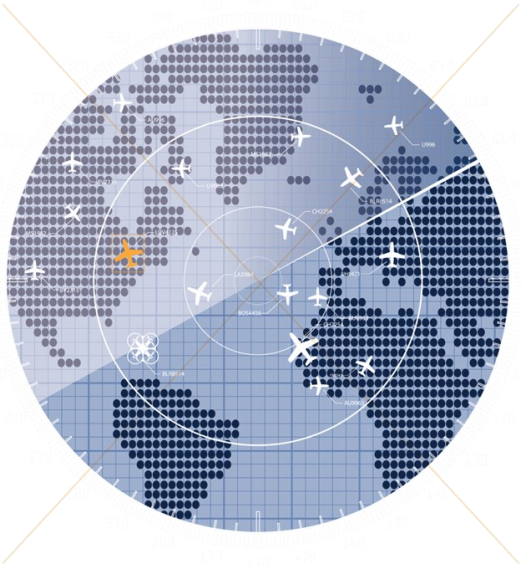
Mission-Critical Data Interoperability

SureLine Features



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1 Introduction

This document describes the features and data conversions available with Sunhillo's SureLine® software version 8.6.0+. It distinguishes the availability of these options with SureLine's base license and its optional Tier 1 and Tier 2 licenses. Where applicable, it also notes any functionality nuances or limitations associated with different hardware platforms.

For additional details regarding any of these features or conversions, refer to document *SUN2353 - SureLine Core Users Guide*.

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2 SureLine Base Overview

2.1 SureLine Base Functionality

SureLine's base functionality consists of the physical interface without additional radar-specific conversion functionality (for example, serial-to-IP, IP-to-serial). The base model supports up to **four** Input/Output streams, except for the Ventnor which supports up to 16 Input/Output data streams.

When UDP is used as a destination or source, the UDP data can be multicast, unicast, or broadcast and be contained in either raw UDP packets or within an Enroute Communications Gateway Protocol (ECGP) or Cyclic Redundancy Check (CRC) frame header, which contains additional information.

When TCP/IP is used as a destination or source, the TCP/IP data can be received and sent out either raw UDP, TCP/IP, translated serially, or any combination of these three transport mechanisms simultaneously.

Table 2-1 lists the base features of SureLine products:

Table 2-1: SureLine Base Features

Base Feature	Description
Serial port consolidation / Fan out	3 ports in → 1 port out 1 port in → 3 ports out Note: This can be up to 15 ports (rather than 3) in/out for the Ventnor.
Data Recording	10 MB recording
SNMP Status and Control	Remote control of SNMP V2 & V3 status and traps via a Management Information Base (MIB)
Security	Full or limited configurable system access with Account Management and User Roles
Unit redundancy	Two SureLine units can act as Active/Standby with UDP health messaging between the units to automatically switch over (with or without Preferred Primary behavior)
Local Area Network (LAN) redundancy	One SureLine unit can have two incoming LANs and can be configured to switch from LAN1 to LAN2 automatically as needed
Serial port redundancy	Two SureLine units using ***unit*** redundancy can also support ***serial port*** redundancy automatically from unit to unit (from Port *x* of unit 1 to Port *x* of unit 2)

2.2 SureLine Serial Port Functionality

Both UDP and TCP/IP can be translated to and from any SureLine platforms with configurable serial interfaces as shown in **Table 2-2**.

Table 2-2: SureLine Serial Port I/O Support

Serial Port Types	I/O Support
13-bit synchronous radar	Input/Output/Bidirectional
9-bit synchronous radar	Input/Output
9-bit synchronous Interfacility	Input/Output/Bidirectional
8-bit raw synchronous	Input/Output/Bidirectional
HDLC Transparent/Unnumbered/ABM DCE/DTE	Input/Output/Bidirectional
HDLC Unnumbered	Input/Output/Bidirectional
HDLC ABM DCE/DTE	Input/Output/Bidirectional
Asynchronous Transparent	Input/Output/Bidirectional
Bisynchronous Transparent	Input/Output/Bidirectional
Bisynchronous Aircat500	Input/Output
Bisynchronous TVT2	Input/Output
Westinghouse TI1033 radar	Input/Output

External clock is an option and the transmitting device can provide clock to Sunhillo products at speeds up to 1.8Mbps (under ideal conditions), which is supported with select products. SureLine has configurable baud rate support per serial port it can generate and the default selectable options are listed in **Table** 2-3.

Table 2-3: SureLine Configurable Baud Rates

Baud rates			
50 kbps	600 kbps	7200 kbps	56000 kbps
75 kbps	1200 kbps	9600 kbps	57600 kbps
100 kbps	1800 kbps	14400 kbps	64000 kbps
134 kbps	2000 kbps	19200 kbps	115200 kbps
150 kbps	2400 kbps	28800 kbps	
300 kbps	4800 kbps	38400 kbps	

A detailed listing of the full features provided with SureLine's base functionality is provided in **Table 2-4**.

Table 2-4: SureLine's Base Functionality

Base Feature	Description
Translation Support	
IP to Serial	Translate IP to Serial
Serial to IP	Translate Serial to IP
IP to IP (4 I/O per unit)	Translate IP to IP
Serial to Serial	Translate Serial to Serial
Visualization	
Radar Display (CD2/ASR9/MAR1 only)	Provide a graphical image of processed radar data.
Generic Input Capabilities	
CD2 In	Receive CD2 data.
ASR9 In	Manage FAA vs. DoD Beacon/Search range radar input.
MAR1 In	Receive MAR1 data.
Framing Capabilities	
ECGP Framer	CD data encapsulated in ECGP LAN protocol.
ECGP Unframer	Receive data in ECGP format and reframe it as CD data.
CRC Framer	Adds a 2-byte index before the data and a 4-byte CRC-32 checksum after the data
CRC Unframer	Receives a message with a 2-byte index header and a CRC 32 footer and verifies its validity
Filtering Capabilities	
ASR9 Filter	ASR9 message filter.
CD2 Filter	CD2 message filter.
Generic Filter (CD2/ASR9/MAR1 only)	Message filtering that can be applied to a variety of input message formats.
Site Filter	Assign site filters for ECGP data from a particular ARTCC.
Duplicate Message Filter	Detect duplicate input messages and filters certain ones out
TI1033 Filter	Filter TI1033 messages.
Utilities	
ARTS Unpacker	Process ARTS data received via TCP/IP.
Timestamp Targets	Add a TOA timestamp to targets based on the scan rate, the targets azimuth and the receipt of scan related messages.
SOM EOM Remover	Drop a configurable number of bytes from the start or end of the data portion of a message before it is transmitted out.
ASTERIX Packer	Places multiple ASTERIX messages into a single packet
ASTERIX Framer	Frames incoming messages into ASTERIX data

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3 SureLine Tier 1 Overview

3.1 SureLine Tier Licensing Overview

A tier license applies to a single SureLine product. If a respective tier is required for a user application using the SureLine product, then a separate tier license is required for each SureLine product. **Table 3-1** denotes the Tier licenses needed for the Longport, whose chassis can contain up to six Processor Card Modules (PCM).

Note that no additional Tier 1 license is required for a 16-port Ventnor versus an 8-port Ventnor.

Table 3-1: SureLine's Tier Functionality for Longport PCMs

Total Serial Ports	Number of PCMs	# of Tier Licenses
4	1	1
8	2	2
12	3	3
16	4	4
20	5	5
24	6	6

3.2 SureLine Tier 1 Functionality

SureLine Tier 1 functionality includes all base functionality plus additional functionality consisting of software features that convert from one radar format to another. SureLine Tier 1 functionality also includes the visualization package and real-time data analysis package via a built-in radar display and real-time data display for applicable data flows and input types. The SureLine Tier 1 functionality enables configuration support for up to a maximum of **10** IP Input/Output streams except for the Ventnor, which supports up to 16 Input/Output streams.

Table 3-2 provides a comprehensive list of all of SureLine's Tier 1 functionality.

Table 3-2: SureLine's Tier 1 Functionality

Tier 1 Feature	Description
Translation Capabilities	
IP to Serial	Translate IP to Serial
Serial to IP	Translate Serial to IP
IP to IP (4 I/O per unit)	Translate IP to IP
Serial to Serial	Translate Serial to Serial
Visualization and Real Time Data Analysis	
Radar Display	Provide a graphical image of processed radar data.
Real-Time Data Display	Provide a tabular real-time display of radar data.
KML Display	Convert radar targets to Keyhole Markup Language (KML) for display.
Generic Input Conversions	
ASTERIX CAT 1&2 In	Receive ASTERIX CAT001/002 input.
ASTERIX Cat 8 Weather In (polar)	Receive ASTERIX CAT008 weather messages
ASTERIX CAT 21 In	Receive EUROCONTROL ASTERIX CAT021 (v.23, .26, 2.1, or 2.4)
ASTERIX CAT 33&23 In	Receive ASTERIX CAT033/023 messages to internal format. (FAA V3)
ASTERIX CAT 34&48 In	Receive EUROCONTROL ASTERIX CAT034/048.
ASTERIX CAT 62 In	Receive ASTERIX CAT062 input.
AIRCAT500 In	Receive AIRCAT500 messages and extract data for use in other functions.
ARSR4 In	Receive ARSR-4 data.
ASR9 In	Manage FAA versus Department of Defense beacon/search range radar input.
ASR9 Weather In	Receive ASR9 Weather data.
ASR11 ASTERIX In	Receive ASR-11 ASTERIX CAT001/002 data.
ASR11 Cat 8 Weather In (polar)	Receive ASR11 ASTERIX CAT008 weather messages
CD2 In	Receive CD-2 data.
CD2 Weather In	Receive CD-2 Weather data.
CD2-T In	Receive CD-2T data.
CD AMS In	Receive CD/AMS format.
MAR1 (FPS117) In	Receive MAR1 data.
Selenia In	Receive data in Selenia format.
SSR2001C In	Process inbound data from SSR2001C radars.
TPS70 13 Bit In	Receive TPS70 13 bit data.
XML SDO In	Receive Surveillance Data Object (SDO) XML input.

Tier 1 Feature	Description
Generic Output Conversions	
ASTERIX CAT 1&2 Out	Output ASTERIX CAT001/002 data.
ASTERIX CAT 8 Out (polar)	Output to ASTERIX CAT008 data.
ASTERIX CAT021 Out	Output ASTERIX CAT021 (v.23, .26, 2.4) data.
ASTERIX CAT 23/33 Out	Output ASTERIX CAT023/033 data.
ASTERIX CAT 34&48 Out	Output EUROCONTROL ASTERIX CAT034/048 data.
ASTERIX CAT062 Out	Output ASTERIX CAT062 data.
AIRCAT500 Out	Convert input data to AIRCAT500 messages, whose output requires synchronization with the radar sweep. By default, this is done by a north mark message in the incoming data. If no north mark is available, you can configure SureLine to use either the BRTQC or SRTQC.
ARSR4 Out	Output ARSR-4 data.
ASR9 Out	Output ASR-9 radar data.
ASR9 Weather Out	Output ASR-9 Weather radar data.
ASR11 ASTERIX CAT 1&2 Out	Output ASR-11 ASTERIX CAT001/002 data.
ASR11 CAT 8 Out (polar)	Output to ASR-11 ASTERIX CAT008 data.
CD2 Out	Output 13-bit CD-2 radar data.
CD2 Weather Out	Output 13-bit CD-2 Weather radar data.
CD2T Out	Output 13-bit CD-2T radar data.
MAR1 (FPS117) Out	Output MAR1 data.
RDIF Out	Output RDIF data.
TPS70 13 Bit Out	Output TPS-70 13-bit data.
CSV Out	Output radar plots & tracks to ASCII comma-delimited data.
XML SDO Out	Output XML SDO data.
Specific Conversions	
ARSR-4 Military to CD2	Convert military ARSR4 format to CD-2 messages.
ARTS to CD2	Convert ARTS message data to CD-ASR messages.
ASR9 to CD2	Convert ASR-9 data to CD-2 format (no scan conversion).
ASR-11 ASTERIX (US UDP) to ASR9	Convert ASR-11 ASTERIX to ASR-9 format.
ASTERIX CAT033 to CD2 (FAA)	Convert ASTERIX CAT033 radar messages to CD-2 Beacon messages.
CD to ASTERIX CAT034/048 (FAA)	Convert CD radar messages to ASTERIX CAT034/048 data.
CD to FAA RAPPI	Converts CD radar messages to Microprocessor Enroute Automated Radar Tracking System (MEARTS) format for use with the FAA Java Random Access Plan Position Indicator (RAPPI).
NUNIO to ASR-9	Convert Sensis NUNIO data to ASR-9 radar data.

Tier 1 Feature	Description
Framing Capabilities	
ECGP Framer	CD data encapsulated in ECGP LAN protocol.
ECGP Unframer	Receive data in ECGP format and reframe it as CD data.
SGF Framer	Uses one or more individual raw messages to create an SGF framed radar packet.
SGF Unframer	Reads one or more messages from an SGF framed radar packet to create individual raw output messages.
CRC Framer	Adds a 2-byte index before the data and a 4-byte CRC-32 checksum after the data
CRC Unframer	Receives a message with a 2-byte index header and a CRC-32 footer and verifies its validity
Filtering Capabilities	
ASR9 Filter	ASR9 message filter.
ASTERIX FRN Filter	Drop specific FRNs, based on input Data Item #, from an ASTERIX category and variant message.
CD2 Filter	CD2 message filter.
Duplicate Message Filter	Detect duplicate input messages and filters certain duplicates out
Generic Filter (CD2/ASR9/MAR1 only)	Message filtering that can be applied to a variety of input message formats.
Geographic Filter	Filter data based on geographic coordinates via polygon file (inside or outside the configurable polygon area).
Mode 3A Range/Azimuth Filter	Assign Range Azimuth Gate (RAG) filters to CD/ASR Beacon or BRTQC messages.
Site Filter	Assign site filters for ECGP data from a particular ARTCC.
TI1033 Filter	Filter TI1033 messages.
Utilities	
Add Lat Long	Convert radar coordinates to geodetic coordinates for a given site.
ARTS Unpacker	Process ARTS data received via TCP/IP.
ASTERIX Framer	Frames incoming messages into ASTERIX data
ASTERIX Packer	Places multiple ASTERIX messages into a single packet
FAA ASTERIX Header	Add a 2-byte message count to a frame to be compliant with the FAA ASTERIX format.
Generate Message	Generate messages from configurable data.
KML Display	Convert radar targets to Keyhole Markup Language (KML) for display.
Radar Display	Provide a graphical image of processed radar data.
Radar Identifier	Assign radar identity to data that does not have this information within the data itself (for example, raw UDP packets).
SOM EOM Remover	Drop a configurable number of bytes from the start or end of the data portion of a message before it is transmitted out.
Timestamp Targets	Add a TOA timestamp to targets based on the scan rate, the targets azimuth and the receipt of scan related messages.

Tier 1 Feature	Description
Plugins that require Tier 1 – Available upon request	
ASR12 to CD2 Status	Convert ASR12 Status messages to CD2 Status messages.
MAR to CD2 Status	Convert MAR1 Status messages to CD2 Status messages.
Mode 3A Code Filter	Filter specific beacon codes (up to 5 beacon codes or 5 configurable ranges of beacons codes).
TPS75 In (9 bit-16 word)	Read data in the TPS-75 format (16 word only).
TPS75 Out (9 bit-16 word)	Output data in the TPS-75 format (16 word only).
Licensed plugins sold separately that require Tier 1 – Available upon request	
Encryption	Encrypts and decrypts Triple Data Encryption Standard (3DES) encrypted UDP packets between two devices.
Multi Track Fuser (MTF)	Utilized for track data alignment of sensor tracks generated by multiple tracked sensors. It produces unique global (system) tracks from these sensor tracks.
Single Sensor Tracker (SST)	Processes plot data received from a single sensor. It applies a smoothing algorithm to this data and correlates the output to a new or existing track. This plug-in supports both the alpha-beta and the Kalman filtering methods.
Licensed features sold separately that require Tier 1 – Available upon request	
Virtual Radar (VR)	Receive Beacon track messages and use these in conjunction with the VR configuration parameters to provide emulated (virtual) radar that outputs the data in a virtual scan.

3.3 SureLine Tier 1 Conversions

Input data messages are translated to an intermediary “generic” format. Some data bits may not map directly. Special configuration parameters can be added to handle unmapped data via custom software development, which may or may not require additional costs depending on the level of effort.

See Section **5** for details regarding the available Tier 1 conversions.

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4 SureLine Tier 2 Overview

4.1 Tier 2 Functionality Overview

All Base and Tier1 functionality is also contained within the Tier 2 license. The additional functionality and features beyond what is contained in the Base and Tier 1 configurations are shown in **Table 4-1**.

Tier 2 includes complex conversions that require persistent state data such as scan generation. The Tier 2 configuration supports a maximum of 150 IP Input/Output streams (sites) on Sunhillo hardware platforms that support higher levels of IP to IP processing.

Table 4-1: SureLine's Tier 2 Functionality

Tier 2 Feature	Description
Input/Output - Surveillance streams	Supports up to 150 IP Input/Output streams (sites)
ASR9-CD2 conversion and skip scan	CV4400 functionality including BRTQC adjustment and scan conversion.

Note

Sunhillo does not recommend more than 10 IP-to-IP Inputs/Outputs on these platforms due to hardware/processor constraints: RICI 4500/5000, Longport 4500/5000, Ventnor, and Margate II ADS-B.

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5 Supported Conversions

This section focuses solely on the conversions available with the Base, Tier 1, and Tier 2 functionality of SureLine. The material is presented in the form of individual tables showing very specific feature subsets.

This section also describes the optional plugins to the SureLine software that are available. These plugins provide unique, and/or customizable additional application features.

The subsections are:

- **Section 5.1, Radar Format and Frame Conversions** – Depicts the conversions from one surveillance data format to another and the various framing options (e.g., ECGP framing)
- **Section 5.2**, **Input Plug-ins Conversions** – Describes the plug-ins used to convert data from the supported ***input*** data format to various output formats. It also lists any framing that is supported.
- **Section 5.3**, **Output Plug-ins Conversions** - Describes the plug-ins used to convert data input data to various ***output*** data formats. It also lists any framing that is supported.
- **Section 5.4**, **Built-in Features and Transports** – Provides a comprehensive list of the innate and licensed features of the SureLine software. These featues include filters, utilites, and conversions. It also lists the Multi-Protocol Suite (MPS) supported transports. Refer to *SUN2353 - SureLine Core Users Guide* for further details regarding these features.
- **Section 5.5**, **Plug-ins** – Offers a comprehensive list of all plug-ins available for the SureLine application, which are provided separately upon request.

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5.1 Radar Format and Frame Conversions

	CD2-C	CD2-T	AIRCAT500	ASTERIX CAT 001/002	ASTERIX CAT 034/048	ASR-9	MAR-1 (FPS117)	ARSR-4	ASR-11 ASTERIX CAT 001/002	RDIF	TPS70 (13 bit)	Civil Aviation Authority (CAA)	ASR-9 Weather	CD-2 Weather	ASTERIX CAT 008 Weather (polar)	ASR-11 CAT 008 Weather (polar)	ASTERIX CAT 021*	ASTERIX CAT 062	ASTERIX CAT 023/033**	OTG (Over the horizon gold)	XML SDO	CSV	KML	SGF Framer/Unframer***	ECGP Framer/Unframer	CRC Framer/Unframer
ARSR-4	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→	→	→	→
ASR-9	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→	→	→	→
ASR-9 Weather													→	→	→	→								→	→	→
CD2-C	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→	→	→	→
CD2-T	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→	→	→	→
CD-2 Weather													→	→	→	→								→	→	→
CD AMS	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
MAR-1 (FPS117)	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→	→	→	→
TPS70 (13 bit)	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→	→	→	→
AIRCAT500	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
Selenia	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
SSR2001C	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
TSR-07C (Japanese Radar)	→	→	→	→	→	→	→	→	→	→	→	→									→	→	→			→
ASR-11 ASTERIX	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
ASR-11 ASTERIX CAT 008 Weather (polar)													→	→	→	→										→
ASTERIX CAT 001/002****	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
ASTERIX CAT 008 Weather (polar)													→	→	→	→										→
ASTERIX CAT 021*	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
ASTERIX CAT 023/033**	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
ASTERIX CAT 034/048*****	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
ASTERIX CAT 062	→	→	→	→	→	→	→	→	→	→	→	→						→		→	→	→	→			→
ADS-B (from RF Antenna - Margate II only)	→	→	→	→	→	→	→	→	→	→	→	→					→	→	→	→	→	→	→			→
Traffic Flow Management Data (TFMD)																	→	→	→	→	→	→	→			→

Radar Format/Frame Conversion Support Legend

→	Conversion from row format to column format
→	Conversion requires addition of Virtual Radar (converts track data to plot data)
→	May require addition of the SST plugin if input data doesn't contain track information (**SGP only**)
→	ECGP, SGF, or CRC Framing capability supported

* ASTERIX CAT 021 supported sub-types	v.23, v.26, v2.1, v2.4 (limited to the confines of SureLine Generic data conversions)
** ASTERIX CAT 023/033 supported sub-types	FAA v3 (limited to the confines of SureLine Generic data conversions)
*** SGF version support	SGF versions 1.1 full & reduced & SGF version 2.0
**** ASTERIX CAT 001/002 variants supported	Eurocontrol, Colombia, TPS77, and Australia
***** ASTERIX CAT 034/048 variants supported	Eurocontrol, TPS78 Secure IFF, and Australia

5.2 Input Plug-ins Conversions

	CD2-C	CD2-T	AIRCAT500	ASTERIX CAT 001/002	ASTERIX CAT 034/048	ASR-9	MAR-1 (FPS117)	ARSR-4	ASR-11 ASTERIX CAT 001/002	RDIF	TPS70 (13 bit)	Civil Aviation Authority (CAA)	ASTERIX CAT 021*	ASTERIX CAT 062	ASTERIX CAT 023/033**	XML SDO	CSV	KML	SGF Framer/Unframer***	ECGP Framer/Unframer	CRC Framer/Unframer
TPS75 (9 bit)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		→
Cardion CTE-2F	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			→
ASTERIX CAT 159	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			→
MRDIF	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			→
TPS-63SS	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			→
Textron GCS	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			→
MXTeaCSVSystem	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			→

Input Plug-ins Conversions Legend

→	Conversion from row format to column format
→	Conversion requires addition of virtual radar (converts track data down to plot data for interoperability)
→	May require addition of the SST plugin if the input data does not contain track info (SGP only)
→	ECGP, SGF, or CRC Framing capability supported
* ASTERIX CAT 021 supported subtypes	v.23, v.26, v2.1, v2.4 (limited to the confines of SureLine Generic data conversions)
** ASTERIX CAT 023/033 supported subtypes	FAA v3 (limited to the confines of SureLine Generic data conversions)
*** SGF version support	SGF versions 1.1 full & reduced & SGF version 2.0

5.3 Output Plug-ins Conversions

	TPS75 (9 bit)	TPS 72	TARS OTG
CD2-C	→	→	→
CD2-T	→	→	→
AIRCAT500	→	→	→
MAR-1 (FPS117)	→	→	→
ASR-9	→	→	→
ARSR-4	→	→	→
CD AMS	→	→	→
SSR2001C	→	→	→
TPS70 (13 bit)	→	→	→
Selenia	→	→	→
TSR-07C (Japanese Radar)	→	→	→
ASR-11 ASTERIX	→	→	→
ASTERIX CAT 021*	→	→	→
ASTERIX CAT 023/033**	→	→	→
ASTERIX CAT 001/002****	→	→	→
ASTERIX CAT 034/048*****	→	→	→
ASTERIX CAT 062	→	→	→
ADS-B (from RF Antenna - Margate II only)	→	→	→
TFMD			→
SGF Framer/Unframer	→	→	→
ECGP Framer/Unframer			
CRC Framer/Unframer	→	→	→

Output Plug-ins Conversions Legend

→	Conversion from row format to column format
→	Conversion requires addition of Virtual Radar (converts track data down to plot data)
→	May require addition of the SST plugin if the input data does not contain track info (**SGP only**)
→	ECGP, SGF, or CRC Framing capability supported
* ASTERIX CAT 021 supported subtypes	v.23, v.26, v2.1, v2.4 (limited to the confines of SureLine Generic data conversions)
** ASTERIX CAT 023/033 supported subtypes	FAA v3 (limited to the confines of SureLine Generic data conversions)
**** ASTERIX CAT 001/002 variants supported	Eurocontrol, Colombia, TPS77, and Australia
***** ASTERIX CAT 034/048 variants supported	Eurocontrol, TPS78 Secure IFF, and Australia

5.4 Built-in Features and Transports

Filters	Utilities	Specific Conversions	Serial to UDP/TCP	MPS Transports***
ASTERIX Filter	Virtual Radar	CD to FAA RAPPI	13-bit radar**	MPS Async
Generic Filter*	Filler Module	ASR-11 ASTERIX (US UDP) to ASR-9	8-bit raw synchronous**	MPS SBSI
ASR-9 Filter	ARTS Unpacker	ARTS to CD-2	9-bit Interfacility**	MPS TADIL-B
CD-2 Filter	Timestamp Targets	CD to ASTERIX CAT 34/48 (FAA)	9-bit radar	MPS X.25
TI1033 Filter	Radar Display*	ASTERIX CAT 033 to CD-2 (FAA)	AIRCAT 500	**MPS Radar Protocols**
Duplicate Message Filter	Radar Identifier	ASR-9 to CD-2	Async Transparent**	ASTERIX
ASTERIX FRN Filter	SOM EOM Remover	NUNIO to ASR-9	Bisync TVT2	CD-2
Mode 3A Filter	ASTERIX Framer	ARSR-4 Military to CD-2	HDLC Transparent**	General 18-bit
Mode 3A Range/Azimuth Filter	ASTERIX Packer	CV4400 Emulation	HDLC Unnumbered**	Marconi 10-bit
Geographic Filter	Site Switchover		NADIN	Modified Eurocontrol
Identity Filter	ASTERIX SIC/SAC Changer		TI1033	NEC Radar Extractor
Site Name/ID Filter	ASTERIX Validator		Transparent Bisync	Raduga-2
Generic Filter	FAA ASTERIX Header			Thompson-CSF
	Add Latitude and Longitude			Thompson-TVT2
	Generate Message			Toshiba
	Radar Display			TPS-43
	Real-Time Data Display			TPS-75
	KML Display			**MPS HDLC Protocols**
	Message Receipt Latency Alert			DFX
	Track Limiter			HABM
				HNRM
				LAPB

Filters/Utlities/Specific/Conversions & Transports Legend

These filters, utilities and specific conversions are accessible with a base licensed SureLine product
These filters, utilities and specific conversions are accessible with a Tier 1+ licensed unit
These filters, utilities and specific conversions are accessible with a Tier 2 licensed unit
These filters, utilities, or specific conversions require Tier 1 and are also sold and licensed separately
*Applies only to CD-2, ASR-9, & MAR-1. The Tier 1 version applies to all radars.
**Includes 13-bit bi-directional data.
***MPS protocols available on RICI 5000 and Ventnor only.

5.5 Plug-ins

Specific Conversion Plug-ins	Input/Output Plug-ins	Utility/Filter Plug-ins
ASR-12 to CD-2 Status	ASTERIX CAT 159 In	Encryption
ASTERIX CAT 048/034 To NATS 001/002	CTE-2F In	Single Sensor Tracker
CD-2 to ASTERIX CAT 034	MRDIF In	Multi Track Fuser
FPS117CnC	MXTeaCSVSystem In	ABS-HQ-Encryption
MAR-1 to CD-2 Status	TARS OTG Out	ABS-Message Throttler
MPSapi	Textron GCS In	Azimuth Eccentricity
	TPS75 In	Generic Recorder
	TPS75 Out	Mode 3A Filter
	TPS72 Out	NASA LVC Gateway
	TPS-63SS In	SIC/SAC Filter
		Time Stamper
		RDFPS
		CAT034 Status Filter

Plug-ins Legend

These plug-ins are accessible with a Tier 1+ licensed unit
These plug-ins require Tier 1 and are also sold and licensed separately

Note

These plug-ins are available upon request from Sunhillo. The processing by some plug-ins may be too customized for most users as they were developed for specific field applications.