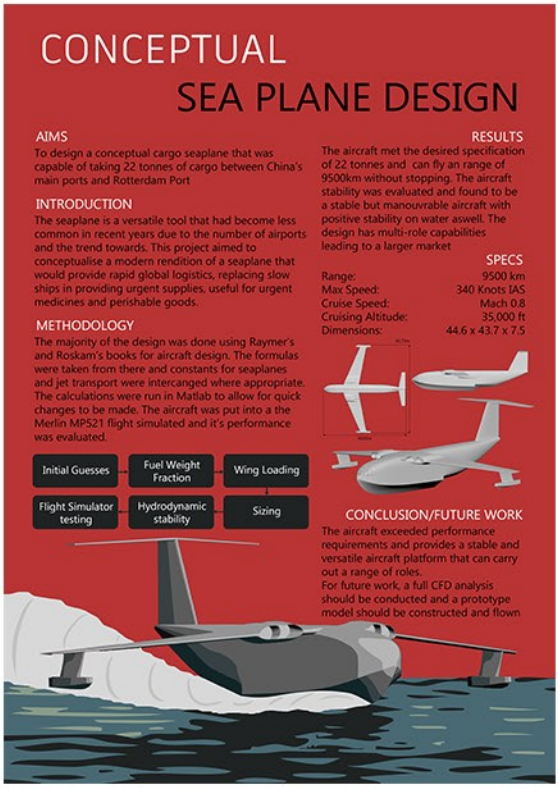
# CARGO SEAPLANE CONCEPT

## AWARD WINNING DISSERTATION PROJECT




A conceptual long-range cargo seaplane designed to move freight directly between major logistics hubs and remote locations without relying on conventional runway infrastructure. The aircraft was conceived as a modern flying boat capable of operating from coastal and inland waterways

The mission was built around a 9,500 km range and a payload of over 22 tonnes, using 20 AKH cargo containers. The aircraft was also targeted to cruise at Mach 0.8 at 35,000 ft, creating a demanding combination of payload, range and water-operating capability




### *WHAT I DID*

I developed the aircraft through weight estimation, wing and fuselage sizing, aerodynamic layout, cargo integration, CG management and hydrodynamic stability analysis

### *HOW I DID IT*

The design used established aircraft-design methods alongside MATLAB, CAD modelling and the Merlin MP521 six-DOF simulator ( image on the right) to refine and assess the final configuration



Figure 15,Flight simulator instructor station

### *FINAL PRODUCT*

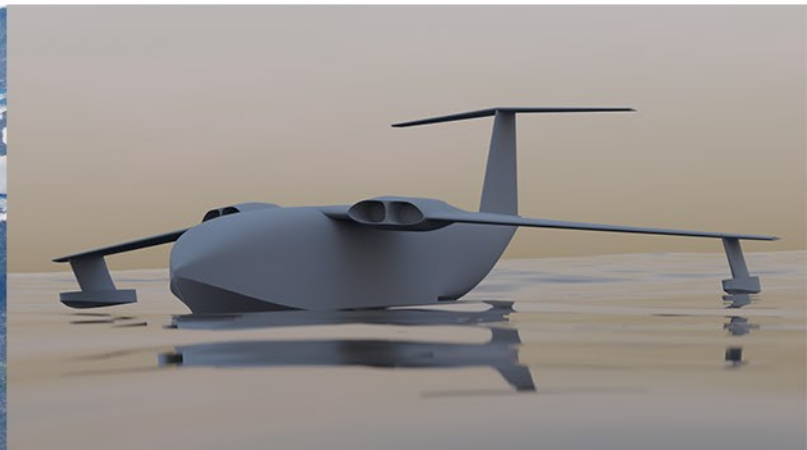
The final concept reached 83,897 kg MTOW, a 352 m² wing area and 43.73 m span, with the completed configuration assessed for stability and handling in simulation. The aircraft proved to be surprisingly agile for it's size and was capable of operating out of remote areas as specified in my requirements



Figure 16, Flight simulator capsule

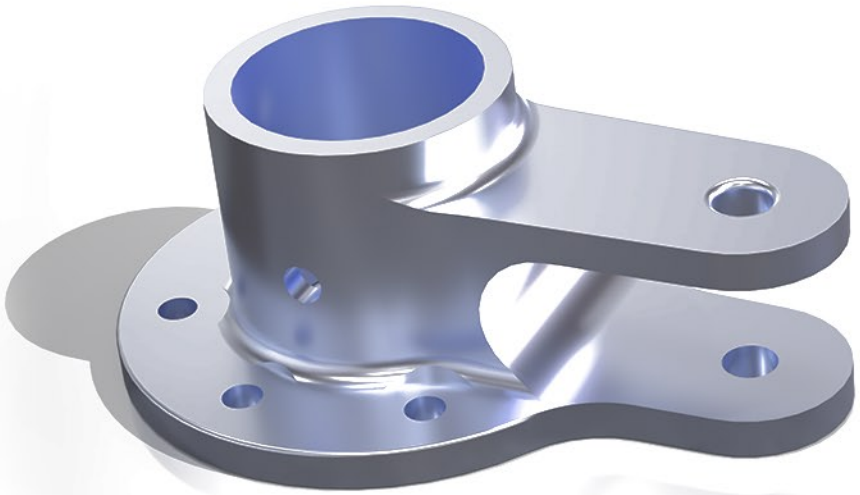
Heres the final renders of the aircraft

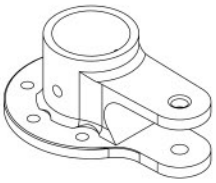


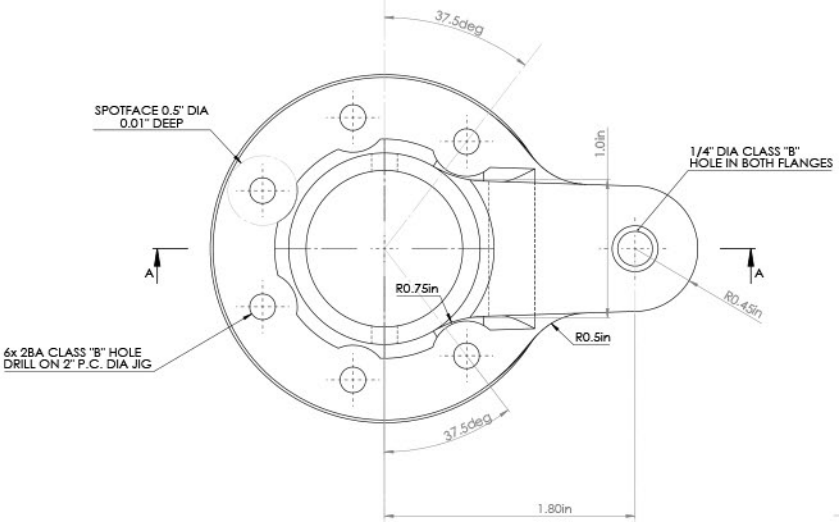


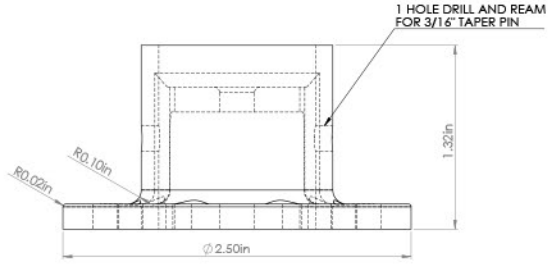
# SPITFIRE AILERON PART
## CAD RECONSTRUCTION

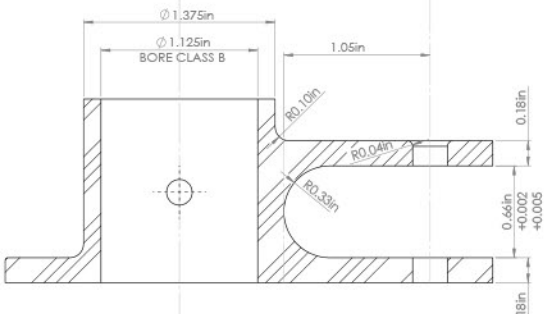
Recreated in SolidWorks from original Supermarine drawings to develop my technical drawing and reverse-engineering skills. I focused on preserving the original design intent and presenting the part in a way that would be clear to manufacture and inspect, drawing on my practical manufacturing experience. Key details such as functional dimensions, mating features, asymmetric tolerances and historic Class B fits were retained and considered throughout.








SECTION A-A

NDT BY FLUORESCENT PENETRANT INSPECTION (DYE-PEN) LA.W. ASTM E1417. NO DETECTABLE FLAWS PERMITTED

ANODISED LA.W. DEF STAN 05-24

SUPERMARINE DWG 35633, SHT 2

FLANGED LEVER
AILERON CONTROL

35633-15

A2

Aluminium 2014-A-L168 T6511

0.15lb

SOLIDWORKS Maker Product. For Personal Use Only.

# BLIND FLYING PANEL

## REPLICA / FLIGHT SIM

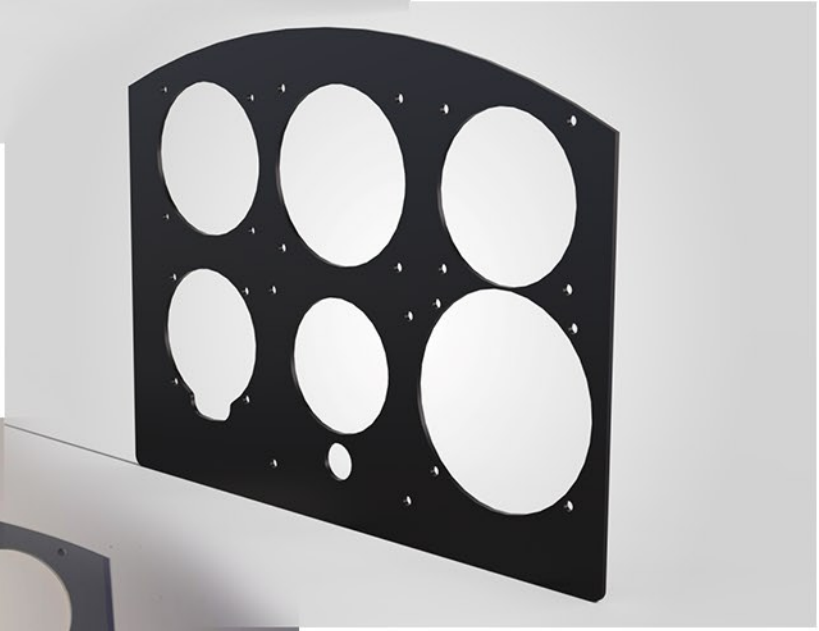
As both modelling practice and  a design challenge, I am working on a project to re create a RAF blind flying panel as would be found in most WW2 RAF aircraft and make it read the outputs of the simulator.

I was surprised about how few drawings there are for such a common component, I had to resort to getting hole diameters and mounting point holes from documentation on the instruments themselves instead of from any official source

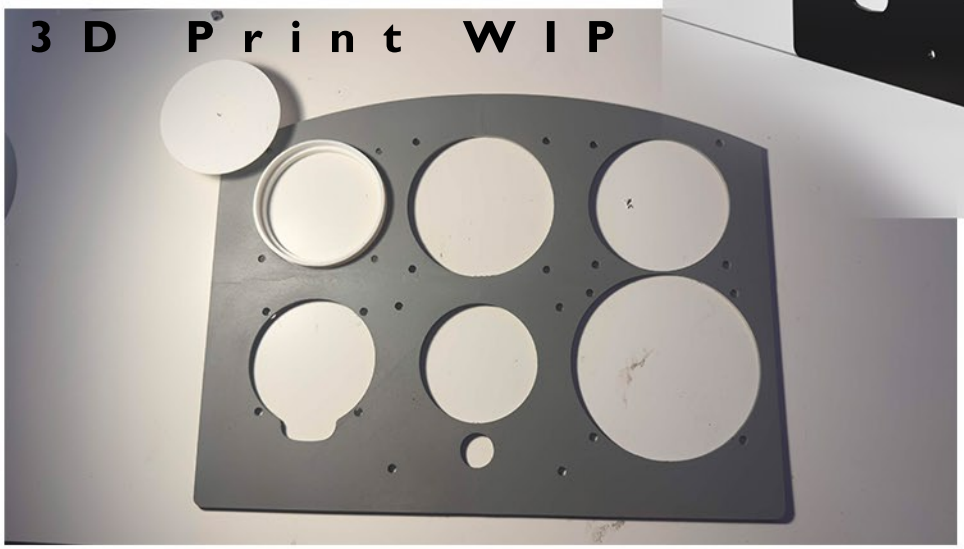
The project has so far been 3D printed but the main plate could be cut from 3mm aluminium to be authentic. Ive started work on an airspeed indicator in the top left hole below but it is still a work in progress



### Renders



### 3D Print WIP

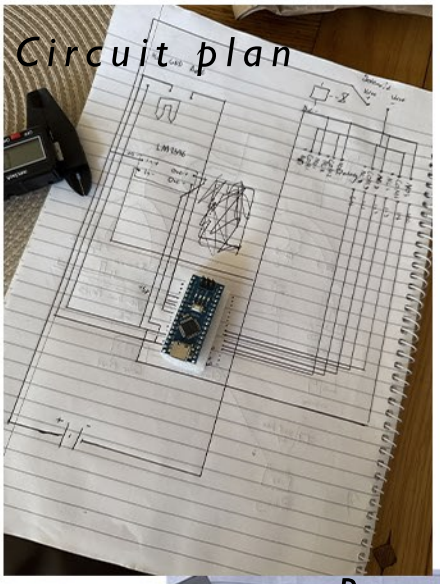


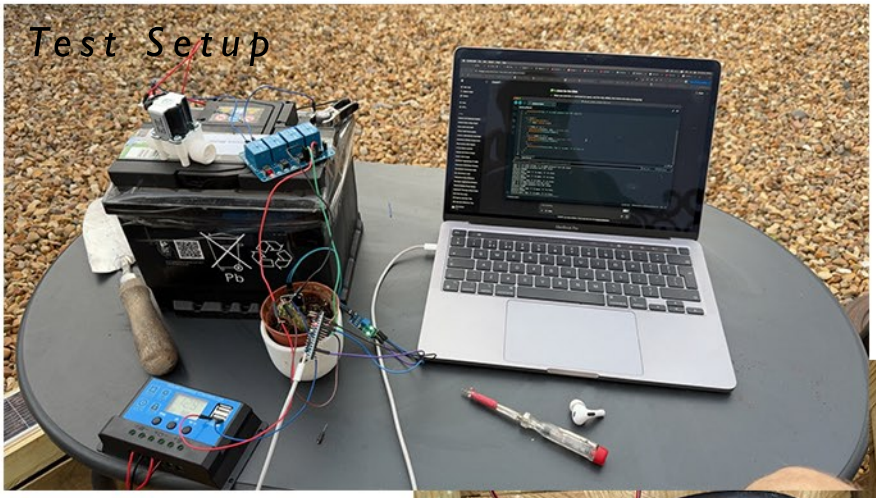
# WATERING SYSTEM

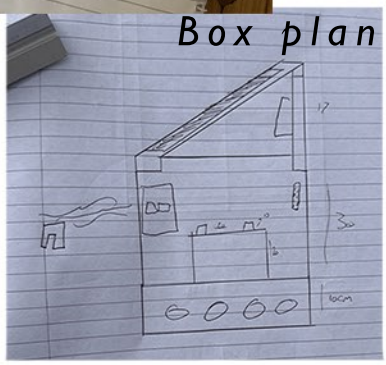
When back from university, I set myself the brief to create a fully autonomous plant watering system using recyled water to result in better fruit yeild and less time spent forgetting to water.

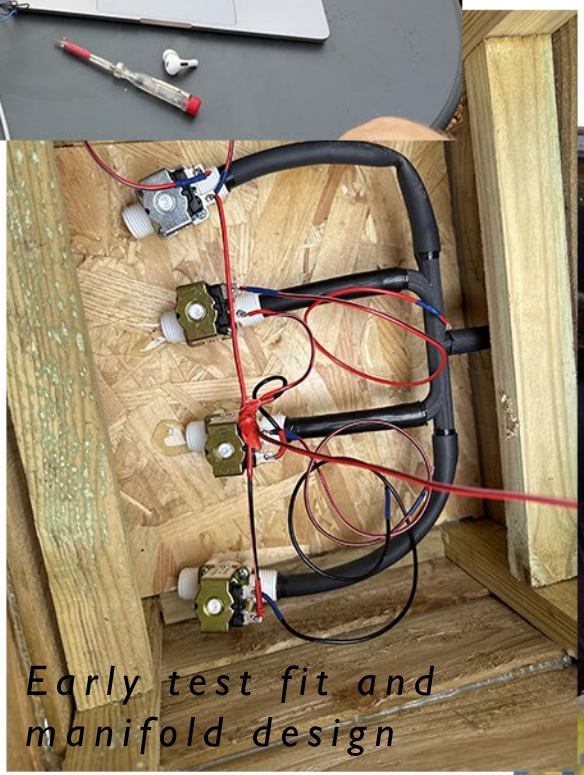
Using a combination of solenoids, moisture sensors, arduino code and power from  a battery and solar panel, the system worked as intended and resulted in some very nice tomato's. The system was inclosed in a multi layered feather edged box seen below and made weather proof for outdoor and greenhouse use when desired.

The system uses standard hose fittings from a water butt , through a pressure regulator and into the manifold (early test version pictured). 4 different solenoids control 4 groups of pots where the solenoids open when moisture is too low


Circuit plan


Test Setup


Box plan


Early test fit and manifold design


Finished Exterior