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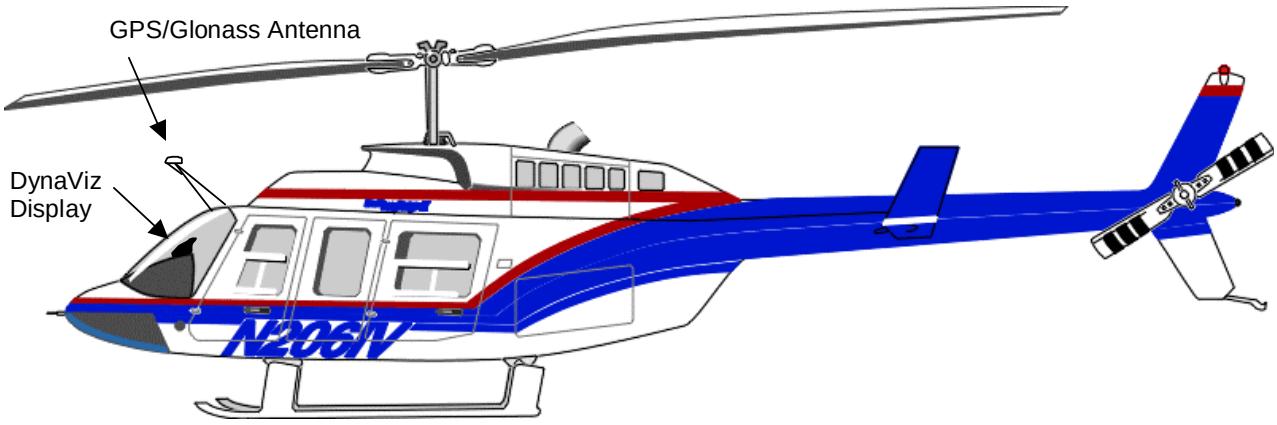
THIS MANUAL CONTAINS HELPFUL HINTS ON:

# Installation of DynaFlight-SeisBag™

## DynaFlight-SeisBag™ Airborne Seismic Bag Guidance and Management system



# INDEX

# DynaNav Installation Manual

## Overview of System

The DynaFlight-SeisBag™ system is an electronic guidance and data management system specifically designed as a tool for the pilot to fly direct to and locate seismic bag deploy points and to return back to the that exact point to retrieve the bag. The system also automatically senses deploying and retrieving for recording and displaying the status of these deploy/retrieve events and displays this to the pilot as well as the ground bag management personnel when the data is transferred. The system can be temporarily or permanently installed and approved, the antenna is TSO'd for a proper permanent installation.

## Mounting

### GPS/G LONASS Antenna

#### Overview

As the GPS/GLONASS antenna has two functions, one, to view the full constellation of orbiting satellites and two, to view the geo-stationary satellite positioned over the equator, the antenna should have as much visibility of the full sky as possible.

#### Placement

The GPS/GLONASS antenna should be mounted on top of the helicopter and should take into consideration the following, see figures 1, 2 and 3 (note on a Bell 206 figures 1 and 3 are preferred.):

- Mount the antenna as far forward on the top as possible while keeping the antenna as flat to the horizon as possible. This is to keep it away from the rotor mast as much as possible as well as lead the pilot to the spot.
- Should be mounted on a metal surface where possible or provide a minimum 6" square ground plain.
- The antenna should be mounted high enough to see as much of the sky above and around so as the fuselage does not block the signal.
- Mounting on the tail would be a last resort and for maximum accuracy should only be done if Laser Gyro option is installed in the DynaFlight.
- Keep as far away from transmitting antennas as possible (at least 12 inches) If this is not possible, please contact DynaNav for recommendations.

### Telemetry and/or Differential Antenna

#### Overview

As the Telemetry/Differential antenna has to view the ground based broadcast antenna, the antenna should be outside the aircraft and have visibility of this base antenna.

#### Placement

The ideal location for this antenna is on the bottom of the helicopter and as vertical as possible with the following considerations:

- Keep away from other communications antennas as far as possible.
- Do not mount immediately next to gear struts of hook assembly
- The shorter the coax the better the range.

## Processor box

### Overview

The DynaByte processor box contains all the electronics of the system. It also contains a magnetic compass for establishing the orientation of the helicopter in hover. As the DynaFlight calibrates the compass to the direction of the helicopter on first flight after turn on, the specific direction around the vertical axis is not critical. The DynaByte has two T-Bars slid into two slots on the bottom with 6-32 tapped mounting holes available. These T-Bars can be removed and split in half for mounting on the slots on the side of the box.

### Placement

The DynaByte processor box should be mounted either horizontal or vertical depending on the direction that the internal compass has been mounted. The internal compass can be changed to either horizontal or vertical orientation in the field to suit the best mounting configuration for the helicopter.

## Pilot Display

### Overview

The pilot display is intended to be a “heads-up” type of display to be placed in the field of view of the normal operation of the helicopter pilot. As such this *DynaViz*™ display has multiple functions including the following:

- Guidance display to guide pilot directly to the bag (or other asset) location to be deployed or retrieved.
- Pilot display for selecting specific target area and location.
- A moving map display to show Bag location pattern and statuses.

### Placement

The display should be mounted to best suit the requirements of both the pilot and the specific helicopter. This should take into consideration the following:

- It should be somewhere in the scan area of the pilot, that is, somewhere between the down view of the long line and the forward view.
- The sun shroud (used on the EL type display) should be positioned for full screen visibility for the pilot while occluding direct sunlight on the screen. As the bottom mount can be tilted from 0 to 45 degrees to adjust for individual pilot needs, be sure the bottom plate is mounted to allow for individual pilot needs (tall or short).
- The front of the screen should be oriented to front of helicopter to give guidance information that relates to helicopter flight direction.

### Product features

- The connector plug for the DynaViz™ display can be switched from side to side to meet installation requirements whether harness enters from either left or right side.
- As the display represents the ground view, the display should be mounted as horizontal as possible so as the pilot can see the complete screen. The EL display can be viewed a quite extreme angles and can use either the tunnel sun shroud or the angled sun shroud The LCD display is limited to the angle off the center view.
- The connector plug is a LEMO connector that is simply pushed on (align red dots first) and pulled off.

## Control Grip or Switches

### Overview

The control grip contains three primary switches that control the entire system. On our supplied grip assembly, two of these switches are contained in the single 5 way Top Hat switch. It is the intention of the system for the pilot to have access to these switches either on his cyclic or his collective or a combination of both. Other than these switches, the DynaFlight system is wire to sense other actions such as deploying or retrieving.

### Placement

If the cyclic or collective has a spare Top Hat switch, it can be wired directly to the connector on the Dual Relay box, along with two other push buttons for the “accept” and the “window “ operation. This Dual Relay box should always be used as it contains the transient spike protection circuitry. If the ErgoGrip™-Collective switch box is used, it should be attached to the collective such that it does not interfere with the normal operation and so the top hat can be operated with the thumb.

### Product features

With the grip or collective switch box in the pilots hands, the pilot will be able to change job functions while observing the display to keep his field of view outside the helicopter, not inside the cockpit.

## Dual Relay box

### Overview

The dual relay box has multiple functions to interface the aircraft and the pilot to the DynaNav system. These functions are as follows: NOTE: THIS BOX MUST BE INSTALLED IN ALL IN INSTALLATIONS TO PROTECT THE COMPUTER.

- To interface to and sense both of the deploy and the retrieve relays of the Seismic Bag carousel operation.
- To protect the DynaNav from the electrical spikes generated by the relay action
- To protect the DynaNav system from static discharge on the control switches
- To interface multiple style of control switch assemblies.

### Placement

The relay box is connected directly to the DynaFlight interface harness which is usually within 1 foot of the back of the DynaFlight processor box. From the relay box two harnesses are connected, the deploy/retrieve sense lines and the control switch module. This does not need to be hard mounted, however for vibration isolation, it would be best to velcro or dual lock it to any secure surface.

## Wiring Harness Diagrams

### Overview

The diagrams attached to appendix are for the interconnect wiring of the DynaNav system. All wires on the harnesses supplied (except the control grip/box)

## Supplied Parts List

### Basic DynaFlight-SeisBag™ airborne system contains:

1) **DynaByte-SeisBag™-.....Processor Box**
2) **DynaViz™.....Electro-luminescent display unit**
3) **DynaViz-Cable.....9 foot Display interconnect cable**
4) **GPS/GLONASS Antenna Kit.....GPS/GLONASS Antenna kit with 15 foot coax cable**
5) **DB-Cable.6.....Control Cable from DynaByte to ErgoGrip 6"**
6) **ErgoGrip™-Collective.....Aluminum switch box containing Military spec containing 5 way Top Hat control switch as well as accept and retrieve switches with 7 foot cable assembly.**
7) **DB-2-1224-4.....Dual relay box for dual sensing of deploy and retrieve**
8) **DB2-24cable9.....Deploy/Retrieve 9 ft. wire and plug**
9) **DB-PowerCable.....Power Plug/Cable 18" with DB-8' wired cable**
10) **DynaFlight-SeisBag™.....Airborne Software Module Software Version 3.0**
11) **Pelican Shipping Carrying Case**

### Optional Telemetry-Air Module (internal Plug-in card to Processor box) Contains:

12) **SS-Telemetry-Remote-Air.....Aircraft to ground 900 Mhz spread spectrum bi-directional RF telemetry module. Includes airborne vertical spike antenna and coax cable.**

### SeisBag- Ground™ Software Version 4.5 module and Flash Memory PC Card (Key Card)

### Optional Telemetry-Ground Module for SeisBag Ground™ contains:

13) **SS-Telemetry-Remote-Base.....An Ground to Aircraft 900 mhz spread spectrum bi-directional telemetry modules for base computer. One module required for each base or remote.**
14) **SS900 Base Antenna.....Telemetry Base Antenna 6db gain**

| Specifications Environmental: | | Physical: | **DynaByte™ Processor** | **DynaViz™ Display Unit** |
|---|---|---|---|---|
| *Operating Temp:* | -30 to +50 degrees C. | *Width:* | 11 ins (28cm) | 6.25ins (16cm) |
| *Storage Temp:* | -40 to +70 degrees C. | *Height*: | 5.35ins (13.6cm) | 5.25ins (13cm) |
| *Humidity*: | 5 to 95%, non-condensing. | *Depth*: | 9.5ins (24cm) | 6.5ins (16cm) |
| *EMI/RFI:* | DOC, FCC | *Weight*: | 13.0lbs (5.8kg) | 1.6lbs (.6kg) |

Installation kit and antennas weights are dependent on installation, typically less than 3 lbs. (1.2kg)

10 - 20VDC or 18 - 36VDC, negative ground (system requires less than 20 watts) Note: Specifications subject to change without notice.

# Appendix

## Wiring Diagrams

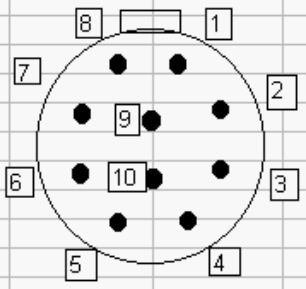
### DynaViz Display Wiring Harness

**Dynanav Systems Inc. wiring diagram for DynaViz display unit- REVISION 2**

| Designation | DynaByte Processor | DynaViz Display | H028 (low L) | LM32K101 | LM4Q30TA | EL320.240.36-HB | | Wire Harness |
|---|---|---|---|---|---|---|---|---|
| UD1 | H | | | | | | | |
| UD0 | J | | | | | | | |
| UD3 | K | | | | | | | |
| UD2 | L | | | | | | | |
| LD1 | Y | 1 | 1 | 8 | 8 | 15 | | White |
| LD0 | Z | 2 | 2 | 7 | 7 | 13 | | White/Blue |
| LD3 | AA | 3 | 3 | 10 | 10 | 19 | | White |
| LD2 | BB | 4 | 4 | 9 | 9 | 17 | | White/Blue |
| CP2 - CLK | GG | 5 | 5 | 3 | 3 | 11 | | White |
| H Sync | FF | 7 | 7 | 2 | 2 | 9 | | White/Blue |
| V Sync | HH | 9 | 9 | 1 | 1 | 7 | | White/Orange |
| GND | JJ | | | | | | | |
| GND | JJ | 6 | 8 | 5 | 5 | 3 | | |
| GND | JJ | 6 | 10 | 5 | 5 | 6 | | White |
| GND | JJ | 6 | 11 | 5 | 12 | 8 | | |
| GND | JJ | 6 | 12 | 5 | 12 | 10 | | |
| 5 volts + | N | 10 | 13 | | | 5 | | White/Blue |
| 5 volts + | N | 10 | 14 | | | 5 | | |
| 12 volts + | P | 8 | 15 | | | 1 | | White/Orange |
| 12 volts + | P | 8 | 16 | | | 2 | | |
| 3.3 volts + VDD | | | | 4 | 4 | | | |
| 20 Volts(neg) VEE | | | | 6 | | | | |
| 13 - 22 VDC + | | | | | 6 | | | |
| Display Enable | | | | | 11 | | | Goes to VDD +3.3Volts |

**Bold Lettering is the cable assembly**

Lemo Connector on the DynaViz viewed from the rear (inside)

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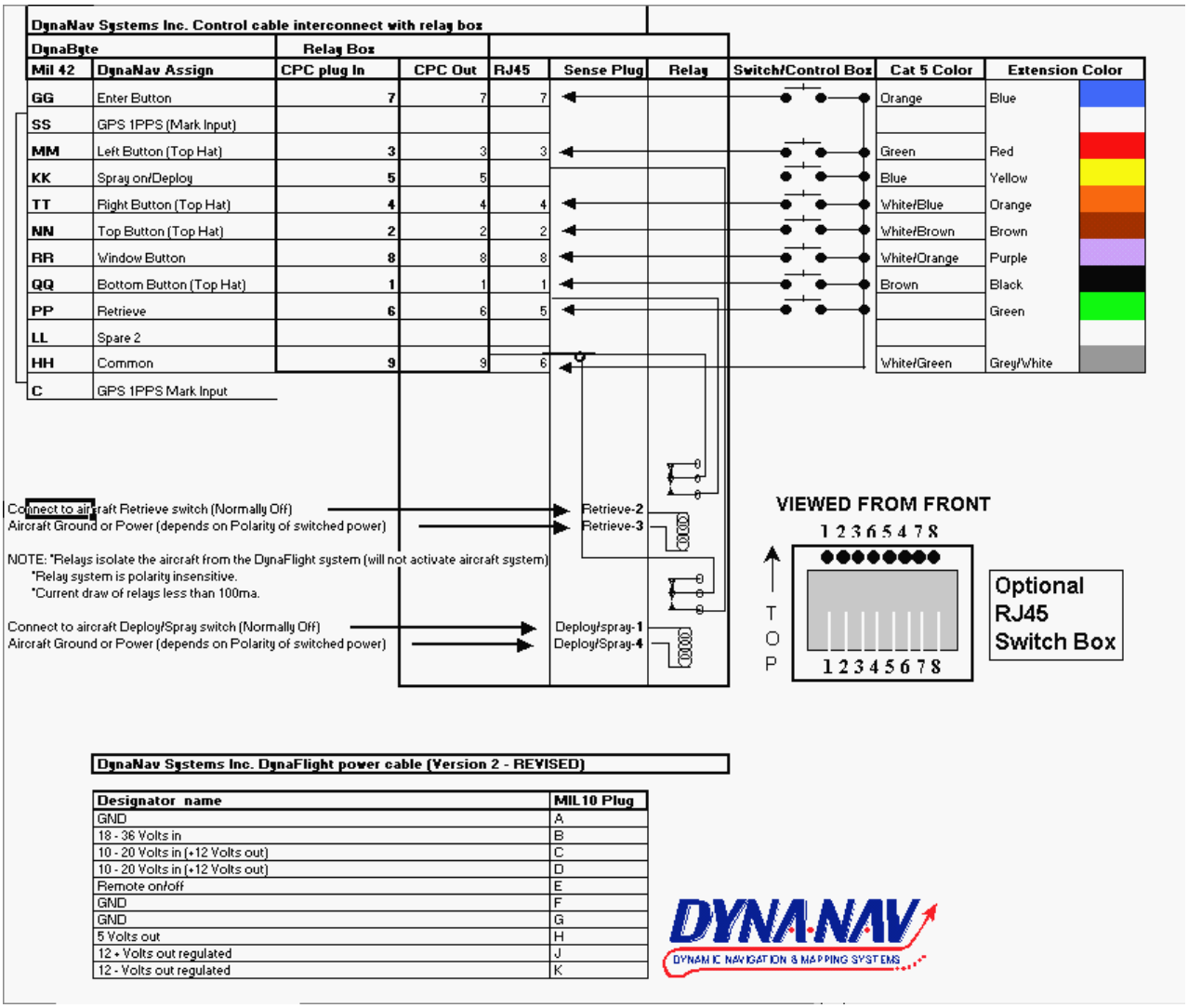
## Control Cable and Switch Interconnect Wiring



**DynaNav Systems Inc. Control cable interconnect with relay box**

| DynaByte | | Relay Box | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mil 42 | DynaNav Assign | CPC plug In | CPC Out | RJ45 | Sense Plug | Relay | Switch/Control Box | Cat 5 Color | Extension Color |
| GG | Enter Button | 7 | 7 | 7 | | | | Orange | Blue |
| SS | GPS 1PPS (Mark Input) | | | | | | | | |
| MM | Left Button (Top Hat) | 3 | 3 | 3 | | | | Green | Red |
| KK | Spray on/Deploy | 5 | 5 | | | | | Blue | Yellow |
| TT | Right Button (Top Hat) | 4 | 4 | 4 | | | | White/Blue | Orange |
| NN | Top Button (Top Hat) | 2 | 2 | 2 | | | | White/Brown | Brown |
| RR | Window Button | 8 | 8 | 8 | | | | White/Orange | Purple |
| QQ | Bottom Button (Top Hat) | 1 | 1 | 1 | | | | Brown | Black |
| PP | Retrieve | 6 | 6 | 5 | | | | | Green |
| LL | Spare 2 | | | | | | | | |
| HH | Common | 9 | 9 | 6 | | | | White/Green | Grey/White |
| C | GPS 1PPS Mark Input | | | | | | | | |

Connect to aircraft Retrieve switch (Normally Off) → Retrieve-2
Aircraft Ground or Power (depends on Polarity of switched power) → Retrieve-3

NOTE: *Relays isolate the aircraft from the DynaFlight system (will not activate aircraft system)
*Relay system is polarity insensitive.
*Current draw of relays less than 100ma.

Connect to aircraft Deploy/Spray switch (Normally Off) → Deploy/spray-1
Aircraft Ground or Power (depends on Polarity of switched power) → Deploy/Spray-4

VIEWED FROM FRONT




Optional RJ45 Switch Box

**DynaNav Systems Inc. DynaFlight power cable (Version 2 - REVISED)**

| Designator name | MIL10 Plug |
|---|---|
| GND | A |
| 18 - 36 Volts in | B |
| 10 - 20 Volts in (+12 Volts out) | C |
| 10 - 20 Volts in (+12 Volts out) | D |
| Remote on/off | E |
| GND | F |
| GND | G |
| 5 Volts out | H |
| 12 + Volts out regulated | J |
| 12 - Volts out regulated | K |

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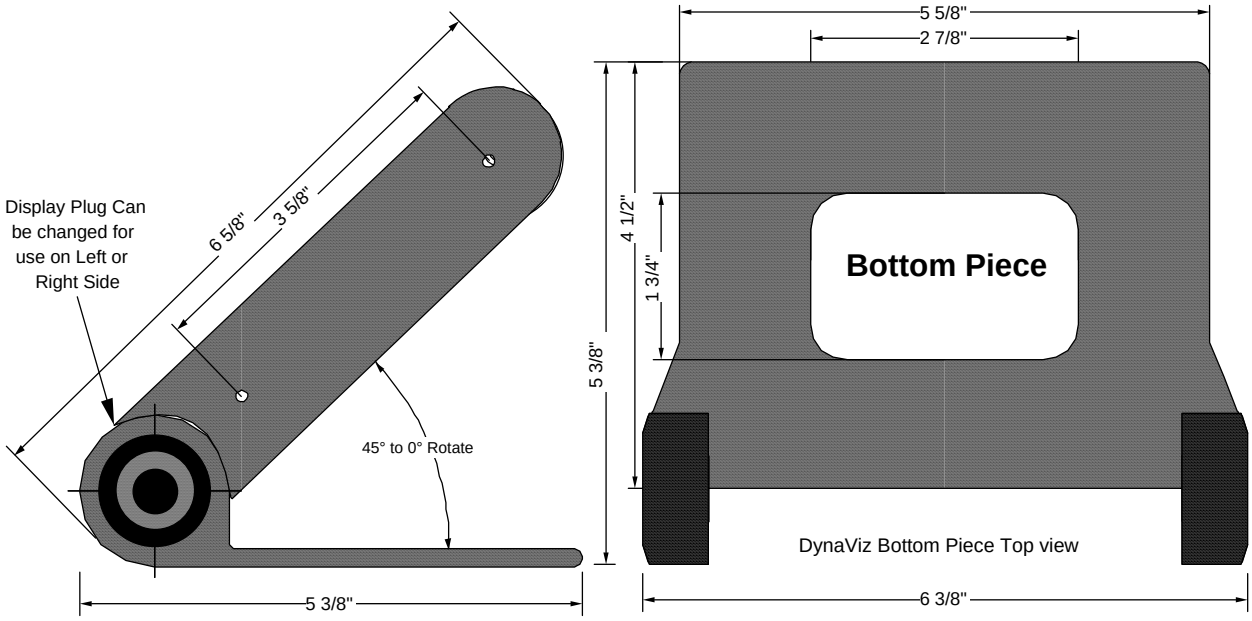
## Dimensional Drawings and Renderings

### DynaViz Display Diagram

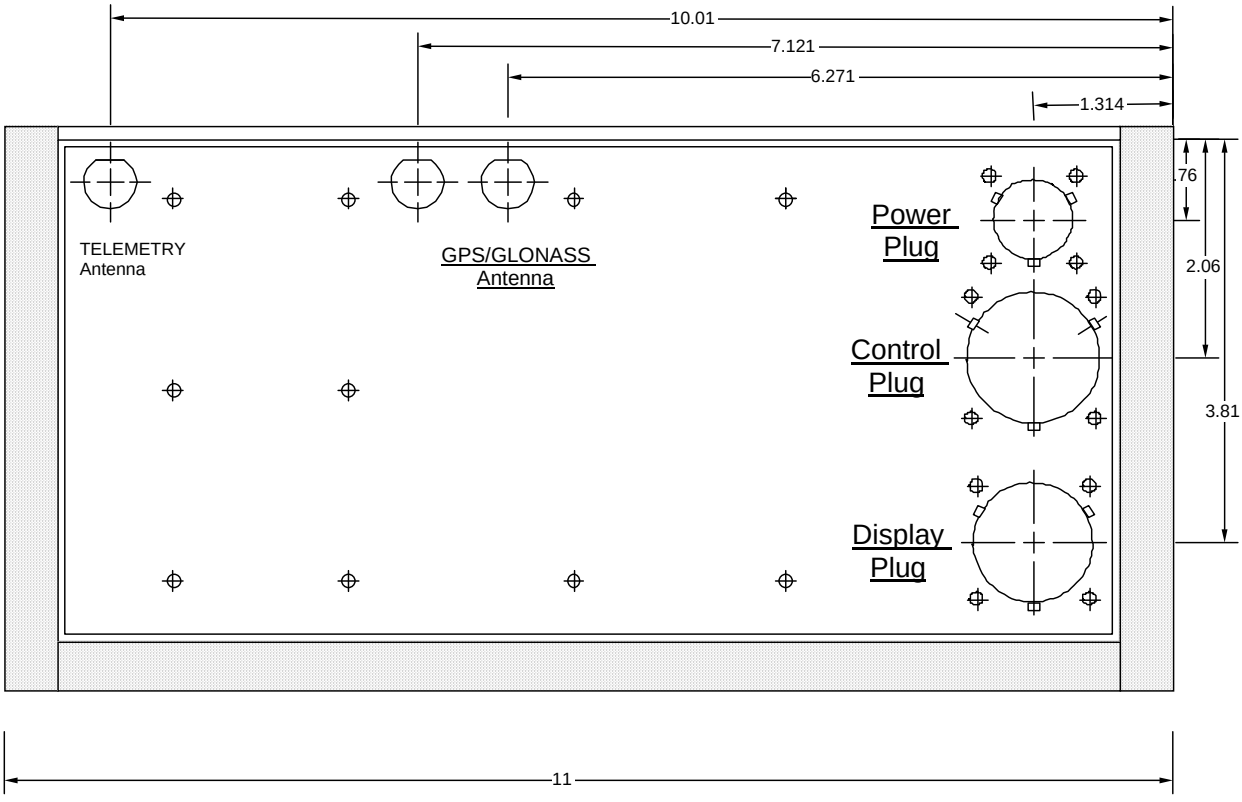



DynaViz Side View

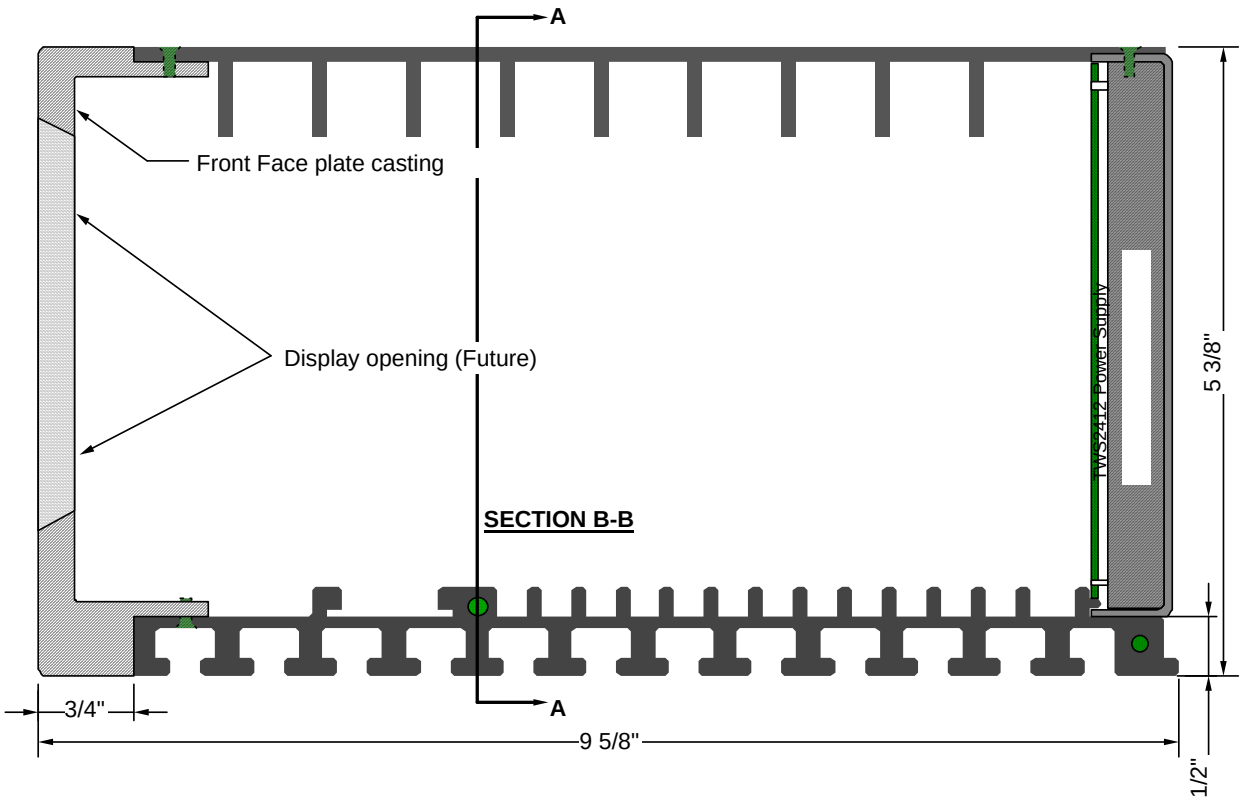
DynaViz Bottom Piece Top view

### DynaByte Processor Box Back View Diagram

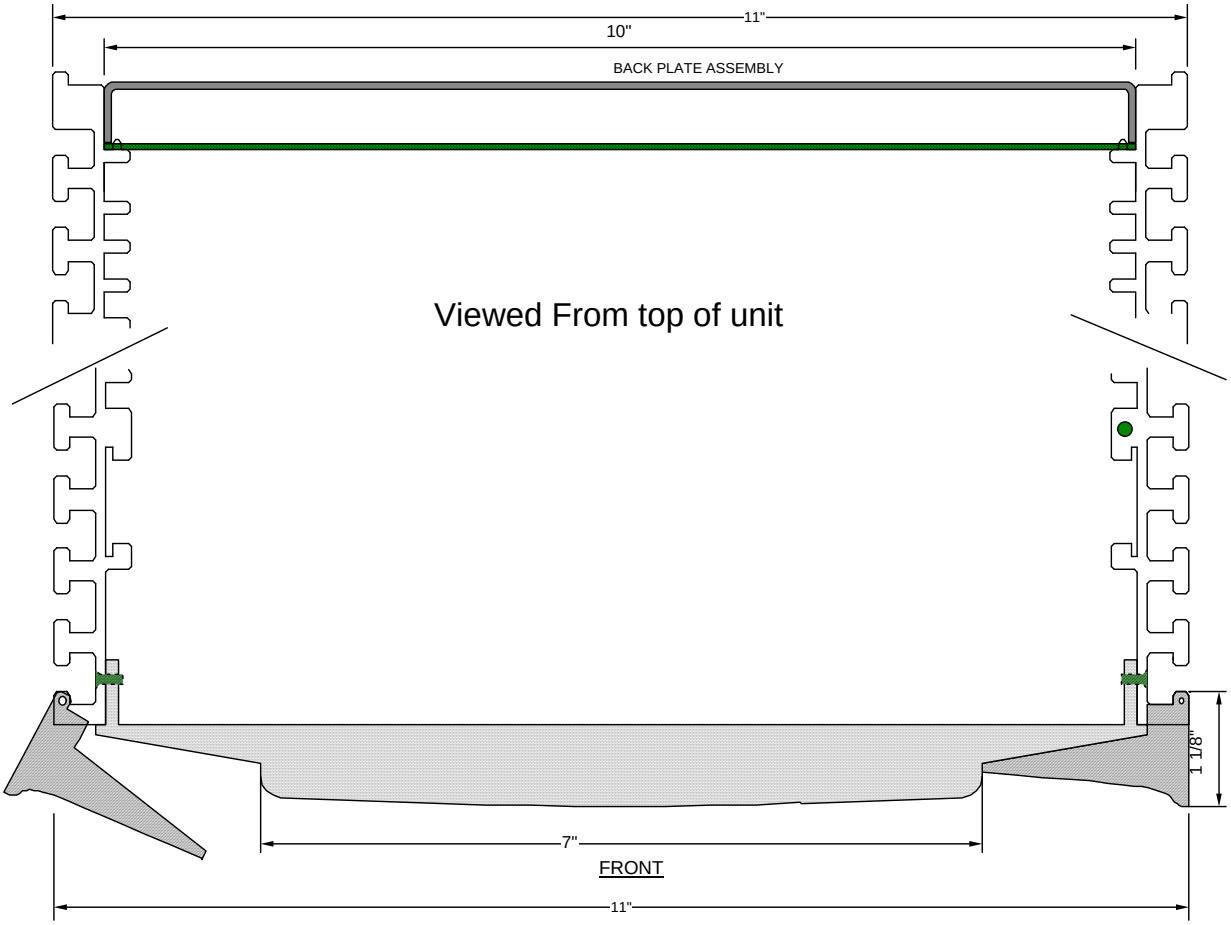
**Back Plate VIEWED FROM Back**
**Drawn at 80%**



## DynaByte Processor Box Through Section Diagram

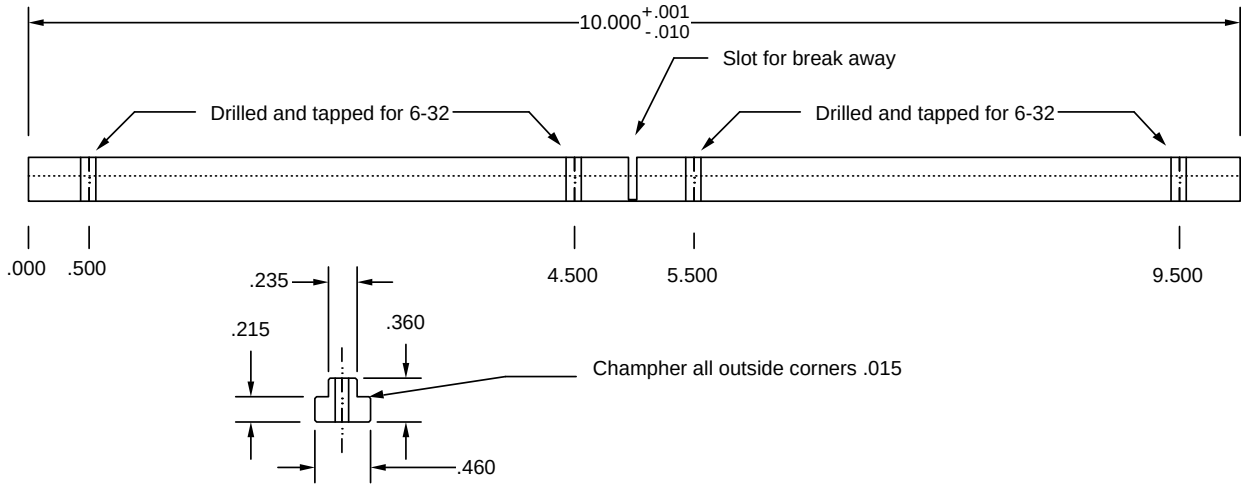


## DynaByte Processor Box Top View Diagram

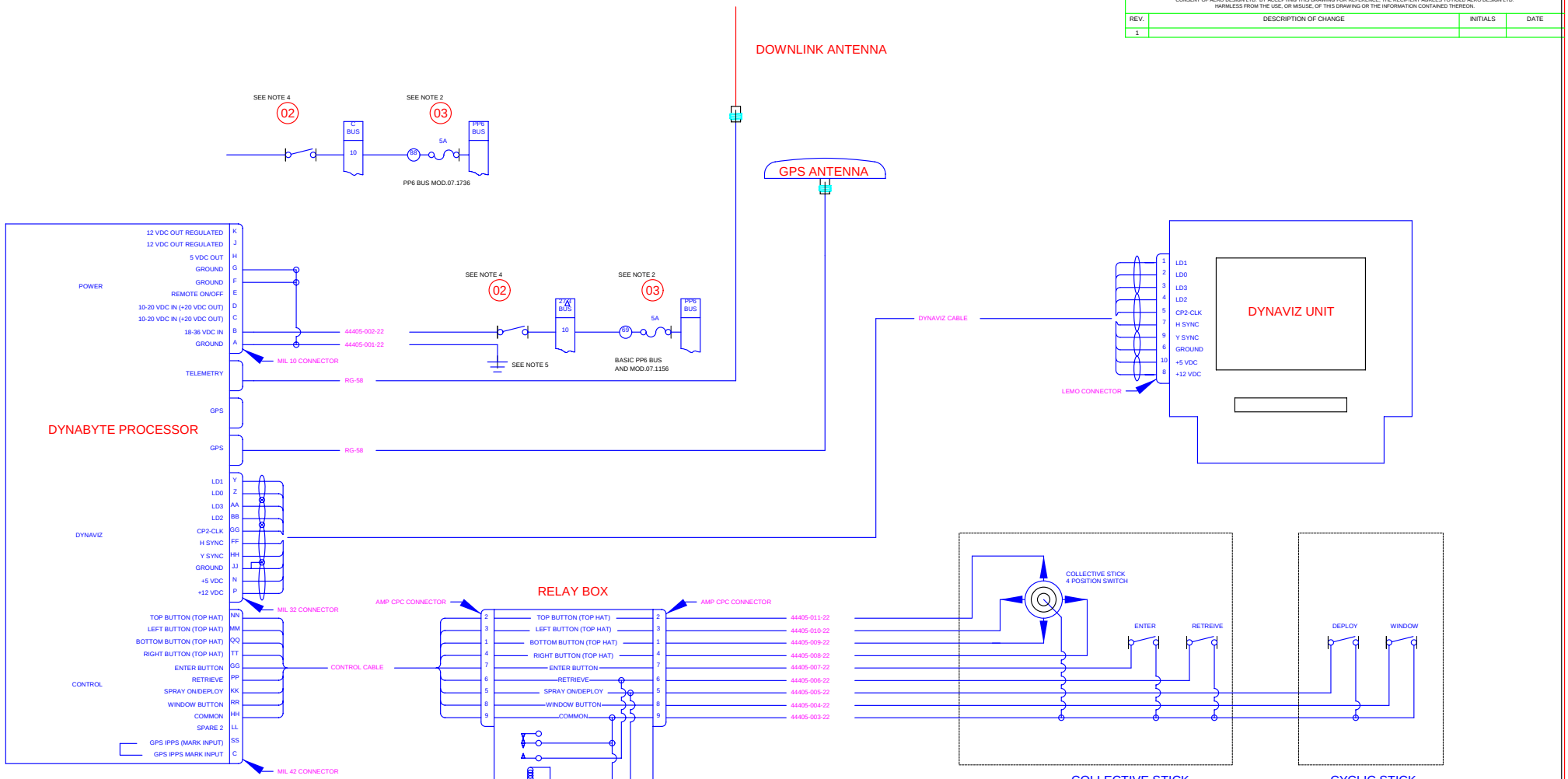



| | |
|---|---|
| SCALE- 80% in inches | **DynaNav Systems Inc.** |
| TOL: +/- 0.001" unless noted | 11959 188A St., Pitt Meadows, B.C., V3Y 1W9 |
| MATERIAL: Macroblend DP4-1377, Dark grey | DRAWINGS BY: REG MOEN |
| DATE: Jun. 16/1997 | DRAWING TITLE: DynaByte complete assembly |

## DynaByte Processor Box T-BAR Mount Diagram



| REV. | DESCRIPTION OF CHANGE | INITIALS | DATE |
|---|---|---|---|
| 1 | | | |




NOTES

1. IDENTIFY, ROUTE AND SECURE ALL WIRING AS PER AC43.13-1A, CHAPTER 11, SECTIONS 4 AND 7.
2. IF DESIGNATED FUSE LOCATION IS USED BY OTHER INSTALLATION, LOCATE 5 AMP FUSE IN CONVENIENT UNUSED LOCATION IN FUSE PANEL. LABEL FUSE "DYNANAV".
3. ALL WIRING UNLESS OTHERWISE MARKED IS MIL-W-22759/16. THE LAST DASH NUMBER INDICATES WIRE GAUGE.
4. LOCATE SWITCH ON PILOT AIR VENT BRACKET. LABEL SWITCH "SEISBAG".
5. ATTACH GROUND TO EXISTING GROUND SCREW BEHIND CIRCUIT BREAKERS ON PEDESTAL.
6. SELECT SUITABLE SWITCHES FOR THE SPECIFIC HELICOPTER AND OPERATION TO AVOID CONFLICT WITH OTHER INSTALLATIONS. LABEL EACH BUTTON ON CONTROL GRIP AS TO FUNCTION. SEE DRAWING 44405 SHEET 2.
7. IF HELICOPTER IS NOT FITTED WITH ACCESSORY SWITCHES ON THE COLLECTIVE STICK GRIP, A DYNANAV CONTROL BOX MAY BE REQUIRED. IF USED, VELCRO CONTROL BOX TO COLLECTIVE WITH APPROPRIATE BRACKET. SEE DRAWING 44405 SHEET 2.

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 03 | FUSE HOLDER (EXISTING) | | | |
| | MS35058-22 | 02 | SWITCH | | | |
| | | 01 | WIRING DIAGRAM | | | |
| 01 | PART NO. | ITEM | DESCRIPTION | MATERIAL | MATERIAL SPEC. | STOCK SIZE |
| QTY. | LIST OF MATERIALS | | | | | |

BASIC CODE

DASH NO. FOR DIA
N=MFD HEAD NEAR SIDE
F=MFD HEAD FAR SIDE

D=DIMPLE
DIGIT = # OF SHEETS TO BE DIMPLED
C=COUNTERSUNK

DASH NO. FOR LENGTH

BASIC CODES:
BJ = MS20470AD
BB = MS20426AD
LZ = NAS1097AD
CX = MS20470DD

INSTALL NEW RIVET
REMOVE/REPLACE RIVET
EXISTING RIVET

| APPROVALS | DATE |
|---|---|
| DRAWN: JEFF CLARKE | 20 JUNE 2001 |
| CHECKED: E. BURGOIN | |
| STRESS: | |

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:

DECIMALS
X.XXX ±0.010
X.XX ±0.03
X.X ±0.1

ANGLES ±1/2°

AERO DESIGN LTD.
ENGINEERING CONSULTANTS
1045 McTAVISH ROAD N.E.
CALGARY, ALBERTA T2E 7G9

SEISBAG SYSTEM
AEROSPATAILE AS350
WIRING DIAGRAM

| SCALE 1 : 1 | DWG. SIZE | DWG. NO. | REV. |
|---|---|---|---|
| SHEET 1 OF 2 | A1 | 44405 | 0 |