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Industrial Placement
Interim Progress Report 3

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Mechanical Engineering with Advanced Design and Innovation
University of Bath

with

Griffon Hoverwork Ltd.
Design Department
SOUTHAMPTON

28th July 2014 to 24th July 2015

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LIST OF SYMBOLS, ACRONYMS AND TECHNICAL TERMS

12000TD	A twelve tonne payload hovercraft, currently being built, that will operate as a passenger ferry from Southsea, Portsmouth to Ryde, Isle of Wight.
995ED	A hovercraft currently being developed with search and rescue operators in mind.
BOM	Bill of materials. It consists of the raw materials, sub-assemblies, sub-components, parts and the quantities of each needed to manufacture an end product
Draftsight	The 2D CAD software currently used by the company.
DXF file	A file compatible with all CAD software used in the industry that gives a 2D representation of a part.
ECR	Engineering Change Request – raised when a change is proposed to a craft.
eDrawing	A file compatible with all CAD software used in the industry that gives a 3D representation of a part.
GRP	Short for 'glass-reinforced plastic', this is a strong, lightweight material that the wheelhouse was fabricated from. It is also known as fiberglass.
Installation drawing	A multi-page drawing created to help with the installation of a complex part into the craft. Commonly used in Stage 2, and to a lesser degree, Stage 3.
HSC Code	High Speed Craft Code – intended to be a comprehensive set of requirements for high speed craft, including equipment and conditions for operation and maintenance.
Lloyd's Register	These surveyors inspect and provide quality assurance for ships and other vehicles in the marine industry.
MCA	Maritime Coastguard Agency, an executive agency sponsored by the Department for Transport.
Passenger cabin	The area in which passengers were situated while the craft was in operation.
Production job card	A document that gives the detail of the job to be performed in the production facility.
Service Bay	The area between the main cabin and the engine room where several pieces of electrical and safety equipment were stored.
SolidWorks	The 3D CAD modelling software currently used by the company.
Submission Drawing	A drawing submitted to the MCA that has craft schematics, or details of a proposed solution to a part of the HSC Code.
12000TD Build Stage 3	Officially called "Hovercraft Integration", this stage covers the installation of several parts designed in Stage 2, as well as electrical, thermal and protective work done on the craft. By the end of this, the hovercraft should be nearly complete.
Work package	Created and controlled by one detail designer, this is a folder that consists of an assembly, all the parts needed to make this assembly and CAD drawings. It also contains DXF files, eDrawings, PDF's and archived parts, as well as a production job card and a BOM. Each task generally assigned is a work package relating to a specific craft.

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INTRODUCTION

Griffon Hoverwork Ltd. are a British hovercraft manufacturer based in Merlin Quay, Southampton since the beginning of 2011.[1] Created from the merger of Griffon Hovercraft Ltd. and Hoverwork Ltd. in 2009 by the Bland Group, Griffon are at the forefront of hovercraft development and currently have over 200 craft operating in 40 countries spanning five continents.[2] These craft are used in a variety of applications such as search and rescue, passenger ferries and military operations, as well as other non-standard uses such as cricket pitch covers and crop sprayers.[3]

WORK, PROJECTS AND ASSIGNMENTS

In the time period that this report covers, the opportunity to work on a wide range of different projects and alongside new members of the company has arisen. As a result of this, the assignments undertaken in this timeframe vary greatly from what has been done so far in the placement.

A selection of some of the projects undertaken in this period is detailed below. Some drawings are also included in ***Appendix A***.

SUBMISSION DRAWINGS (12000TD)

One of the major changes of the placement role was a reassignment from the Modelling department to Statutory Compliance. Statutory Compliance are the department who deal with the rules and regulations that need to be met when building a brand new passenger craft, and as such are in constant communication with;

- Lloyds Register
- Maritime and Coastguard Agency (MCA)

By working closely with these two organizations, a craft that meets the HSC Code can be built, approved and commissioned.

The role within this department was to create submissions drawings that would then be given to the MCA for approval and, if necessary, refinement. Because these drawings were given to an external source, it was doubly important that these drawings conveyed the message that the author was trying to get across; as such, multiple sheets were often used to get across the message.

ECR REGISTER

Working closely with the Auditing section of the design office, the successful implementation of the ECR process was another role taken during this time period.

An Engineering Change Request (ECR) is submitted when a change to the design of the craft would be beneficial to either the production process, the procurement process, or if a change has been made to the craft that has not been shown on the model (which drives all production of the craft).This process goes through a change board, which is made up of the chief engineer, the technical and electrical team leaders, and a detail designer.

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From here, a list of all the new ECR's raised are discussed at a weekly ECR meeting, where the decision is taken to accept or reject them based on production easement, design improvement, cost and a variety of other factors.

ELECTRICAL EQUIPMENT BRACKET (12000TD)

One of the few modelling jobs assigned during this period was the design of a bracket to support the weight of several pieces of electrical equipment in the wheelhouse. The total weight of the equipment was 20kg, and could only be mounted on six pre-existing studs.

This was made challenging due to the fact that space in the service bay was very limited due to the amount of equipment already stored there. Adding to this, the vertical distance the equipment needed to fit into was 446mm, but the tallest piece of equipment was 436mm. When factoring in the 3mm thick of the sheet used, the clearance that the bracket needed to fit into was tiny – and the bracket would easily have not fitted if there was even a slight variation on the craft as opposed to the model, the bracket would not have fitted.

QUOTE GENERATION (995ED)

As briefly mentioned in an earlier report, a prototype of the 995ED had been built earlier in the year in order to iron out any potential design flaws, as this was a brand new hovercraft design. With the sample now complete, and most would-be flaws spotted, the time had come to start costing the overall price of building the hovercraft, so a retail price could be created.

Working with members of the Production team, the creation of several drawings for production and DXF's were created in order to send to our sheet metal subcontractor. From here, several parts of the design were refined and remodeled, in order to either reflect changes made on the prototype, or to actually improve the design of the craft. As this in ongoing, at the moment of writing, this project is still live.

CONCLUSION/REFLECTION ON THE PLACEMENT SO FAR

After having spent most of my placement so far in the modelling department of Griffon Hoverwork, the last few months have given me the opportunity to explore other parts of the Design Office, namely ***Statutory Compliance*** and ***Quality Assurance***. Having had the chance to work with these other departments has given me a greater understanding of the design process, and the challenges posed when designing a craft at the same time as building it. It has also allowed me to learn how to use Draftsight, software that (in my opinion) requires a greater user input than Solidworks.

Having worked with a lot of the different departments within the company, I think I have a greater understanding of how everyone within the organization pulls together to create a product that can be sold. I can say that the work I have done in the last couple of months is one of the reasons I have changed my degree from Automotive Engineering to Mechanical Engineering with Advanced Design and Innovation.

REFERENCES

1. http://en.wikipedia.org/wiki/Griffon_Hoverwork
2. http://www.griffonhoverwork.com/about-us.aspx
3. http://www.shippingandmarine.co.uk/article-page.php?contentid=15908&issueid=454

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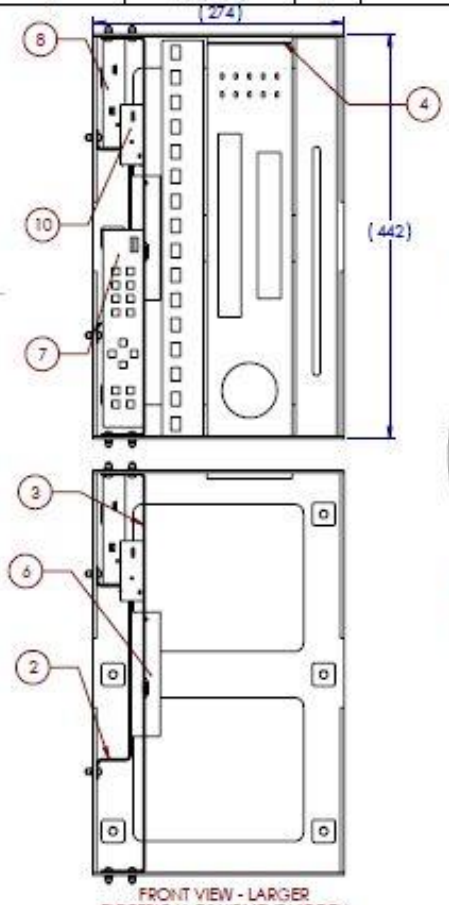
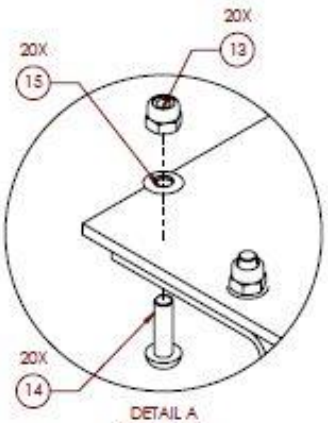
APPENDIX A

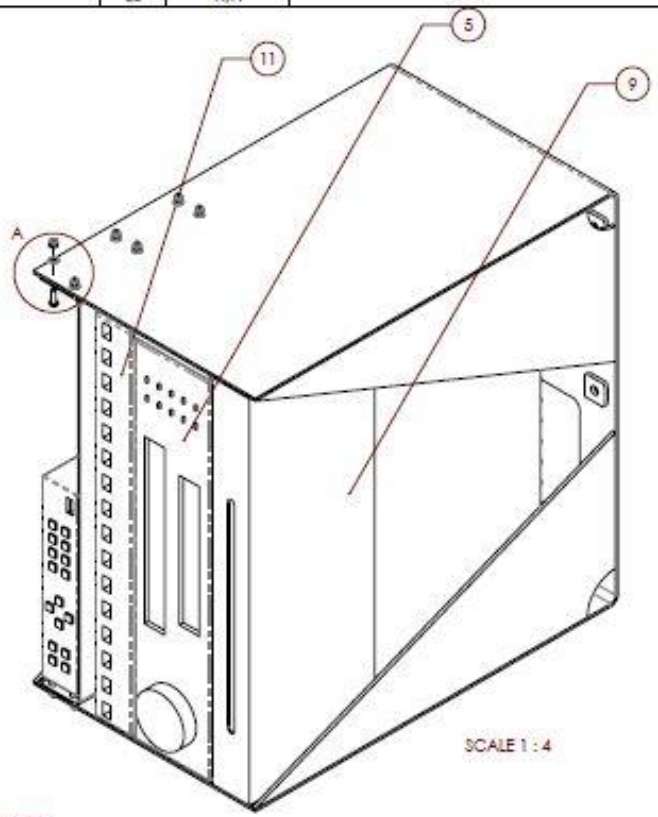
ITEM NO.	PART No.	REV	DESCRIPTION	Qty	PBS No.	NOTES
1	12000-23-03-0021	A	FAB CUSTOMER ELECTRICAL EQUIPMENT BRACKET	1	300	
2	12000-23-03-0022-01	-	CUSTOMER ELECTRICAL EQUIPMENT BRACKET MOUNTING PLATE A	1	300	
3	12000-23-03-0022-02	-	CUSTOMER ELECTRICAL EQUIPMENT BRACKET MOUNTING PLATE B	1	300	
4	12000-23-03-0022-03	-	CUSTOMER ELECTRICAL EQUIPMENT BRACKET 6MM PACKER	1	300	
5	ELEC-2104	A	CAMERA, RECORDER, 240VDC, VXH264-16/2000	1	N/A	
6	ELEC-2108	A	CONTROLLER, BRIGHTSIGN, CUSTOMER INFO PLAYER, HD222	1	N/A	
7	ELEC-2151	A	CONTROLLER, KRAMER, COMPOSITE PICTURE IN PICTURE, PIP-4	1	N/A	
8	ELEC-2152	A	CONTROLLER, KRAMER, HDMI SWITCHER, VS-211HA	1	N/A	
9	ELEC-2154	A	CONTROLLER, ATEN, HDMI SPLITTER, VS0108H	1	N/A	
10	ELEC-2155	A	CONTROLLER, STARTECH, S-VIDEO TO HDMI CONVERTER, VID2HDCON	1	N/A	
11	ELEC-2205	A	CAMERA, CCTV AMP, CAT5, NVT, NV-16PS42-PVD	1	N/A	
12	HDWR-2572	-	CABLE TIE, NYLON, 200 x 3.6mm	3	N/A	
13	NMC04NYA4	A	NUT M4 NYLOC A4 STAINLESS	20	N/A	
14	SMC04BC014A4	A	SCREW M4 x 14mm BUTTON CROSS HEAD A4 STAINLESS	20	N/A	
15	WM04AA4	A	WASHER M4 FORM A A4 STAINLESS	20	N/A	



FRONT VIEW - LARGER ELECTRICAL EQUIPMENT HIDDEN



DETAIL A
SCALE 1 : 1



SCALE 1 : 4

GENERAL NOTES:

1. SEE SUB-ASSEMBLY AND/OR PART DRAWINGS FOR FURTHER DETAILS
2. ELECTRICAL EQUIPMENT TO BE MOUNTED USING EXISTING MOUNTING HOLES (EXCLUDING ELEC-2155)

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	INITIALS	DATE	NOTES
DRAWN	IA	27/04/2015	
APPROVED			

SCALE:1:5
SHEET 1 OF 2

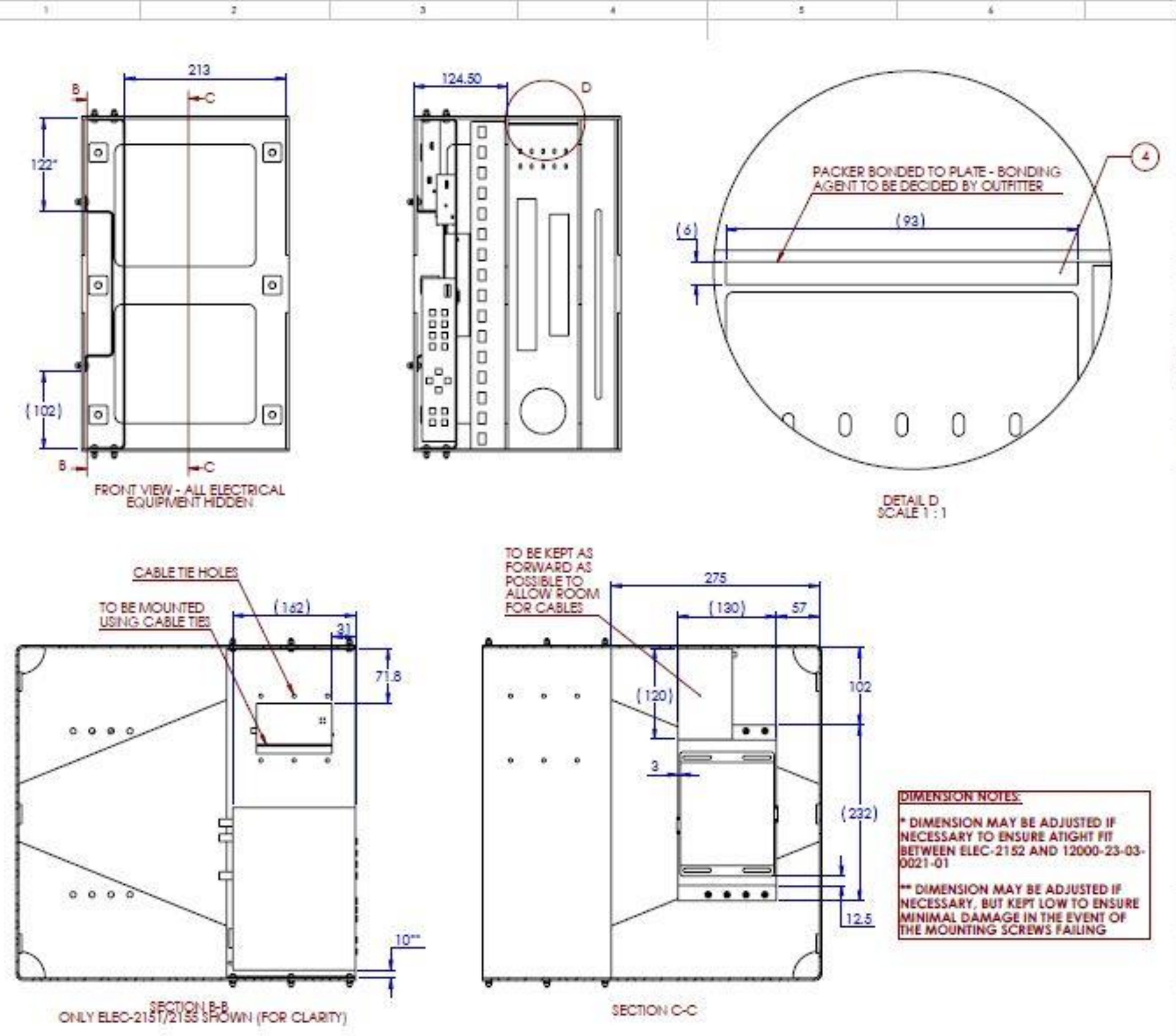
REVISIONS

REV.	DATE	DESCRIPTION	REVISED BY	APPROVED
A	30/03/2015	NEW ISSUE	IA	CWB

REVISION:	PAPER SIZE:	WEIGHT (Kg):
A	A3	36.96

PART NO:
12000-23-03-0022

TITLE:
POPULATE CUSTOMER ELECTRICAL EQUIPMENT BRACKET



DIMENSION NOTES:

* DIMENSION MAY BE ADJUSTED IF NECESSARY TO ENSURE ATIGHT FIT BETWEEN ELEC-2152 AND 12000-23-03-0021-01

** DIMENSION MAY BE ADJUSTED IF NECESSARY, BUT KEPT LOW TO ENSURE MINIMAL DAMAGE IN THE EVENT OF THE MOUNTING SCREWS FAILING

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	INITIALS	DATE	NOTES
DRAWN	JA	27/04/2015	
APPROVED			

SCALE:1:5
SHEET 2 OF 2

REVISION:	PAPER SIZE:	WEIGHT (Kg):
A	A3	36.96

PART NO: 12000-23-03-0022

TITLE: POPULATE CUSTOMER ELECTRICAL EQUIPMENT BRACKET