



201 - 60 Bastion Square • Victoria, BC • Canada V8W 1J2 • www.syscor.com

FR-Tracker

Repeater

User Manual

000252

Rev.0.0.1 (DRAFT)

2013-11-07

PUBLIC

Author: Eric Pesty

Keywords: TMX, FR-Tracker, Manual

Document: Repeater-user-manual-draft_0.0.1.docx

Notice: The authorized version of this document is an electronic master stored in an on-line repository and is write-protected. That is, only authorized persons may alter it. If you are reading a hard copy of this document, be aware that it is to be considered an uncontrolled version of the document.

<this page is left blank, intentionally>

Table of Contents

1	Introduction.....	1
1.1	System Overview	1
2	Regulatory information and notices	2
2.1	Intrinsic Safety	2
2.2	FCC Part 15	2
2.3	FCC Part 18	2
2.4	Industry Canada.....	3
2.5	Antennas	3
3	Repeater installation	4
3.1	Location	4
3.2	Installation	5

DRAFT

Revision History

Revision	Date	Author	Revision Description
0.0.1	2013-Nov-07	Eric Pesty	

Date last saved:

Thursday, November 07, 2013

DRAFT

1 **Introduction**

Scope

The present manual provides installation and operation instructions for the FR-Tracker Repeater (model number 000252)

1.1 **System Overview**

The FR-Tracker system is a multi-component system which provides wireless sensor and monitoring features. The general intent for the system is installation in petroleum shipping and refinery facilities, particularly where large form factor petroleum storage tanks are employed.

The system is scalable but is typically comprised of one Base-Station in communication with multiple Repeaters where each Repeater in turn communicates with one or more Multi-Sensor units. Multiple wireless networks are formed between various units, all of which are ultimately under control of the Base-Station. The Base-Station collects sensor and other system data on an ongoing basis and provides accessibility through wired industrial field bus and Ethernet.

The Repeater and Multi-Sensor components are powered by internal non-rechargeable long-life cells and power is enabled by simple removal of an external magnet, simplifying installation. From a wireless network perspective, the system's various networks are generally self-organizing with further optional manual optimization being supported through web interfaces with the Base-Station.



2 Regulatory information and notices

2.1 Intrinsic Safety

The Repeater has been certified for operation in hazardous locations under the following parameters and conditions:

- Class 1, Division 1, Groups A, B, C and D
- Intrinsically safe Exia
- Ambient temperature range -40°C to +60°C, Temperature Code T5
- Enclosure type 4X

WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY

**WARNING – SUBSTITUTION OF COMPONENTS NOT EXPRESSLY SPECIFIED BY SYSCOR
CONTROLS & AUTOMATION INC. WILL VOID INTRINSIC SAFETY CERTIFICATION**

2.2 FCC Part 15

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

[FCC 15.105 (b) Class B]

Caution: The FR-Tracker system is an intentional radiator of Radio Frequency (RF) energy. In order to limit RF exposure to personnel in the immediate area, the system should be located and installed such that a separation of at least 20 centimeters is maintained between the antennas and personnel in the vicinity of the devices.

Caution: Changes or modifications to this equipment, not expressly approved by Syscor Controls & Automation Inc. could void the user's authority to operate the equipment. [FCC 15.21]

2.3 FCC Part 18

Note:

- (a) The radio(s) of this device operates discontinuously in the RF bands specified as IEEE802.15.4 channels and uses modulation techniques designed to minimize its interference potential. Nevertheless, from time to time brief contention periods may exist for other equipment also operating on these frequencies.
- (b) This equipment requires no calibration or other maintenance in order for it to maintain its adherence to radio frequencies for which it is registered.

(c) In the unlikely event that this equipment is found to noticeably impair the operation of other equipment, reorienting the antenna(s) of this device may reduce or resolve the interference problems. The maximum transmit power of this device can also be reduced using a web browser configuration interface. Finally, the entire system within which this device communicates may be reconfigured so as to block its use of specific IEEE802.15.4 channels.

[FCC 18.213 (a) (b) (c)]

2.4 Industry Canada

This Class B digital apparatus complies with Canadian ICES-003. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

2.5 Antennas

This radio transmitter 11413A-000252 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

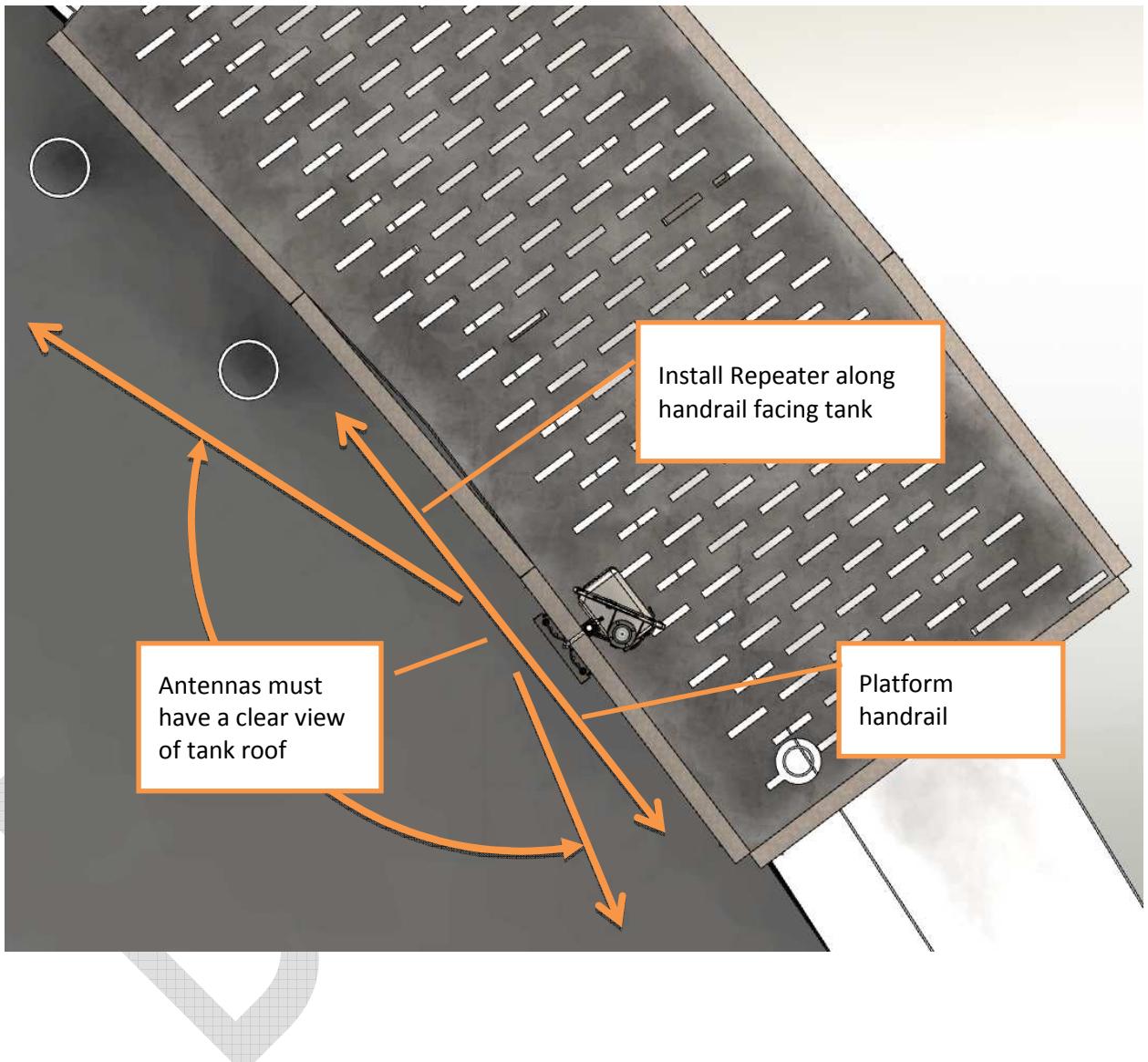
Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

- Downstream: 2.4GHz Omni-directional outdoor antenna, 8dBi maximum gain, 50Ω impedance.
Example: Taoglas Limited part number OMB.242.08F21 or equivalent
- Upstream: 2.4GHz ½ wave dipole whip antenna, 8dBi Maximum gain, 50Ω impedance.
Example: Antenna Factor Part number ANT-2.4-CW-CT-SMA or equivalent.

3 Repeater installation

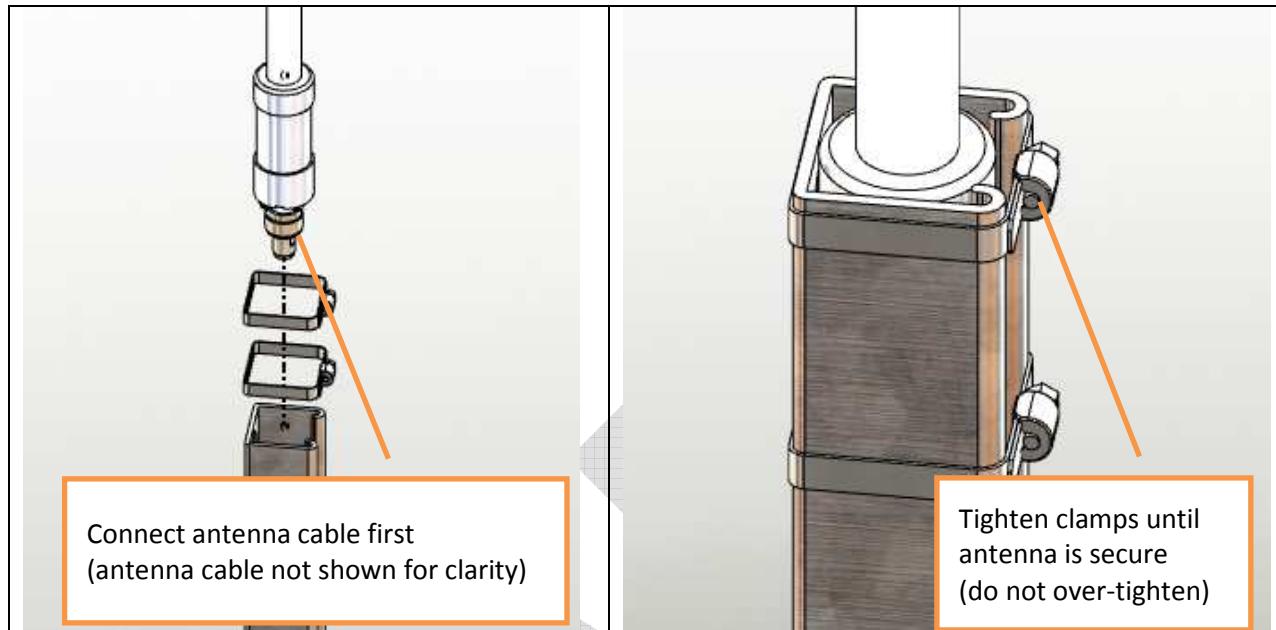
3.1 Location

Repeater should be installed on handrail of the platform facing the tank. Ensure that antennas have a clear line of sight to the tank roof. Follow the steps below for installation details.

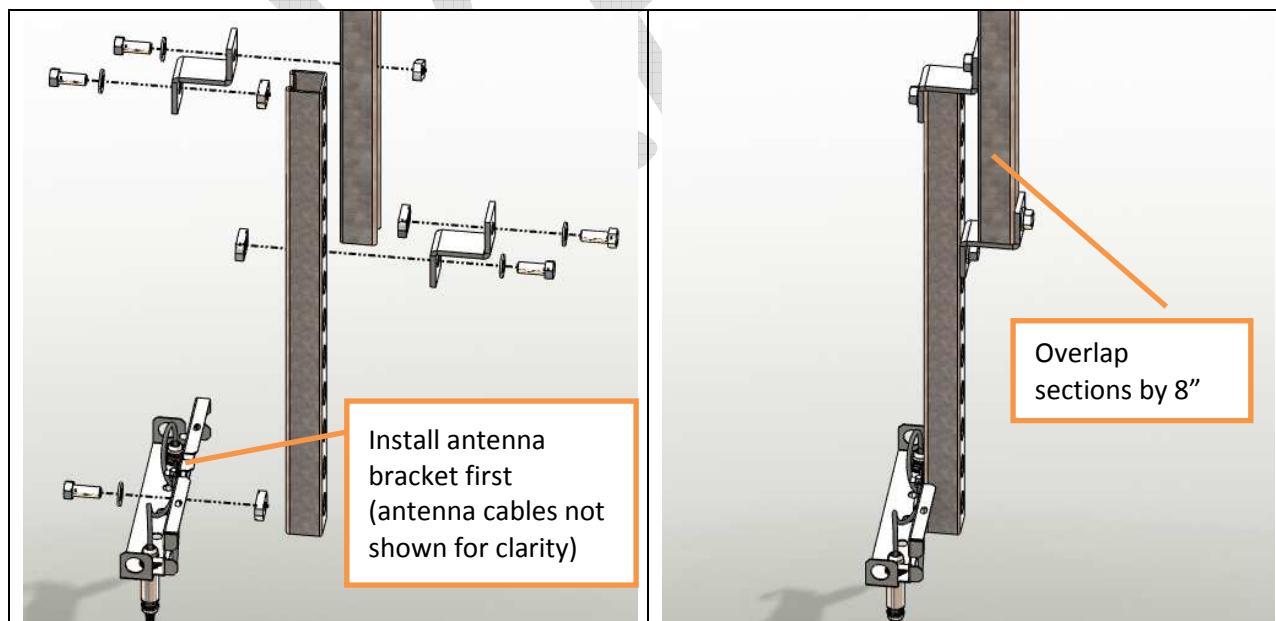


3.2 Installation

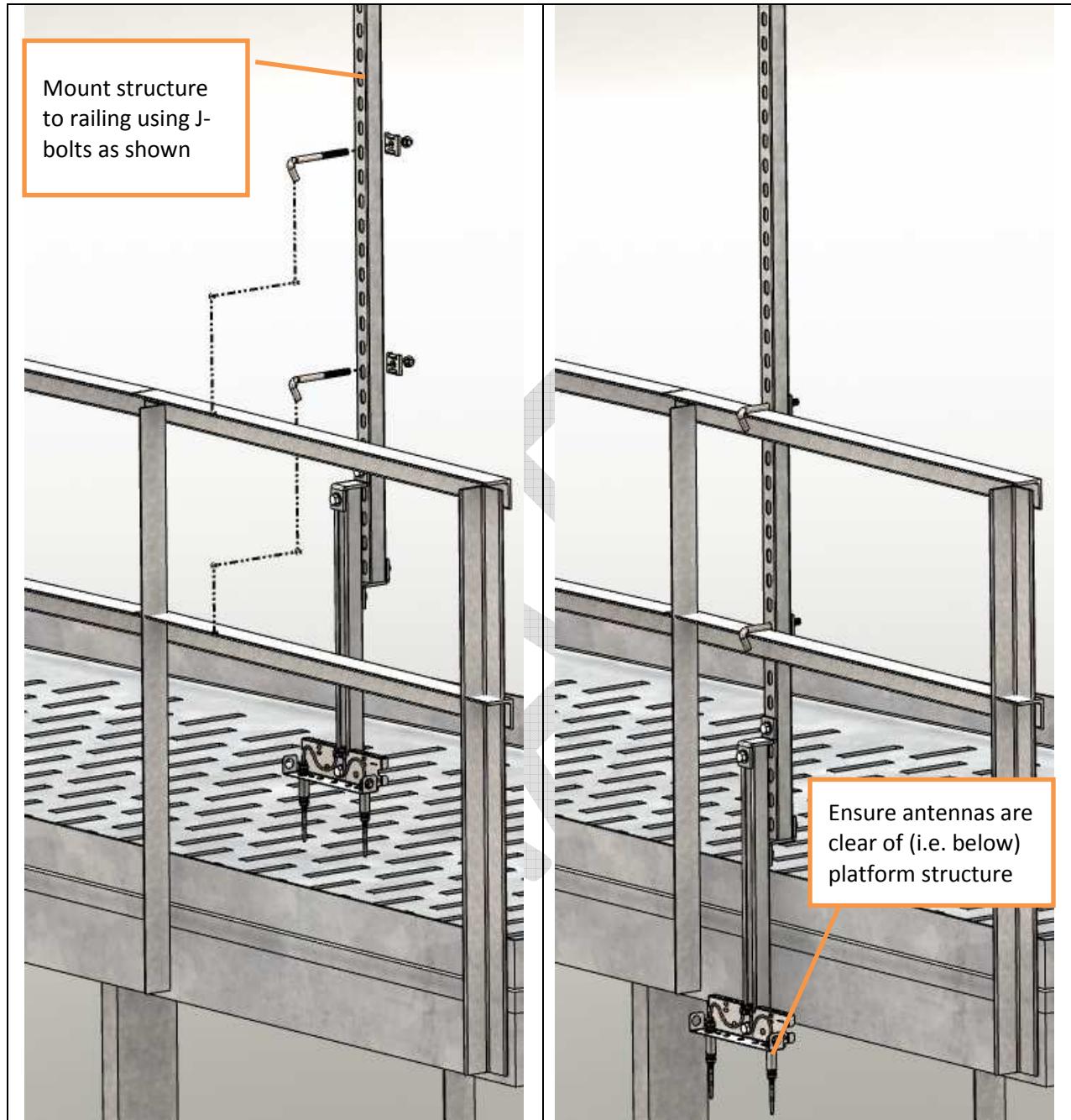
- Base-Station antenna: insert antenna into end of 6' section of strut channel and secure with clamps as shown in figure below. Connect antenna cable to antenna before assembling in strut channel.



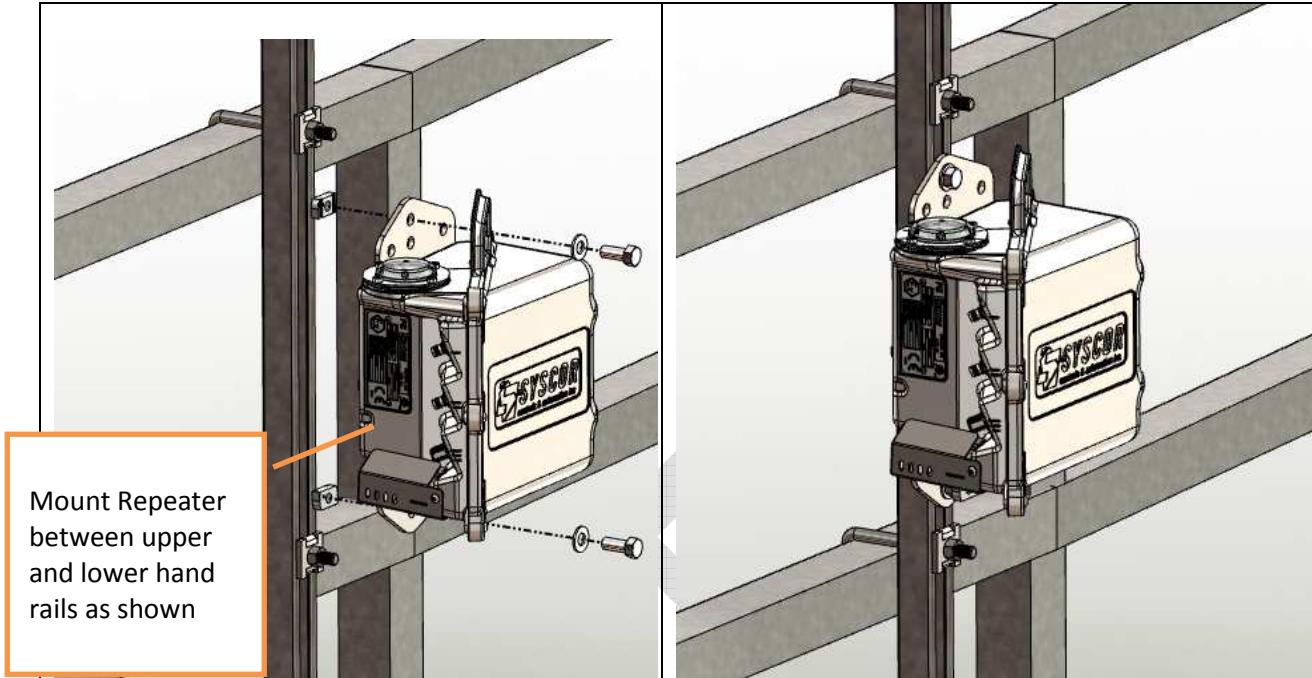
- Tank antenna: install antenna bracket on end of 2' strut channel using one bolt as shown. Connect the two sections of strut channel using 2 Z brackets as shown, overlapping the channels by approximately 8".



- Strut channel structure: install strut channel assembly to platform railing as shown (some of the railing is hidden for clarity). Ensure antennas are clear of bottom of platform structure.



- Repeater body: install Repeater body to strut channel structure as shown (some of the railing is hidden for clarity).



DRAFT

- Antenna wiring: connect antennas as shown. Secure cables individually to strain relief bracket using zip ties. Secure cable runs to strut channel with zip ties, ensuring cables do not contact any sharp edges.

