STAR-PAN Tactical Soldier Systems: Multiport Data and Power Management Hubs

The widest range of mission-critical interconnect technologies in the world
Soldier-Based C4ISR

Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance technology providing Situational Awareness (SA) to dismounted soldiers, allowing fast and accurate decisions and actions on the battlefield

Typical Ensemble Configuration:
- End User Device (EUD): chest mounted computer tablet
- Communications: Tactical radio
- Peripherals: GPS Navigation, ISR Receiver, Laser Range Finder, etc.
- Auxiliary Power: Battery packs
STAR-PAN Mission Profile

Digitally Aided Close Air Support (DACAS)

- JTAC and JTAC support
  - Joint Terminal Attack Controller
- Key digital technologies include:
  - Radio communications
  - Video downlink
  - Digital targeting
  - Blue force tracking
Smart Power = Longer Missions, Lighter Load

Battery power utilization and management

- STAR-PAN distributes battery power to radios, peripheral devices, and the EUD/host (green) via designated ports.
- On-board power conversion capability can also deliver 5 Volt power (red) for USB power.
Smart Power = Longer Missions, Lighter Load

Auxiliary power utilization and management

- Regulated DC power, such as vehicles power (orange 10 to 36V) is conditioned by the STAR-PAN embedded electronic sub-system for use by both standard battery-powered devices (green 10 to 20V) as well as compatible 5 Volt equipment (red).
- The power may be served to both the EUD host port as well as to multiple pan and radio ports. Finally, STAR-PAN functions as a charging station (blue) to a rechargeable lithium ion smart battery.
Smart Power = Longer Missions, Lighter Load

Symbiotic radio / battery power utilization and management

- STAR-PAN VI configured with available 808-063 Radio Power Booster
- While operating from the main Power Source, trickle charge is provided to the radio battery
- If the main power source is depleted, STAR-PAN’s smart power management utilizes 5V power from the radio battery to power the system’s critical 5V lines.
808-063 Power Booster

Carry less • interchange more • go further

- L3
- TNR
- Thales
- MBITR, IMBITR
- AN/PRC 154(A)
- Harris
- RF-7850S
- AN/PRC 152(A)
- Persistent Systems
- MPU4, MPU5
The EUD, typically an Android-based smartphone or tablet, provides a link into command and control networks plus applications to call in fire support, plan and coordinate operations, and track friendly forces.

- Android smartphones
- USB open-system tablets
- Pads with interconnect-equipped frames / cases / base pads

Samsung Tablet

Getac MX50

Tough Mobile

Kägwerks Galaxy S7 Case

ToughPad FZ-M1 and FZ-B2

Connectorized Juggernaut.Case™
Tactical Radio / Communications

Tactical communications (Comms) systems are built around software-defined radios in the Joint Tactical Radio System (JTRS) family

- Hand-held
- Man-pack
- Vehicular
Tactical Radio / Communications

Additional tactical radios used in international programs

- Harris 7800S
- Persistent Systems MPU4
- Elbit Systems PNR-1000
USB / Ethernet / SMBus Peripheral

Common peripherals providing advanced navigation, situational awareness, and information sharing capabilities

- GPS navigation
- Blue Force tracking
- Laser range finders
- Night vision goggles
- Intelligence, Surveillance, and Reconnaissance (ISR) video receivers
Power Sources: Batteries and Auxiliaries

Compatible access to military-approved battery power can affect mission time, weight, and logistics

- Mil-standard batteries and COTS innovations
- Legacy interconnect requirements (MIL-DTL-26482)

- BB-2590/BA-5590 battery
- Universal field charging station
- Ultralife lightweight smart battery
- Conformal wearable battery (CWB)
- Auxiliary power sources
Soldier-based Personal Area Networking (PAN)

Electronic hub and interconnect system providing network data access, peripheral connectivity and battery power management to dismounted soldier electronics

Range of Capabilities may include:

- Ethernet networking
- USB compatible peripheral support
- Software-defined radio support
- Common interconnect interface
- Charging and battery power management
Cables Modular and Flexible

Any length you like

The cables come in:

- Nomex with the most common colors black, green or tan

- Santoprene which is similar to polyurethane but softer and more flexible. It’s also the same material we use for the connector over molding

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Concept of Operation is the Same the World Over

High-performance, COTS solutions are the order of the day

System Cables
Peripheral Cables
Radio Data Cables
Radio Data Adapters
Battery Adapters
MOLLE Pouches
Smartphone X-Frames
USB / Power Distribution Hubs
Range of Applications

STAR-PAN is a commercial, off-the-shelf (COTS) solution

- Military tactical radio ensembles
- Law Enforcement
- Fire / Rescue
- Underground, Highwall, and Surface Mining
Commercial Applications for STAR-PAN

Power/data management for “first responder” electronic systems

- Body-worn cameras
- Embedded sensors (health, environmental threats, suspect tracking)
- Field radios and microphones
- Robot/bomb squad control monitors
- Border control inspection sensors
- Vest antennas
Peripheral and device types in BLUE fully supported by the integrated STAR-PAN™ data / power system
STAR-PAN USB Hub/Power Distribution Interconnect System

Key features and advantages

- Versatile 2 and 6-port USB high-speed hub configurations
- Compatible with USB 1.1, USB 2.0, and SMBus
- Embedded power charging/conditioning electronics in all designs
- Smart power monitoring for longer mission life
- Robust circuit protection
- Sealed IAW the MIL-STD-810 harsh-environment standard

* Requires STAR-PAN™ Ethernet Adapter
STAR-PAN™ II

808-057 · 2+ port smart power and data hub / cable

- Provides Battery Power and +5VBus power to up to 3 USB peripheral devices (Requires 808-081 for 3rd device)
- Heat efficient electronics packaging to optimize efficiency and extend battery life
- 2 power inputs ports for extended missions or battery hot swap
- SMBus, USB2.0 (Full & HighSpeed), USB1.1 compatible interface
- Glenair’s power monitoring and management for each voltage rail and port
- Compatible PAN pin configuration and Smart Battery interface
- SMBus, USB2.0, USB1.1 compatible interfaces
- Built-in SMBus to USB converter to USB host devices
- IP67 rated dust and water resistant
STAR-PAN II Capability Diagram

- Universal PAN compliant ports (up to two devices)
- 1 designated host/EUD port
- 1 designated radio peripheral port
- 1 expandable PAN port for up to two USB peripherals
- Hot-swappable power sources
- Radio-supplied backup power
- Glenair power port management
STAR-PAN™ VI

808-037 · 6-port smart power and data hub system

- Battery Power and +5VBus power for up to 4 USB peripheral devices, 2 dedicated radio ports
- Glenair’s power monitoring and management for each voltage rail and port
- Fault mode protection for surge, reverse voltage, over current and others
- Embedded level 3 controller for smart battery with a wide charge voltage range
- Able to draw from auxiliary DC power sources
- APS port for system power and battery charging for extending missions
- Heat efficient electronics packaging to optimize efficiency and extend battery life
- Radio port VBUS system hold for extended mission time and SWaP
- Compatible PAN pin configuration and Smart Battery interface
- SMBus, USB2.0, USB1.1 compatible interfaces
- Built-in SMBus to USB converter to USB host devices
- Power-ON Night Vision Goggle (NVG) compatible LED Signal
- IP67 rated dust and water resistant
STAR-PAN VI Capability Diagram

- Universal PAN compliant ports (up to six devices)
- 1 designated host/EUD port
- 2 designated radio peripheral ports
- 4 PAN receptacles for up to four peripherals
- Battery and auxiliary power source input
- Glenair power port management

- Radio-supplied backup power
- Smart battery charging from auxiliary power
- Up to 5A battery power per port, 5A system total
- Up to 3A 5 Volt VBUS power per port, 5A system total

- Battery and auxiliary power source input
- Glenair power port management

- Universal PAN compliant ports (up to six devices)
- 1 designated host/EUD port
- 2 designated radio peripheral ports
- 4 PAN receptacles for up to four peripherals
- Battery and auxiliary power source input
- Glenair power port management

- Radio-supplied backup power
- Smart battery charging from auxiliary power
- Up to 5A battery power per port, 5A system total
- Up to 3A 5 Volt VBUS power per port, 5A system total
# STAR-PAN Core Capabilities Kit

Smart hub and essential cables for STAR-PAN II and VI

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<td>1X USB-A Accessory Cable</td>
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STAR-PAN Competitive Strengths

12 design and technology advantages unique to STAR-PAN
(1) Universal / Mil-Std. Protocol Support

Non-Proprietary USB, Ethernet, and SMBus

- Legacy systems featured proprietary software interfaces and peripheral devices
- Current worldwide requirements are for non-proprietary Ethernet, USB 1.1, USB 2.0, and SMBus data/battery interfaces to COTS peripherals
(2) Broad support for Mil-Std. / NATO Radios

Field radio variability is unpredictable and so requires across-the-board support for all common types, including available power and data adapters:

- AN/PRC 148 MBITR
- AN/PRC 152(A) Handheld Falcon III
- AN/PRC 117G Manpack Falcon III
- AN/PRC 154(A) Rifleman
- RT-1922 SADL
- RF-7800S
- RF-7850S
- PNR 1000
- KDA MH600
- MPU4 (MANET)
(3) Scalable, Customizable Hub Packaging

Versatile hub configurations, geared to common unit roles, easily customizable into standard COTS solutions

2-Port System for Ground Soldiers

6-Port System for Mission Commanders
(4) Industry-Standard I/O Connector Interface

Glenair Series 804 Mighty Mouse, designed and qualified for Nett Warrior, is the de facto soldier system standard

- Ultra small form-factor push-pull Series 804 Mighty Mouse: proven worldwide performance and availability
- STAR-PAN hub, EUD, radio, battery, and peripheral I/O interfaces all use the 804 quick-disconnect
(5) Ongoing Reduction of Size and Weight

innovations such as brazed-in connector mounts contribute to ongoing package size reduction

- Relentless attention to size and weight reduction is perhaps the most important requirement from the soldier’s perspective
- Requirement extends from hub to connector to cable
(6) Effective Thermal Management

Heat efficient electronics packaging must be optimized to extend system and battery life

- Internally-generated heat may damage C4ISR electronics, hub, and interconnect technologies and sap battery power
- Effective thermal management requires optimization of embedded circuit board electrical performance as well as enclosure design
(7) Smart Power Monitoring and Embedded Charging /Conditioning

Power management and distribution are a core capability

- Support for both standard battery and auxiliary power sources
- Board-level firmware power monitoring and conditioning for extended mission life
- Interconnect hub-to-power source adapters
- Support for scavenged power from direct current sources
(8) Android-Based Power Management App

Available smart device app for real-time power monitoring and management

- SPAR: STAR-PAN Android Remote
- User-configurable
- Device enable/disable function
- “Sleep”, “Up”, “Kill”, and “FUBAR” modes
(9) Robust Circuit Protection

Long-term durability depends on anticipating and preventing damage to internal circuits

- Board-level support for hot-swapping during charging
- Corner-case testing and validation of extreme electrical events such as short circuits, surge and reverse voltage
- Robust environmental and mechanical hardening of all system components
- EMI shielding IAW MIL-STD-464C
(10) Full Validation Testing and Standards Compliance

Short list of most common qualification requirements

- MIL-STD-810G: Environmental Engineering Considerations and Laboratory Tests
- MIL-STD-461F: Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
- MIL-STD-1275E: 28V Vehicular Power Standard
- MIL-HDBK-217F: Reliability Prediction of Electronic Equipment
- MIL-STD-464C: Electromagnetic Environmental Effects
- DoDI 8500.2: Information Assurance (IA) Implementation
(11) Laser-Focused Mission Profile

Digitally Aided Close Air Support (DACAS)

- Purpose-designed and developed for JTAC use in Digitally Aided Close Air Support
- No compromise power and data support for JTAC C4ISR missions
High Availability COTS SOLUTION

Demand — when it exists — is immediate

- COTS component model
  - Bagged, tagged, ready-to-ship
- “No gaps” in compatible cables and adapters
STAR-PAN Tactical Soldier Systems:
Multiport Data and Power Management Hubs