

# Rail and Heavy Transport

## Heavy Duty Antennas



SINCLAIR TECHNOLOGIES

### The Original Excaliber™

Sinclair offers a broad range of heavy duty antennas, designed to meet the unique requirements of the rail and transport industries including the world renowned Excaliber™ Series which has become the design standard for the industry. These antennas cover the major frequency band allocations from lowband VHF up to 2.4 GHz including ATCS, GSM, GSM-R, Tetra, Public Safety, Trunked and Conventional Mobile Radio, Cellular, PCS and IDEN.

Sinclair also offers scaled and customized designs to address new frequency bands and specialized performance requirements of its customers.

Key market applications for Sinclair rail and transport antennas include trains, subways, trams, monorails, security trucks, buses, heavy transport vehicles and marine vessels.

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ANTENNAS  
FILTERS  
DUPLEXERS  
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COMBINERS  
SYSTEMS

## Global Experience

For decades, Sinclair has worked with industry associations in Europe, the Middle East and North America including Railroad Associations, Public Transit Authorities and Heavy Transport fleet managers to understand and define their unique antenna product requirements. Sinclair is continuing to set the pace for rugged antenna designs that meet the very demanding requirements of the rail and heavy transport industries.

## Sinclair Customer Installations from Around the World

### ***London Underground***

Sinclair is a major supplier of heavy duty specialized antennas for use on the London Underground trains. In 1996, special Sinclair VHF dipole designs were introduced on the Northern and Jubilee Line trains. The particular challenge was to design an antenna which would mount behind the skin of the front of the train, but not be visible externally. The antenna had to fit mechanically into a restricted space envelope surrounded by metal objects. The design and matching of the antenna to achieve the desired electrical performance in an extremely limited space was a challenge successfully met by Sinclair. Due to this experience and success, Sinclair was also chosen in 2002 to design and manufacture high performance train antennas for the major Tetra Public Safety Network being installed in the London Underground. The ST331 was therefore designed to address harsh atmospheric conditions underground.

### ***Egyptian Rail***

Over the last 5 years, Sinclair has supplied several hundred heavy duty VHF Excaliber™ train antennas for use on the Egyptian railways. A specially matched version of the antenna design had to be provided in order to meet the wide bandwidth of the operational frequencies in service. Due to our extensive experience in this area, Sinclair was able to develop and supply these custom-designed antennas quickly for the customer.

### ***Irish Railways***

Since 1997 Sinclair has been the main supplier of UHF heavy duty train antennas for use on the Irish Railways. The ST421R was designed for high speed applications, hence it's low profile robust design. With several hundred units supplied to date, the UHF Excaliber™ train antenna has withstood the test of time again under severe operating conditions.

### ***OEM Bus Manufacturer***

One of the largest North American manufacturers in the heavy duty transit market has been using the SM500 antenna on their buses for over 10 years. In addition, the largest intercity bus manufacturer in North America is using the SM500 for the buses of the New York Bus Transit system.

### ***Canadian Navy***

The Canadian Navy has been using the ST321 and ST321R Excaliber™ antennas on their frigates, destroyers and supply vessels for over 10 years. The ST321 and ST321R have also been installed on commercial cruise and container ships in the Victoria Ship Yards for over 30 years. This antenna is popular for marine applications as it is extremely rugged, stands up well under salt water environmental conditions, and is easily secured to a steel plate.

### ***Canadian Pacific Railway***

Canadian Pacific Railway, one of the premier transcontinental railways in North America, has been using Sinclair Excaliber™ ST221 and ST321 antennas as well as the ST50404 end of train antenna for over 25 years. The extreme North American operating conditions have not been a match for these rugged, high performance, heavy duty transportation antennas.



ST121R - Low Band VHF



ST221 - VHF



ST321 - UHF

### Excaliber™ ST121R, ST221 and ST321

For over 30 years Sinclair's Excaliber™ antennas have been the recognized standard in North America and many other parts of the world for rail and heavy transport applications. The ST121R, ST221 and ST321 use low-profile, cast aluminum designs to achieve unparalleled levels of durability and performance. Typical applications include police cars, emergency vehicles, trains, airfield services, taxis, buses, trucks, tractors and material handling equipment. All models are available with rugged radome enclosures. The ST121R is available in a super low profile version. As well, the ST121 Low band VHF, will soon be released in a one piece, cast aluminium design.

### Excaliber™ ST421R

The latest addition to Sinclair's Excaliber™ line is the ST421R. This model was designed to meet the new GSM-R European Rail Standard for radio communications in the 870 - 960 MHz band, and to operate generally in the 700-1000 MHz frequency range. The GSM-R standard is being adopted in many countries around the world for voice and data railway services, including public safety. The ST421R uses a rugged, low profile, radome enclosed design, only 53 mm in height, making it an attractive solution that uses minimal mounting space and leaves maximum head room clearance.



ST421R

### End of Train Antenna ST50404

Sinclair's ST50404 end of train antenna is used in wireless telemetry applications that track brake function and performance, sense car motion, monitor back-up battery voltage, and monitor emergency brake activation. The ST50404 enables the locomotive operator to receive critical information leading to the safe operation of the train. It is a rugged omni-directional antenna that operates in the 452- 458 MHz railway band.



ST50404

### Heavy Duty 380-400 MHz Train Antenna ST331

This extremely rugged externally mounted dipole antenna provides Tetra band public safety communication system coverage in trains. It is designed to withstand the severe climate, vibration, and shock conditions typically experienced in rail applications. The design uses stainless steel, no-rust construction and comes in a low profile package. The ST331 antenna can also be used in North American UHF applications in the 380-400 MHz bands.



ST331

### Omni Directional Antenna SM503

Sinclair developed the SM503 series of antennas in response to the requirement for a rugged antenna that could provide reliable coverage in a wide range of voice and data applications. This unique design enhances resistance to signal degradation due to fading in the mobile environment. The SM503 is a compact, low profile antenna enclosed in a weatherproof radome, mounted on a cast aluminum base. It is inconspicuous, light weight but extremely rugged, and requires only a minimal ground plane for superior performance. The SM503 is used extensively for advanced train control systems, heavy transport applications and public safety including police, fire, ambulance and security vehicles. These antennas are excellent choices for heavy transport trucks and buses. They are available in frequencies ranging from 806 to 1800 MHz.



SM503

### Omni Directional Antenna SM500

Sinclair's SM500 series of omni directional radome enclosed antennas were designed to provide an economical solution for a variety of rail and heavy transport mobile applications where communication reliability and performance can benefit from their rugged design. This antenna, which is well suited for external rooftop use, is ideal for railroad locomotives, transport vehicles and in-building applications. A ground plane is required.



SM500

**SINCLAIR**<sup>®</sup>  
Superior then, Superior now.



RELIABILITY  
SECURITY  
CUSTOMIZATION  
COVERAGE

Sinclair provides antennas, filters, combining systems, and radio coverage solutions for RF telecommunications networks. Designed to function in extreme weather conditions, Sinclair's products enjoy a reputation for high performance, reliability, durability and value. We have been serving our markets with new innovative products for over 57 years.

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