

PRODUCT DATA SHEET

THE SHIFT5 PLATFORM

Our nation's military assets, such as transport and combat aircraft, tanks, ships and space assets, create massive volumes of short-lived data obscured across a vast terrain of onboard networks and proprietary Operational Technology systems. This data is critical to survivability, readiness, and lethality, but modern warfighters are locked out. Those who can capture and make sense of this data will gain a strategic competitive edge, and those that can't will be left in the dark.



SHIFT5

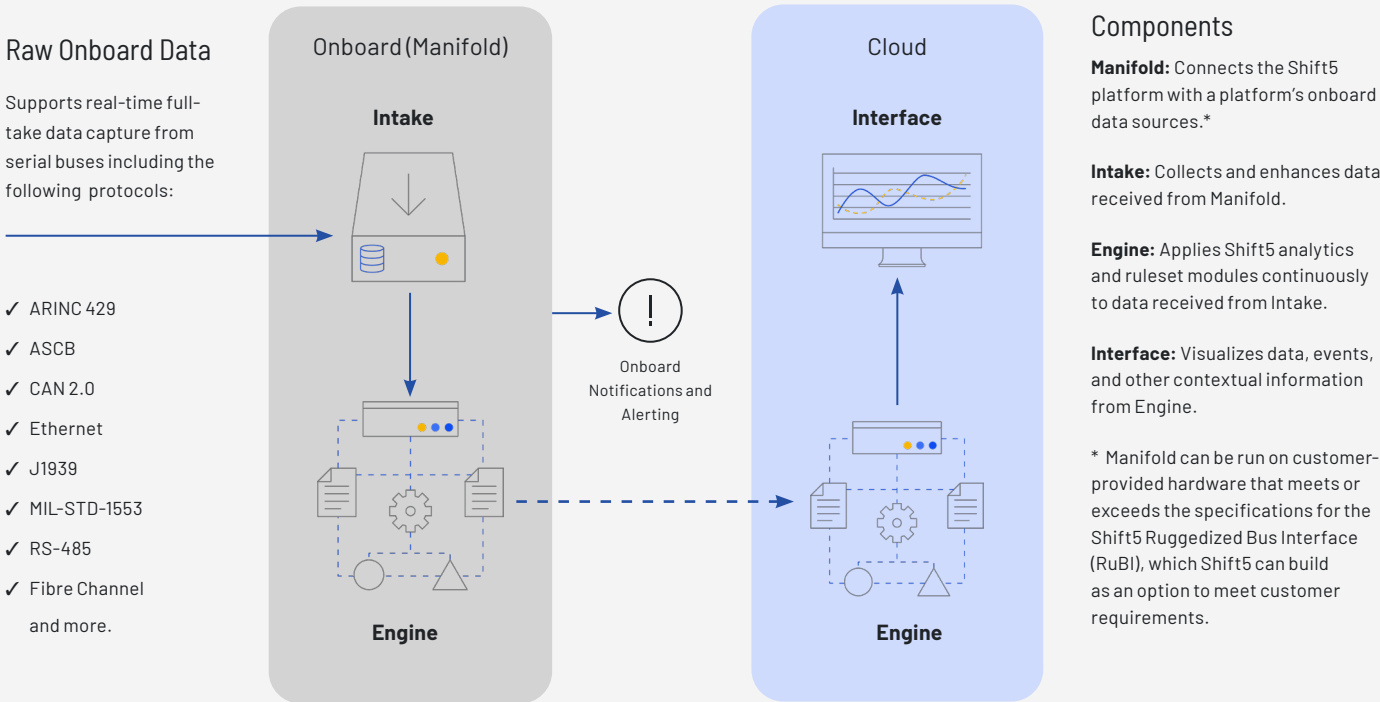
The world's most comprehensive data and cybersecurity platform for planes, tanks, and weapon systems.

Shift5 brings order to the complexity of onboard data.

Our platform captures and analyzes onboard data in real time, revealing the critical operational and cybersecurity insights needed to move from data to decisions quickly and confidently. These insights provide real-time alerting, historical trends, and new perspectives beyond the limits of log files and traditional dashboards. With the Shift5 platform, modern warfighters are better prepared to ensure the readiness and cyber resilience of military assets.

HOW IT WORKS

The Shift5 platform deploys on-prem or in the cloud and supports streaming and air-gapped modes for offline and online capability. The platform is tested TRL 9, DoD Authority to Operate (ATO) expected in February 2023, and is deployed today across production and operational environments.





VISIBILITY

What you can't see can't help you. The Shift5 platform's passive, full-take data capture provides unprecedented visibility into the most important and longest-lived military assets.

- Collect and analyze every frame of data from multiple onboard OT data sources.
- Enrich data with metadata such as GPS, timestamps, phase of flight, etc.
- Analyze complex data sets and translate them into meaningful information.
- Visualize anomalies and data trends at the individual vehicle level and at fleet scale.

CRITICAL INSIGHTS

Move quickly from data to decisions. The Shift5 platform analyzes the data it collects to uncover critical conditions-based maintenance insights that help ensure asset availability, readiness, and lethality.

- Identify and prioritize maintenance or repairs based on indicators of impending failure or decreasing performance.
- Reduce the time between repairs compared to traditional preventative maintenance.
- Ensure teams have the right supplies and parts to perform just-in-time maintenance.
- Export Shift5 data to other analytics platforms to train AI tools.
- Export data from the Shift5 platform in any industry-standard format.
- The Shift5 platform includes available APIs for data scientists.

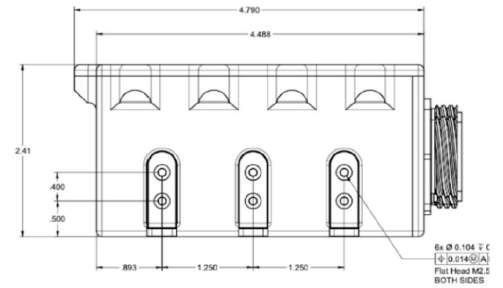
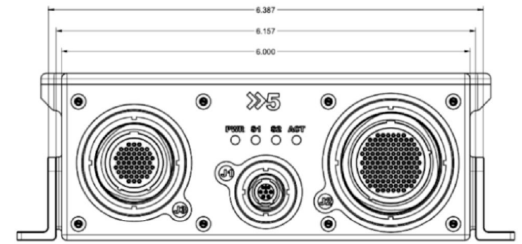
CYBERSECURITY

Hunt threats and take action. The Shift5 platform detects, identifies, and alerts on anomalous behavior, conducts real-time inspection, and takes action to get ahead of cybersecurity threats.

- Sense vehicle state and detect anomalies including
 - **Message injection**
 - **Denial of service**
 - **Unexpected source/dest pair**
 - **Untrusted source**
 - **Behavioral anomalies**
- Monitor data continuously using advanced algorithmic machine learning engines and behavioral heuristics with advanced statistical methods

SHIFT5 RUGGEDIZED BUS INTERFACE

The Shift5 RuBI™ (Ruggedized Bus Interface) is a customizable, Shift5-built solution that meets the Shift5 platform's hardware requirements for Manifold. Intake on RuBI provides passive, full-take data capture, while Engine on RuBI analyzes and enriches serial bus, Ethernet, and other data in real time and provides real-time onboard alerting. RuBI is adaptable to specific application requirements and has been tested against the most stringent environmental conditions, such as RTCA DO-160G and the U.S. Department of Defense Test Standards including, but not limited to, MIL-STD-810H, MIL-STD-461G, and MIL-STD-704F.



SPECIFICATIONS

Processor	Intel Atom C3708					
Expansion Slots	4x Mini PCIe Slots					
Memory	32GB DDR4					
Storage	2TB SSD internal (Up to 3,000 flight hours stored on board)					
Data Compression	100:1 (protocol dependent)					
Power	18-32 VDC					
Dimensions	6.0 x 4.5 x 2.4 inches					
Weight	4 lbs					
Temperature Range	-40 to +71 C operational, -55 to +85 C storage					
MIL-STD Testing	Meets MIL-STD-810G, MIL-STD-461G, and MIL-STD-704F requirements					
Encryption	Deploys LUKS for full disc encryption, meets CNSP 11 requirements					
Data Streaming	Supports air gapped and streaming off-board in real-time					
Safety	Passive-only data collection					
Example of maximum buses supported in a single protocol configuration	MIL-1553 8	ARINC 429 24	CAN-BUS 16	RS-422 8	Eth 10/100/1000 8	Fibre Channel 4

COMPLIANCE TESTING

<p>MIL STD 810H & DO-160G</p>	<ul style="list-style-type: none"> • Method 500.6 - Operational Altitude (70kft) • Method 500.6 - Rapid Decompression (70kft to 8kft in 15 sec) • Method 511.7 - Explosive Atmosphere (71C & 40kft) • Method 514.8 - General Vibration (7.7 Grms 1 hr/axis) • Method 516.8 - Functional Shock (40g SRS 18 pulses) • Method 516.8 - Crash Hazard Shock (75g SRS 12 pulses) • Method 501.7 - High Temp Storage & Operation (85C Storage, 71C Operation) • Method 502.7 - Low Temp Storage & Operation (-55C Storage, -40C Operation) • Section 5.0 - Temp Variation : Category B (-40C to 71C @ 5C/min 2 cycles) • Method 507.6 - Aggravated Humidity (30C - 60C @ 95% RH 10-24hr cycles) • Method 509.7 - Salt Fog (5% Salt Fog @ 35C 2-24hr cycles separated by 24hr drying cycles)
<p>MIL STD 461G</p>	<ul style="list-style-type: none"> • CE101 - Conducted Emissions, Audio Freq (Power Leads) • CE102 - Conducted Emissions, Radio Freq (Power Leads) • CS101 - Conducted Susceptibility (Power Leads) • CS114 - Conducted Susceptibility, Bulk Cable Injection • CS115 - Conducted Susceptibility, Impulse Excitation • CS116 - Conducted Susceptibility, Damped Sinusoidal Transients • CS118 - Conducted Susceptibility, Personnel Borne Electrostatic Discharge • RE101 - Radiated Emissions, Magnetic Field • RE102 - Radiated Emissions, Electric Field
<p>MIL STD 704F</p>	<ul style="list-style-type: none"> • LDC101 - Load Measurement • LDC102 / LDC301 / LDC401 - Operation Steady State • LDC103 - Distortion Spectrum • LDC104 - Total Ripple • LDC105 - Normal Transients • LDC201 - Power Interrupt • LDC302 - Abnormal Voltage Transients • LDC501 - Starting Voltages • LDC601 - Power Failure

SHIFT5

Shift5 is the onboard OT data and cybersecurity company for planes, trains, and tanks. Created by founding members of the U.S. Army Cyber Command who pioneered modern weapons system cyber assessments, Shift5 defends military platforms and commercial transportation systems against malicious actors and operational failures. Customers rely on Shift5 to detect threats and maintain the readiness and availability of today's planes, trains, tanks, and weapons systems and tomorrow's next-generation vehicles.