ASPEN™ TECHNOLOGY

High Performance, Flexible, Reliable and Ready

ASPEN (Advanced Signal Processing ENgine) is the latest technology and innovation platform from L3Harris. It provides core functionality to a wide assortment of flexible Software Defined Radio (SDR) system implementations, enabling CDL/BE-CDL, ROVER® legacy waveforms, Intelligence Surveillance and Reconnaissance (ISR) data links, Advanced Tactical Data Link (ATDL), SATCOM and Electronic Warfare (EW) capabilities.

PRODUCT DESCRIPTION

The L3Harris ASPEN Technology platform consists of a series of proven hardware modules with programmable SW and FPGA options to provide the most advanced, configurable data links. ASPEN Technology provides a foundation for custom development of next-generation products with major advancements in high data rate or protected communications.
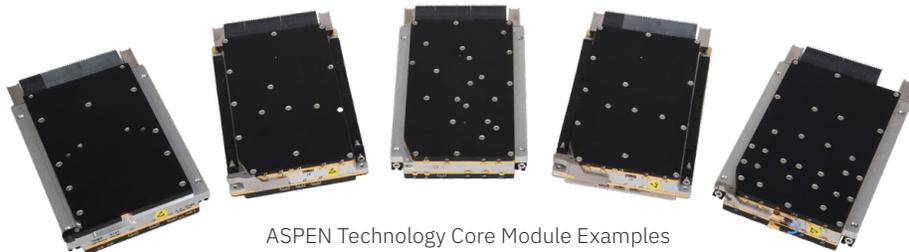
ASPEN provides ROVER legacy waveforms and ROVER interoperability, STD-CDL waveforms, BE-CDL waveforms, SATCOM waveforms, covert waveforms, and network functionality in a single system solution to meet the needs of the most demanding environments and users.

Standardized modules minimize cost, reduce design and production lead time, maximize configurability, and facilitate a family of precision, ultra-high speed, reliable products.

ASPEN features are typically not all implemented in every product configuration at the same time—the system is tailored to focus on the platform objectives.

System configuration examples demonstrating the flexibility of the core modules include:

> CDL / BE-CDL / ISR – high-bandwidth, video streaming, bidirectional point-to-point, and networked connections for LOS and SATCOM

> ATDL – ultra flexible mobile adhoc networking, covert communications and precision positioning

> EW – electronic sense/electronic attack, jamming applications and anti-jam comms

> SATCOM - various waveforms and data rates

Modular System Accelerates Next Generation, Flexible Data-Link Solutions

KEY FEATURES

> **Modular family of VPX compliant modems, processors, up/down converters, and crypto modules for use in a variety of chassis**

> **CDL / BE-CDL / ROVER waveform-compatible**

> **Air to Air, Air to Ground, Data Relay and networked secure communications with expanded data rates (currently up to 622 Mbps) and frequencies from L- through Ku-Bands**

> **RF power and directional antenna control built into core technology**

> **Designed for the highest level of resilient communications; providing superior LPI/LPD/AJ features, situational awareness, and geo-location capabilities**

> **Secure communications and superior mobile, ad-hoc, mesh networking via multiple frequency band converters and covert signaling; well-suited for contested or access denied environments**

> **Capable of hosting the L3Harris Chameleon™ Waveform and Network Technology for protected and assured comms mission sets**

> **Capable of supporting multiple independent links from a single chassis**

ASPEN Technology Core Module Examples

Sample Chassis Configurations – Current Product and in Development

L3Harris.com

ASPEN CAPABILITIES[3]

WAVEFORMS – NETWORKING AND SECURITY:

> ROVER 6 legacy and tactical waveforms (see table)

> STD-CDL waveforms, Rev G (see table)

> BE-CDL waveforms, Rev A and Rev B (see table)

> Each modem module supports two simultaneous independent full-duplex channels, with 22 MHz, 90 MHz, 320 MHz, or 1 GHz of frequency bandwidth

> Designed to accommodate AES, Type 1 (KIV 701A, CCM 701A and KGV-8X) COMSEC encryption

> Supports DHCP server or client, IPv4/IPv6 protocols

> CDL networking Annex B and Annex X

> OSPF and RIP networking protocols

INTERFACE:

ASPEN core modules are extremely flexible. Chassis level configuration is the primary interface driver. Sample interface configurations include:

> 1-2x 10/100/1000 Base-T Ethernet data

> 2-7x 10/100/1000 Base-T Ethernet for CMD/STS/maintenance

> 1-4x RS-232 interface for serial console CMD/STS

> 1-3x RS-422/485 for navigation data, CMD/STS (input / output)

> Core logic supports I/O expansion for system specific Input or Output signals

> VITA-49 Digital I/F over Fiber (optional)

> Fiber Optic interface (optional) up to 100Gbps

> PPS navigation reference (input / output)

> 100 MHz optional Reference Clock input

CHARACTERISTICS:

> Nominal +28 VDC (+22 to +29 VDC) prime power as defined in MIL-STD-704F

> Operational Temperature: -40 °C to +55 °C (forced air per MIL-STD-1788A)

> Non-operational Temperature: -55 °C to 85 °C

> Typical operating altitudes up to 50,000 ft.

> Includes BIT and PBIT for HW and SW detectable faults to increase maintainability

> Typical system configuration will include 6 to 12 modules in a ruggedized, externally cooled chassis

> Modules are ANSI/VITA 46/48 standard 1" pitch, 3U form factor

> Isolation and power filtering in core designs

SWaP ALLOCATIONS
(System level example only; depends on system configuration and modules installed in chassis)

LRU DESCRIPTION	NOMINAL SIZE	TYPICAL WEIGHT	POWER
ASPEN single-channel AMA	1,350 in³ nominal overall dimensions: 10.55" H x 7.50" W x 17.02" D	36.5 lb.	400 W to 520 W at +28 VDC
ASPEN dual-channel AMA		40.0 lb.	520 W to 800 W at +28 VDC

CORE WAVEFORMS[2]

ROVER 6 LEGACY WAVEFORMS	
VNW (0.05 Mbps to 5 Mbps)	Tactical 455K (Rx only)
NTSC FM analog (Rx only)	Tactical 466ER
Tactical 1.6 Mbps (legacy and networked)	DDL 1.5 (Rx only)
Tactical 3.2 Mbps (legacy and networked)	DDL 4.5 (Rx only)
Tactical 6.4 Mbps (legacy and networked)	

STD-CDL WAVEFORMS	
BR-0.2 (spread, clear)	BR-21.42
BR-0.4 (spread, clear)	BR-44.73
BR-2.0 F (spread, clear)	BR-137 B or D
BR-2.0 R or S	BR-274 B or D
BR-10.71 N, M or S	

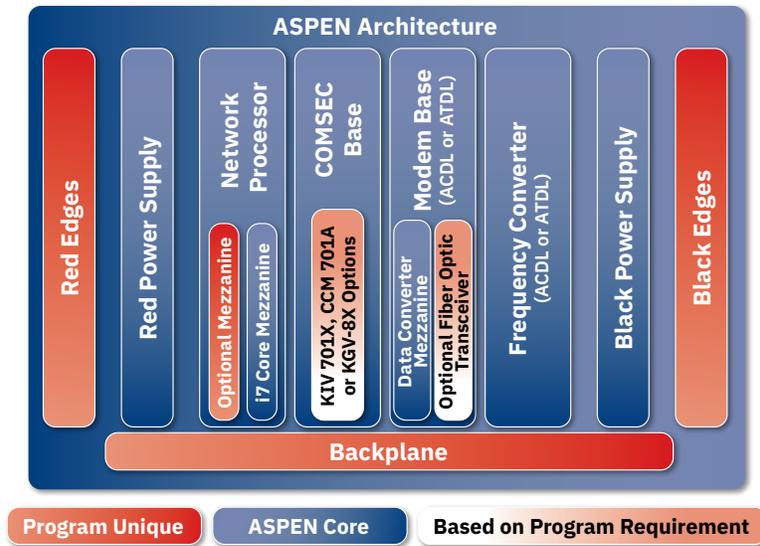| BE-CDL WAVEFORMS (BR = MBPS)	
Mode 1 - OQPSK 512K	Mode 15 - 8PSK 45
Mode 2 - OQPSK 1	Mode 16 - 8PSK 52
Mode 3 - OQPSK 2	Mode 17 - OQPSK 100
Mode 4 - OQPSK 4	Mode 18 - OQPSK 137
Mode 5 - OQPSK 8	Mode 19 - 8PSK 155
Mode 6 - OQPSK 10	Mode 20 - 8PSK 200
Mode 7 - OQPSK 16	Mode 21 - 8PSK 274
Mode 8 - OQPSK 20	Mode 101 - QPSK 0.200–44.736
Mode 9 - 8PSK 4	Mode 102 - QPSK 0.200–44.736
Mode 10 - 8PSK 8	Mode 103 - QPSK 1.024–466.560
Mode 11 - 8PSK 10	Mode 104 - QPSK 1.544–622.080
Mode 12 - 8PSK 16	Mode 105 - 8PSK 1.544–622.080
Mode 13 - 8PSK 20	Mode 106 - 16APSK 3.2 to 900[1]
Mode 14 - 8PSK 32	

SUPPORTED FREQUENCY RANGES

BAND	RF FREQUENCY LOW	RF FREQUENCY HIGH
L LOS	1.6250 GHz	1.8500 GHz
S	2.0250 GHz	2.5000 GHz
C Low	4.4000 GHz	4.9500 GHz
C High	5.2500 GHz	5.8500 GHz
X Low	9.7500 GHz	9.9500 GHz
X High	10.1500 GHz	10.4500 GHz
Ku Low	14.4000 GHz	14.8300 GHz
Ku High	15.1500 GHz	15.3500 GHz
Extended Ku[2]		

1. System enhancements in development and projected to be available in 2022
2. System enhancements that can be individually added and/or licensed
3. Example only, system configuration options may alter these specifications.

ASPEN INTEROPERABILITY

ASPEN based Modem Assemblies are inherently interoperable with the rest of the family of L3Harris ROVER compatible platforms, data links, and handheld devices. L3Harris data links are the world standard in high-bandwidth, long distance LOS and BLOS connectivity. The ASPEN Technology implementations provide the next technological breakthrough in performance and mission success capability. Interoperability with thousands of L3Harris systems on platforms and programs like Gray Eagle, Global Hawk, Predator, Apache and Hawklink makes ASPEN the premier choice for migration to the next generation of high performance. The integral design of L3Harris ROVER capabilities in ASPEN provides complete battlespace integration with all airborne, surface, and naval platforms, including the widely deployed ROVER 6, OSRVT™, TACTICAL NETWORK ROVER hand-helds, CMDL™ (LITENING and Sniper pods), BANDIT™ (ScanEagle UAV) and other tactical assets. Proven reliability and certified encryption capabilities are why the U.S. Government and U.S. Allies rely on L3Harris for warfighter communications solutions.

ASPEN Architecture

Red Edges · Red Power Supply · Network Processor (Optional Mezzanine / i7 Core Mezzanine) · COMSEC Base (KIV 701X, CCM 701A or KGV-8X Options) · Modem Base (ACDL or ATDL) (Data Converter Mezzanine / Optional Fiber Optic Transceiver) · Frequency Converter (ACDL or ATDL) · Black Power Supply · Black Edges

Backplane

Program Unique · **ASPEN Core** · **Based on Program Requirement**

ASPEN Core Modules

SUMMARY

ASPEN Technology is a flexible, high performance platform that can be configured to enable your specific missions. Interoperability with existing platforms, ongoing enhancements to the core capabilities to keep up with emerging BE-CDL standards, and the the ability to host Chameleon Networking and Waveform Technologies enable the ultimate solution.

ASPEN specifications include a significant list of additional capabilities that are not authorized for public disclosure.

Contact the ASPEN Product Manager at CSW.Products@L3Harris.com for more detailed information.

COYOTE Modem

BANDIT™
BANDIT™ 2

VORTEX®

Tactical
Network
ROVER
(TNR, TNR 2e)

Multi-Platform
Interoperability

CMDL™
CMDL™ 2

ROVER 6
ROVER 6S

GEN 3 SMA

Future
ASPEN-based
system enhancements
(TBD)

A few examples of interoperable L3Harris data links and the platforms (large and small) that they service.

ASPEN Technology expands interoperability to include the next generation of high performance data links and remains interoperable with widely deployed existing systems.

Contact L3Harris for additional information on the data links, uses, and platforms supported.

L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defense and commercial technologies across air, land, sea, space and cyber domains.

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