

# Spider 6 Installation Manual

Applicable for the Spider 6.

Appends:

- Minor Modification Summary Report
- Structure Test Procedure
- Electromagnetic Compatibility Test Procedure
- RTCA DO-160 Test Reports

spidertracks

Real-time aircraft tracking. **Made easy.**

# Table of Contents

1. Installing your Spider 6	3
1.1. Positioning the Spider 6	3
1.2. Power	4
2. Installation	5
2.1. Start-Up	5
2.2. GPS Signal	5
2.3. Iridium Connectivity	5
Appendix	6
(A)Spider 6 Minor Modification Summary Report	6
(A)1.Description	6
(A)2.Modification Approval Basis	6
(A)3.Configuration Control Data	6
(A)4.Post Installation Testing	6
(A)5.Operation and Limitations	6
(A)6.Weight and Balance	6
(A)7.Electrical Load	7
(A)8.Continuing Airworthiness	7
(B)Spider 6 Structure Test Procedure	8
(B)1.Test Definition	8
(B)2.Special Tools and Equipment	8
(B)3.Test Conditions	8
(B)5.Test Procedure	8
(B)6.Pass/Fail Criteria	9
(B)7.Test Record	9
(C)Spider 6 Electromagnetic Compatibility Test Procedure	10
(C)1.Test Definition	10
(C)2.Special Tools and Equipment	10
(C)3.Test Conditions	10
(C)4.Test Procedure	10
(C)5.Pass/Fail Criteria	11
(C)6.Test Record	12
(D)Wiring Diagram - Power Lead	17
(E)RTCA DO-160 Test Reports	18

# 1. Installing your Spider 6

## 1.1. Positioning the Spider 6

Correct positioning of the Spider is critical in achieving effective performance from the Spidertracks system as a whole, in this case the Spider should be mounted up on top of the instrument panel in the aircraft, as far forward under the glare shield as possible to maximise visibility with the sky, and free from any obstructions.

In order to function nominally, the Spider is required to receive GPS signal and then transmit that information, along with other flight data, to the Iridium satellite network. The GPS antenna is able to receive GPS information at any angle, as long as it is not obstructed by metallic material, such as the centre windshield pillar, however, the Iridium antenna must have an unobstructed, horizon-horizon view of the sky in all directions to function nominally (Figure1). Obstructions consist of any metallic or carbon composite object, but also electrically heated windshield filaments that act as an RF shield whether they are turned on or not (Faraday Cage effect). The Spider is able to transmit through glass, fibre glass, or plastic. Please see [installation examples](#) on our support website.

NB: If you are attempting to fit your Spider 6 into an aircraft with electrically heated windshields please stop and contact your distributor for advice.

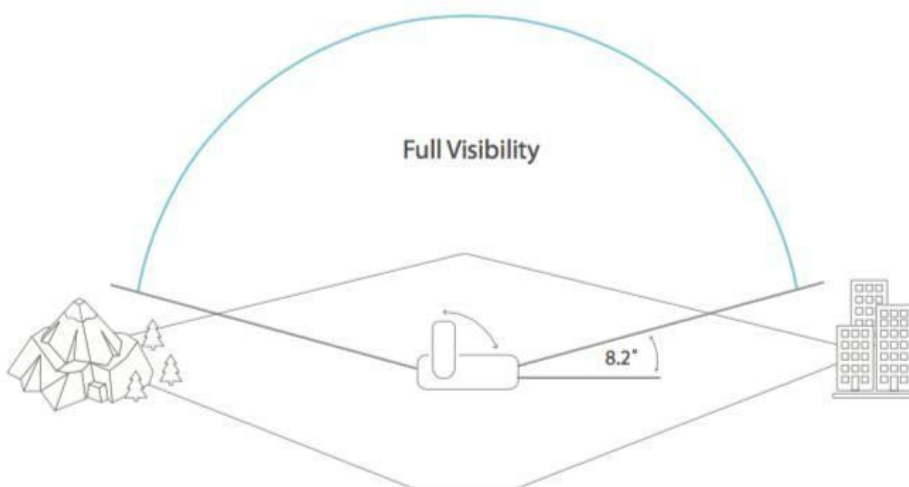


Figure 1: Visibility of the sky requirements for an Iridium transmitting product

The Spider is not subject to Specific Absorption Rate testing, however, it is recommended to have separation of at least 200mm between the device and a person.

Secure the Spider to the airframe using the bracket supplied. Please allow 12 hours for the VHB tape to cure.

## 1.2. Power

The Spider can be powered using the supplied power lead - just plug into your aircraft's 10 to 28 volt DC (cigarette lighter) power supply. The power supply must be capable of delivering up to 1.5 A peak current. An alternative option to using the cigarette lighter, would be to hard-wire the power supply in your vehicle. Hardwiring the power lead and keeping the Spider portable would normally be done as a minor modification by a Licensed Aircraft Maintenance Engineer or technician.

Power supply must be stable in the range of 10-28 VDC and capable of delivering at least 1.5 A peak current. The Spider must be fuse protected, in which case we recommend using a 3A in-line fuse.

The power lead supplied has three wires. Brown is positive, black is earth, and blue is not required (see Appendix (D) Wiring Diagram - Power Lead).



## 2. Installation

Figure 2 provides a visual reference for content discussed within Sections 2 and 3 of this document.

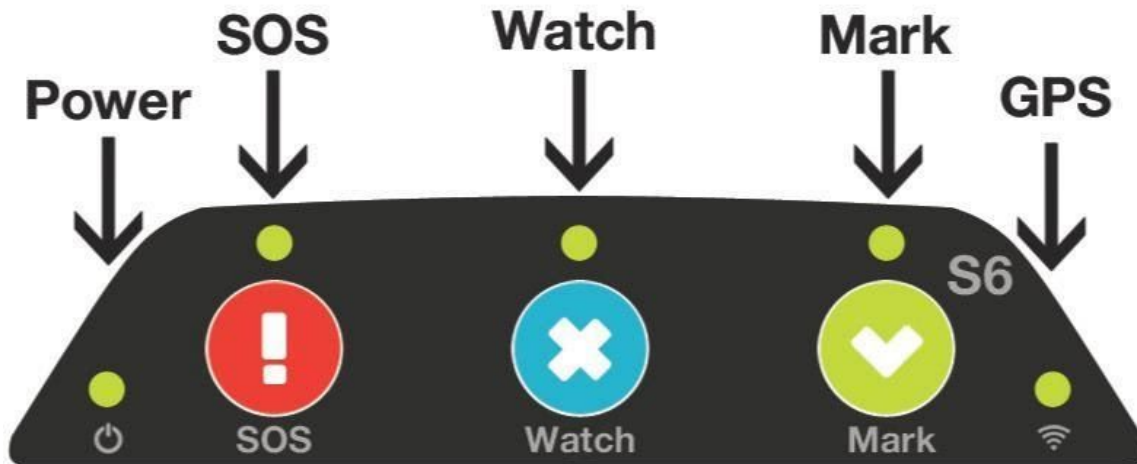


Figure 2: Spider 6 Keypad

### 2.1. Start Up

When the Spider is first powered the LEDs will cycle through a start-up sequence (that indicates firmware version) and should then display a solid Power LED indicator only.

### 2.2. GPS Signal

In order to acquire a GPS lock, the aircraft will need to be outside and in full view of the sky (refer to 1.1) with the power on. Once a GPS lock is attained the Signal LED indicator (bottom right) will turn orange. A GPS lock should be acquired within 60s in the general case.

### 2.3. Iridium Connectivity

Once a GPS lock has been attained the Spider will immediately attempt to send the first position report to the Iridium satellites. Once a connection has been made with the Iridium network the Signal LED indicator will turn from orange to green and should remain green throughout the duration of the flight.

Under normal operating conditions the time taken from startup through GPS lock and connection with the Iridium network should be less than 2 minutes.



# Appendix

## (A) Spider 6 Minor Modification Summary Report

### (A)1. Description

The subject modification consists of the installation of a Spider 6 real-time aircraft tracking device.

### (A)2. Modification Approval Basis

Spidertracks recommends classifying the subject modification as a minor modification. This recommendation is based on the evaluations of the modification against (1) Transport Canada Civil Aviation Standard 571 Appendix A, Criteria for the Classification of Modifications and Repairs; and (2) Federal Aviation Administration FAR Part 43 Appendix A. Therefore, acceptable data will be employed to support the installation of the Spider 6. Compliance is at owner's discretion.

### (A)3. Configuration Control Data

Chapter	Version	Date
Spider 6 Instruction Manual	2.0.0	03/02/2017

### (A)4. Post Installation Testing

Complete post-installation in accordance with the following guidelines:

Title	Version	Date
Appendix (B): Spider 6 Structure Test Procedure	IR	24/11/2015
Appendix (C) : Spider 6 Electromagnetic Compatibility Test Procedure	IR	24/11/2015

### (A)5. Operation and Limitations

Refer to Spider Tracks Limited, Spider 6 Instruction Manual for operational instructions.

Basic flight manual limitations remain applicable.

### (A)6. Weight and Balance

Update aircraft weight and balance report as required:

Description	Weight [kg]	Arm [mm]	Moment [kg-mm]
Installation, Spider 6	0.165		

### (A)7.Electrical Load

Installation of the Spider 6 introduces a maximum continuous draw of 1.0A at 12VDC.

Update the aircraft electrical load analysis report as required.

### (A)8.Continuing Airworthiness

Maintenance of the modification is in accordance with the applicable OEM maintenance manual. Instructions for Continued Airworthiness (ICA) are not required.



## (B)Spider 6 Structure Test Procedure

### (B)1. Test Definition

The purpose of these test procedures is to demonstrate structural integrity for the installation of the Spider 6.

### (B)2. Special Tools and Equipment

A calibrated digital or analogue fish hook type scale (e.g. Transducer Techniques HFG-110) is required to conduct the structural testing.

### (B)3. Test Conditions

The Spider 6 must be installed prior to starting the structural testing. Allow for adequate time for the adhesive to fully bond to the installation location.

### (B)4. Applied Loads

Conservative ultimate load factors for structural testing purposes are provided for FAR 23 (normal, acrobatic and utility category airplanes) and FAR 27 (normal rotorcraft) installations. For additional information, refer to the acceptable data source, FAA AC43.13-2B, Chapter 1, Paragraphs 103 through 105.

Load Case	Ultimate Load Factor	Weight of Spider 6	Minimum Applied Load [Load Factor x Weight]
Forward	18.0g	0.165 kg	2.970 kg
Downward	20.0g	0.165 kg	3.300 kg
Upward	5.7g	0.165 kg	0.941 kg
Side	8.0g	0.165 kg	1.320 kg

Table 1: Minimum Applied Loads.

### (B)5. Test Procedure

The following procedures detail the methodology for the structural test.

1. Record the serial number of the Spider 6 being used in the test and complete the test record information.
2. Apply the minimum loads listed in Chapter 3.4 to the centre of the Spider 6 in accordance with AC 43.13-2B, Para 105. Record the actual applied loads:






Forward

Downward

Upward

Side

### (B)6.Pass/Fail Criteria

When no damage or permanent deformation occurs after 7 seconds of applied static load in all directions, the Spider 6 installation is acceptable. Should permanent deformation occur after 3 seconds, reinforcements are required (e.g. doubler installation) to the affected structure and repeat test.

### (B)7.Test Record


Date of Test

Spider 6 S/N

Location of Test

A/C Registration

LAME conducting

testing:

Print Name

Signature

License No.

# (C)Spider 6 Electromagnetic Compatibility Test Procedure

## (C)1. Test Definition

The purpose of these test procedures is to demonstrate Electromagnetic Compatibility (EMC) between the aircraft's electrical or electronic systems, and the Spider 6 being tested. This test procedure is an aircraft-level test to determine if there is any electromagnetic or radio frequency interference (EMI/RFI) to the various critical aircraft systems, radios, and installed equipment.

## (C)2. Special Tools and Equipment

The following equipment may be required depending on aircraft installed equipment and availability of navigation aids and ATC radar in the area where testing is conducted.

- a. NAV/COM Ramp Tester (e.g. NAV-402AP, IFR-4000);
- b. Transponder/DME Ramp Tester (e.g. ATC-600A, ATC-601, IFR-6000);
- c. TCAS Ramp Tester (e.g. TCAS-201, IFR-6000);
- d. Headsets; and
- e. Other equipment as required to exercise all modes of operation for systems under test.

## (C)3. Test Conditions

All aircraft systems under test must be functional prior to starting the EMC test. Any reduced functionality of the system(s) should be noted. All testing shall be conducted in day VFR conditions with a clear view of the sky to ensure that a GPS fix can be obtained for starting the Iridium transmission.

For the test, the following conditions are required:

- a. All engines running with all generators online (for part of the test);
- b. All electrical busses powered; and
- c. All avionics/electrical systems and installed equipment powered and active.

## (C)4. Test Procedure

The following procedures detail the methodology for the EMC test.

1. Identify all aircraft systems under testing from the test matrix table and strike out those that are not applicable to the respective aircraft used in the test.
2. Record the serial number of the Spider 6 being used in the test and complete the test record information.
3. Power up the Spider 6. The left LED on the keypad of the Spider will glow green and the right LED will turn amber when it has a GPS fix.
4. Achieve a Bluetooth connection with the Spider 6 and an appropriate device (e.g. Apple iPhone).
5. Operate each aircraft system under test in all the modes of operation, while monitoring the system for interference. If there is no interference observed, insert a checkmark in the “passed” column. If interference is observed, describe the interference in the respective observation column and contact Spider Tracks Limited for further assistance.
6. Multiple systems may be monitored in tandem to expedite the test whenever possible.
7. Systems should be tested on the ground unless the aircraft system/equipment can only be tested in flight.
8. If there are avionics/electrical systems on the aircraft that are not listed, add them at the end of the table.
9. Ensure there is no interference to aircraft systems from the use of the Spider 6.
10. When test is complete, note any comments or differences in the test procedures “Comments” section remembering to sign and date the appropriate areas at the end of this document.

### (C)5.Pass/Fail Criteria

EMC testing is subjective in nature since an interference can be deemed acceptable or unacceptable. If an interference is observed, the decision of acceptability should be determined by the person who will be making a compliance finding against the applicable airworthiness standards. In general, the systems under test shall have no unintentional changes in operating mode, unexpected responses, intermittent behaviours, or unacceptable noise.

## (C)6. Test Record


Date of Test

Spider 6 S/N

Location of Test

A/C Registration

Aircraft System Under Test	Test Instructions	Passed	Observations
VHF 1	Open squelch. Tune to 118, 120, 124, 128, 132, 136MHz. Listen for noise. Verify transmit and reception.	<input type="checkbox"/>	
VHF 2	Open squelch. Tune to 118, 120, 124, 128, 132, 136MHz. Listen for noise. Verify transmit and reception.	<input type="checkbox"/>	
VHF 3	Open squelch. Tune to 118, 120, 124, 128, 132, 136MHz. Listen for noise. Verify transmit and reception.	<input type="checkbox"/>	
HF 1	Tune to 3, 6, 9, 15, 21, 27MHz. Listen for noise. Verify transmit and reception in both AM and SBB modes for each channel.	<input type="checkbox"/>	
VHF/FM 1	Tune to test frequency. Verify transmit and reception.	<input type="checkbox"/>	
VHF/FM 2	Tune to test frequency. Verify transmit and reception.	<input type="checkbox"/>	
UHF 1	Tune to test frequency. Verify transmit and reception.	<input type="checkbox"/>	
VOR 1	Tune in to local stations and/or use ramp tester. Verify VOR bearing display and station audio ident.	<input type="checkbox"/>	
VOR 2	Tune in to local stations and/or use ramp tester. Verify VOR bearing display and station audio ident.	<input type="checkbox"/>	
SATCOM	Verify operation in all modes.	<input type="checkbox"/>	

Aircraft System Under Test	Test Instructions	Passed	Observations
ILS 1	Tune in to local stations and/or use ramp tester. Verify GS / LOC display and station audio ident.	<input type="checkbox"/>	
ILS 2	Tune in to local stations and/or use ramp tester. Verify GS / LOC display and station audio ident.	<input type="checkbox"/>	
DME 1	Tune in to local stations and/or use ramp tester. Verify correct DME and station audio ident.	<input type="checkbox"/>	
DME 2	Tune in to local stations and/or use ramp tester. Verify correct DME and station audio ident.	<input type="checkbox"/>	
ADF 1	Tune in to local stations and/or use ramp tester. Verify correct indication and station audio ident.	<input type="checkbox"/>	
GPS 1	Display GPS satellite data. Verify signal quality and number of satellites tracking. Verify GPS position is reasonable.	<input type="checkbox"/>	
GPS 2	Display GPS satellite data. Verify signal quality and number of satellites tracking. Verify GPS position is reasonable.	<input type="checkbox"/>	
GPS 3	Display GPS satellite data. Verify signal quality and number of satellites tracking. Verify GPS position is reasonable.	<input type="checkbox"/>	
RAD ALT 1	Verify RAD ALT displays zero feet on ground.	<input type="checkbox"/>	
RAD ALT 2	Verify RAD ALT displays zero feet on ground.	<input type="checkbox"/>	
ELT	Monitor ELT for inadvertent trigger.	<input type="checkbox"/>	
WX RADAR	Operate weather radar in all available modes. And verify no erroneous indications.	<input type="checkbox"/>	
CLOCKS	Verify no erroneous indications.	<input type="checkbox"/>	
STBY INST	Verify no erroneous indications.	<input type="checkbox"/>	
STBY COMPASS	Monitor for erratic indications.	<input type="checkbox"/>	



Aircraft System Under Test	Test Instructions	Passed	Observations
HSI/DG 1	Monitor for erratic indications.	<input type="checkbox"/>	
HSI/DG 2	Monitor for erratic indications.	<input type="checkbox"/>	
AHRS 1	Monitor for erratic attitude and heading indications.	<input type="checkbox"/>	
AHRS 2	Monitor for erratic attitude and heading indications.	<input type="checkbox"/>	
CVR	Run self-test if available. Verify no flags or lights appear.	<input type="checkbox"/>	
FDR	Run self-test if available. Verify no flags or lights appear.	<input type="checkbox"/>	
COCKPIT LIGHTS	Verify normal operation.	<input type="checkbox"/>	
EXTERNAL LIGHTS	Verify normal operation.	<input type="checkbox"/>	
HTAWS	Monitor for erroneous indications. Perform self-test if available.	<input type="checkbox"/>	
TCAS	Monitor for erroneous indications. Perform self-test if available.	<input type="checkbox"/>	
MFD	Monitor for erroneous indications. Perform self-test if available.	<input type="checkbox"/>	
TRANSPONDER	Use ramp tester or check in flight to establish Mode C interrogations.	<input type="checkbox"/>	
CAUTION PANEL	Monitor for erroneous indications.	<input type="checkbox"/>	
CIRCUIT BREAKERS	Monitor for erroneous indications.	<input type="checkbox"/>	
SPAS	Perform system test and monitor for erroneous indications.	<input type="checkbox"/>	
AFCS / SCAS / CSAS	Perform system test and monitor for erroneous indications.	<input type="checkbox"/>	
FLIGHT DIRECTOR 1	Engage flight director in all modes of operation.	<input type="checkbox"/>	
FLIGHT DIRECTOR 2	Engage flight director in all modes of operation.	<input type="checkbox"/>	
ADC 1	Perform a system function test. Verify correct display of airspeed, altitude, TAT, TAS.	<input type="checkbox"/>	



Aircraft System Under Test	Test Instructions	Passed	Observations
ADC 2	Perform a system function test. Verify correct display of airspeed, altitude, TAT, TAS.	<input type="checkbox"/>	
HEATER / ECS	Operate in all modes.	<input type="checkbox"/>	
FUEL QUANTITY	Monitor for erroneous or erratic indications.	<input type="checkbox"/>	
FUEL SYSTEM	Monitor for erroneous or erratic indications.	<input type="checkbox"/>	
HYDRAULIC SYS	Cycle hydraulic pumps. Monitor for erroneous or erratic indications.	<input type="checkbox"/>	
FUEL CONTROL	Cycle system to manual and back to auto. Monitor for erroneous or erratic indications.	<input type="checkbox"/>	
FIRE DETECTION SYSTEM(S)	Monitor for erroneous or erratic indications.	<input type="checkbox"/>	
ENGINE INDICATING	Run engines. Verify proper functioning. Monitor for erroneous or erratic indications. Transfer electrical busses to all engine driven generator(s).	<input type="checkbox"/>	
AC/DC ELECTRICAL SYSTEMS	Configure the electrical systems in different modes. Verify no interference when switching loads from one bus to another.	<input type="checkbox"/>	
MAST MOMENT INDICATOR	Monitor for erroneous or erratic indications.	<input type="checkbox"/>	
FADEC / DECU	Run engines in all modes. Monitor for erroneous or erratic indications.	<input type="checkbox"/>	
VEMD	Run engines in all modes. Monitor for erroneous or erratic indications.	<input type="checkbox"/>	
PITOT STATIC HEAT	Confirm correct operation.	<input type="checkbox"/>	
EMERGENCY LIGHTS	Monitor for inadvertent activation.	<input type="checkbox"/>	
PARTICLE SEPERATOR	Monitor for erroneous indications.	<input type="checkbox"/>	



Aircraft System Under Test	Test Instructions	Passed	Observations
CYCLIC TRIM	Verify for normal operation and monitor for inadvertent activation.	<input type="checkbox"/>	
ENGINE TRIM	Verify for normal operation and monitor for inadvertent activation.	<input type="checkbox"/>	
CARGO HOOK	Verify for normal operation and monitor for inadvertent activation.	<input type="checkbox"/>	
LONG LINE RELEASE	Verify for normal operation and monitor for inadvertent activation.	<input type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	

### Comments

Indicate any deviations from the test procedure, or observations regarding the test results:

---



---



---



---

LAME conducting testing:

\_\_\_\_\_  
PRINT NAME

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
LICENSE  
NO

Pilot conducting testing:

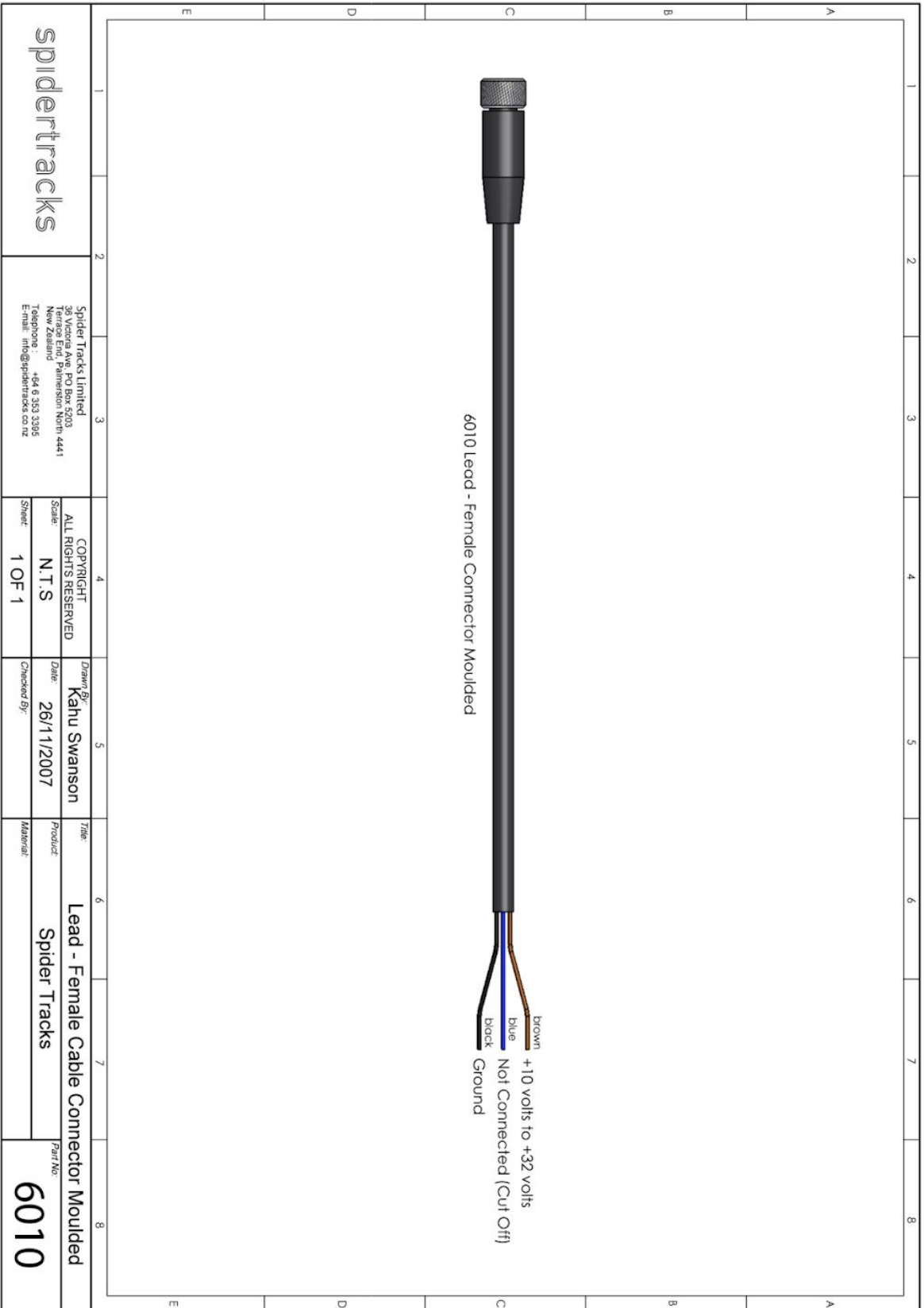
\_\_\_\_\_  
PRINT NAME

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
LICENSE  
NO



# (D)Wiring Diagram - Power Lead



# (E)RTCA DO-160 Test Reports

Links to download:

- [DO-160F Sections 15 and 21](#): Magnetic Effect & RF Emissions
- [DO-160G Sections 7 and 8](#): Shock and Vibration
- [DO-160G Section 17](#): Voltage Spike
- [DO-160G Section 26](#): Flammability

