



# MINS Technologies Inc.

Marine Information & Navigation Systems

[www.minstech.com](http://www.minstech.com)

## ORBIT AL-7103-Ku MKII (OrSat )

### Mid-Life Service Proposal



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Dear Sir / Madame.

Thank you for your expressed interest in servicing and upgrading your VSAT antenna manufactured by Orbit Communication Systems Ltd.

As an Orbit official dealer and service contractor - we are pleased to submit this proposal in response to your enquiry and look forward to working with you to provide the best possible solution.

We hope that the information submitted in this proposal will help with your evaluation process and planning. For any questions or additional information, please do not hesitate to contact us for clarification or assistance. We thank you for your consideration and look forward to working together.

Best Regards.

Sincerely,

Alexander Goldenberg | CEO

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## 1. Introduction

**Orbit's OrSat™ (AL-7103-Ku MK II) 1.15m (45") TxRx Ku-Band Maritime Satellite Communications System** is a dual offset Gregorian stabilized composite material antenna. housed in a 1.28m (52") low-loss Radome.

**OrSat™** is built with an innovative mechanical design, exclusive to Orbit, that allows it to be compact, with no 'keyholes', at Zenith or Horizon for continuous communication in rough sea conditions.

## 2. System Components

- *1.28m (50") Radome*
- *1.15m (45") composite material Ku-Band Tx/Rx antenna, linear polarization*
- *Four axes pedestal*
- *Servo Drive Modules (SDM) (one per axis)*
- *Pitch/Roll sensor and short-term Yaw (IMU)*
- *Tracking controller (SBC), including Narrow Band Receiver (NBR)*
- *GPS receiver and antenna*
- *RF Package, including 4W/8W/16W BUC*
- *Cross-pol RF front-end (OMT, Filters, LNB)*
- *ADMx / BDMx subsystem*
- *Central Control Unit (CCU)*



## 3. Mid-Life Maintenance Service Program

A VSAT system life span is said to be ~10 years. Orbit recommends keeping and extending the life time of an OrSat™ system, by presenting the OrSat™ Half-Life Maintenance program to allow you, the customer, to use and enjoy your investment as long as possible - without degrading the performance and system endurance. With all mentioned above – we would proudly state that the unique Orsat system topology (built with replaceable LRU) permits to extend the system life-span for other 10 years, providing MLS is done once every 5 years.

### Basic MLS (Mid-Life Service) Package

#### 3.1.1 Servo Drive Modules replacement

Each of the Azimuth, X, and Y axes is equipped with an identical SERVO DRIVE MODULE (SDM), which acts as a full self-contained turntable that rotates the axis.

Each SDM contains the following assemblies:

- *Stepper driver with 1:16 micro-step control capability*
- *Integral stepper motor*
- *Back-EMF over-voltage protection card*
- *Dynamic-brakes relay, applying the axes brakes when there is no power*
- *1:1 absolute 17-bit resolution encoder*
- *1:60 reduction gear*



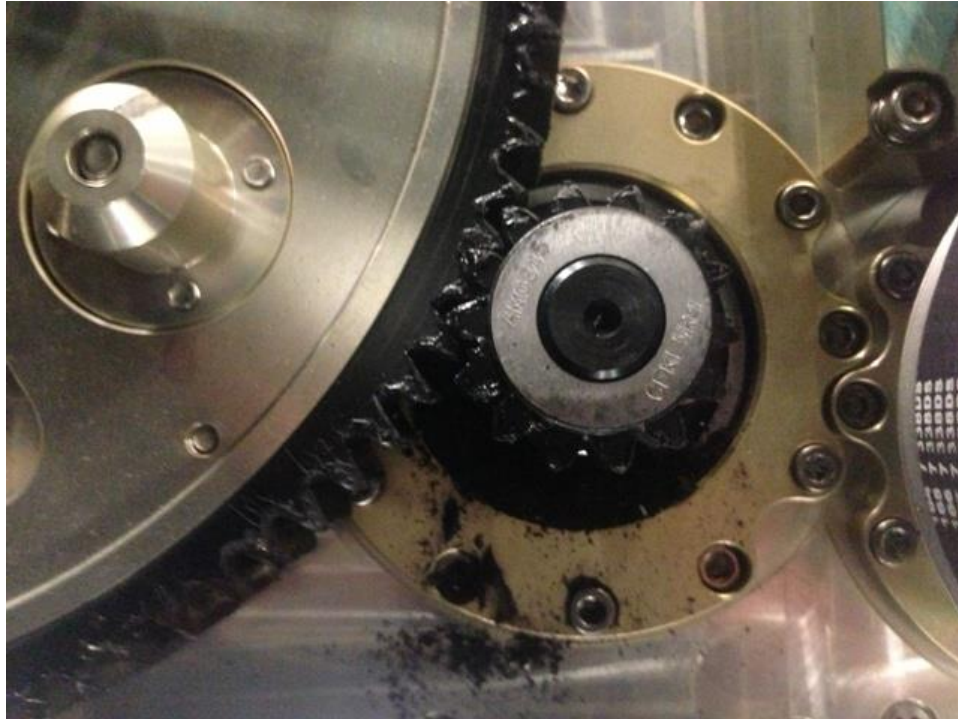


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Since the VSAT antenna's electro-mechanical system is working non-stop 24 hours a day, 7 days a week – the appropriate damage applies to the bearings, step motors as well as to part of electronic hardware. The typical bearing damages have been noticed in ALL Orsat systems that have passed 5 years of extensive work:



The MLS includes replacement of all 3 SDM to either new or refurbished units with more powerful step-motors and an upgraded bearing system.



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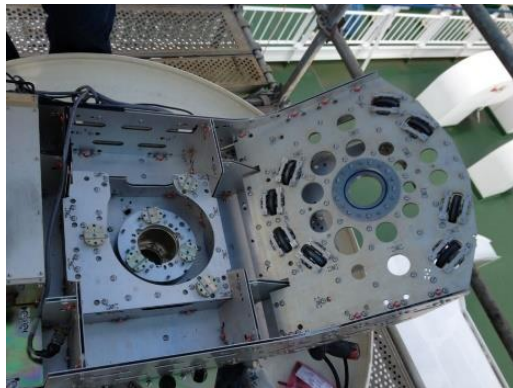
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## 3.1.2 Replacing X, Y & Z axes bearings

For the same reasons mentioned above – OrSat system's axis bearings should be replaced to the new ones.



The three axis bearings replacement process means total system disassembly.



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### 3.1.3 Replacing the base springs

The OrSat™ Anti-Vibration/Shock Absorber Spring is a “Helical” wire rope isolator, all metal multidirectional, with exceptional reliability and long life, high damping, no ageing, corrosion resistant, wide temperature range (-180°C to +300°C), with great adaptability and versatility, complying to the typical shock/vibration specification of Marine: MIL-STD-167, MIL-STD-901, STANAG042, GAM EG13C and more.

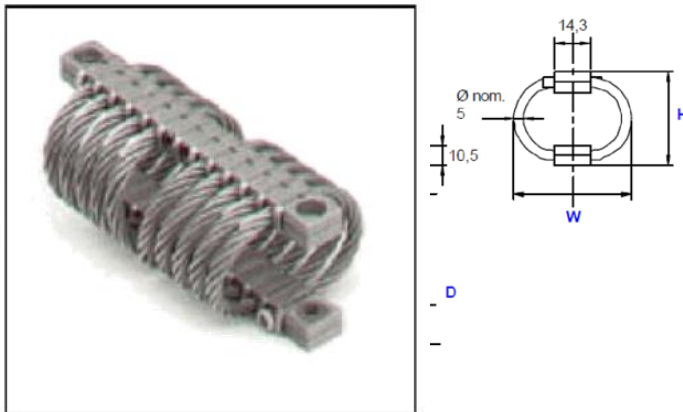


Figure 3-4: Anti-Vibration and Shock Spring #2

### 3.1.4 Replacing the coax cables

Coaxial cable is used as a transmission line for radio frequency signals. Its applications include feed lines connecting radio transmitters and receivers with their antennas, computer network (Internet) connections, and distributing cable television signals

A standard OrSat™ Mk-II ADE has the following cables:

ORBIT P/N	LENGHT (m)	A	B	C	D
26-1144-9-1	12	RX-SPLITER	RX-SPLITTER	SMA-FEMALE	F-MALE
26-1144-9-2	13	RX-LNB	RX-WEDGE	F-MALE	SMA-MALE
26-1144-9-3	0.65	RX-SPLITER	RX-SBC-JB	F-MALE	F-MALE
26-1144-9-4	1.22	TX-WEDGE	TX-ADMX	SMA-FEMALE	F-MALE
26-1144-9-5	1.3	TX-DC INS.	TX-WEDGE	N-MALE	SMA-MALE
26-1144-9-6	0.25			F-MALE	F-MALE



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## **3.1.5 Software upgrade**

Orbit SatCom solutions are built from ADE and BDE, where the main controller of ADE is the SBC/ACU and the Central controller of the BDE is the CCU. The 2 controllers per system communicate with each other, and both units should run the same SW version, but each its own related package. Orbit recommends its customers to keep the systems updated and upgrade them with the latest release SW version, compatible with the system.

The offered upgrade consists of 2 steps:

- SBC software upgrade to the latest version.
- CCU software upgrade to the latest version.

## **3.1.6 CCU LCD screen and PS replacement**

MINSTECH has initiated some additional works, which has not been included in the original Orbit Half-Life program. The CCU LCD screen replacement is necessary to prevent any CCU faults in the nearest 5 years. This operation includes CCU unit removal from the rack, LCD screen and power supply replacement to brand new units.

## **4. The MLS process**

**The Mid-Life Service is the most technically complicated and sophisticated service for the OrSat antenna. There is a range of mechanical, electronic and software tasks involved and requires well-detailed logistical preparation.**

The MINS Tech team has developed special techniques and processes that have allowed us to accomplish the whole MLS service process without removing the system from the pedestal which saves the client money and resources. This statement is relevant when the appropriate safety solutions may be provided by the vessel crew or subcontractors.







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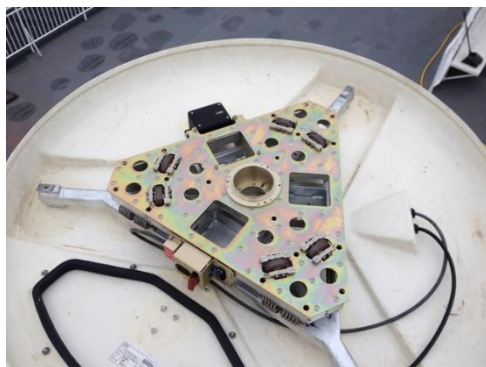
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## The MLS consists of the following major steps:

1. The system configuration back-up download and power shut-down.
2. Dome removal and disassembly SDM modules and the system axes.
3. Disassembly of X, Y, Z axes' main bearings and replacement with new ones.
4. Antenna base disassembly and replacement of old spring absorbers with new ones as well as installation of three additional springs. (OPTIONAL for any cruise or ferry vessels).
5. Replacement of major RF cables and the wave guide cable.
6. Re-assembly of all the modules and system start-up.
7. CCU LCD screen and power supply replacement as well as CCU clean-up
8. The software upgrade for both CCU & SBC.
9. System integration and negotiation on the satellite.
10. The pedestal alignments including X & Y axes offset alignments.
11. Pedestal dynamic test and RF tests including cross-pol alignment, 1 dB compression test, AGC stability tests with different tracking modes and during the sea trial (optional).



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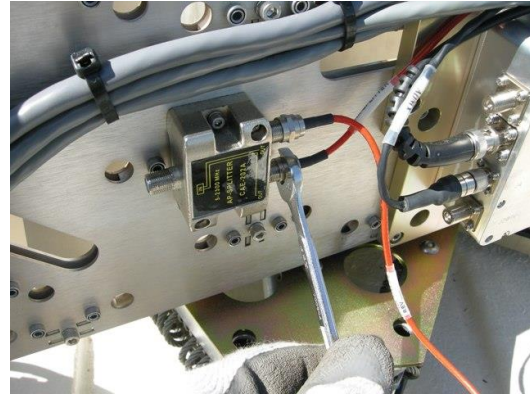
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## 5. Notes

5.1 The estimated service time – 16 hours. (2 working days).

5.2 Orbit 32-0098 MLS KIT should be provided by a Customer or purchased from MINSTECH prior to servicing.

5.3 To perform this service the system needs to be removed from the pedestal and placed at the area that allows a proper condition to disassembly/assembly and testing before re-installation and commissioning. However, MINS has developed special techniques and methods to provide such a task without antenna removal from the pedestal.

We will try to apply these techniques, **but crane operation may be required.**

5.4.1 Since the overall mechanical and electronic condition is unknown – we may recommend the replacement of additional parts or subassemblies. Usually such recommendations may come after the deep, detailed system audit and electro-mechanical tests.

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## 6. Duties and responsibilities

### MINS Technologies:

- The project management and all relevant communication with the Manufacturer, subcontractors, client and any other parties involved.
- The purchased MLS KIT delivered to the Customer facility (vessel) at the time of service.
- The job performance onboard the vessel on the planned date.
- Provide the Customer with the MLS detailed report and the Manufacturer warranty Certificate.
- Issue the invoices for both – labor and MLS KIT separately or as most convenient for the client.

### The Customer (or End User):

- Reception and storage of the MLS KIT on one of the company facilities.
- Coordination and cooperation with the MINS project manager and providing the vessel refit plan with the exact days and locations of work to be done.
- Notify crew and other applicable personnel about planned operation date and nature crane operation (if necessary).
- Dedicated Customer (vessel crew) employee or representative for the service period in the service location chosen (if option “B” has been chosen).
- Provision of timely payments on both (MLS KIT purchase and labor) project stages.

## 7. Warranty

After completion of Mid-Life service, we provide a **6-month warranty to the COMPLETE Orsat AL-7103 MKII system**, supported by the Manufacturer Certificate. Any hardware fault during the 6-month period will be covered by MINS warranty.

**Orbit Communication Systems Inc** – provides free hardware replacement for any system part failure during the warranty period. **MINS Technologies Inc.** - provides free of charge labor work onboard the vessel in replacing failed part. This coverage does NOT include the travel and accommodation expenses, if such warranty service will be required the **Customer** will accommodate for travel expenses related to this warranty service.



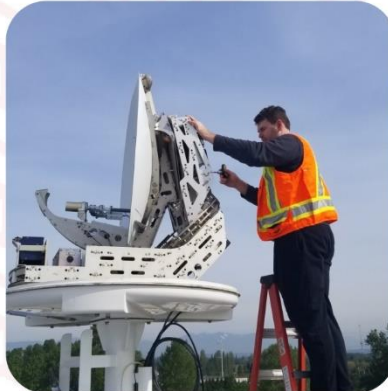




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*Thank you for your interest in our services. Please contact us with any possible questions/suggestions.*

*Yours sincerely – The MINSTECH Team*

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