

# **PEL CORPORATE BRIEFING**

# Company Overview

## What we do?

- **OEM** product supply to Telecom Service Providers, Railways, Oil & Gas and Security customers
- **BTP/ BTS** contract manufacturing for Defence, Medical and Hi-Tech customers
- Undertake **Turnkey Projects** including Prime Contracts and EPC contracts
- Provider of Engineering **Services** for complex C<sup>4</sup>I<sup>2</sup>SR projects such as Installation & Commissioning, Testing, Customer Acceptance, Training, Documentation and MRO

## General Information

- Incorporated in 1979 under Indian Companies Act
- Registered as MSME
- Licensed for Defence Production by MOD in Category A (Top Secret)
- Public Limited company listed on the Bombay Stock Exchange (BSE) under "Precision Elec" stock ticker
- Victora Group – a major shareholder in PEL
- More than 150 employees with 50% Engineering resource
- QMS: AS9100D, ISO 27001
- Revenue of INR 400 Million in FY'19

# PEL Locations

PEL's Noida facility is spread over 5000m<sup>2</sup>. Inherent capabilities include: -

- Design & Engineering (D&E)
- Rapid Product Prototyping
- Production for Civil specs
- Technical Support Services
- Marketing & Sales



















PEL's Roorkee facility is spread over 6500 m<sup>2</sup>. Inherent capabilities include:









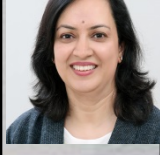

- Production of Electronic, Electrical and Mechanical assemblies and sub-assemblies for A&D, Hi-Tech and Medical
- Product Validation



# Our Customers

	Telecom	Oil & Gas (Infocom)	Railways (Signaling)	Hi-Tech/ Healthcare	Defence & Security
	  			 	        
OEM	✓	✓	✓		✓
BTP/ BTS				✓	✓
Turnkey	✓	✓		✓	✓
Services	✓	✓	✓		✓

# PEL Team

Board		Senior Management	
	<b>Lt. Gen. (Dr.) Rajesh Pant PVSM, AVSM, VSM Retd. – Non-Exec Chairman</b> National Governing Council – IETE, Academic Panel of ORF, Data Security Council & IIPA		<b>Mr. Nikhil Kanodia, President</b> M.S./ B.S. from Carnegie Mellon University, USA. Author of IEEE/ IETF papers. Patent for Gig Ethernet Link Aggregation. Bus Dev & Strategy
	<b>Mr. Ashok Kanodia, Managing Director</b> Chairman Defence MSME committee: CII, National Defence committee member: FICCI, ASSOCHAM. Alumni of MIT, USA		<b>Mr. Deepak Jagga, Head Marketing &amp; Sales</b> 20+ years of experience in PEL in Institutional Marketing & Sales including BSNL, MTNL, ONGC, ITI, BEL, Railways. MBA-Nagpur Univ
	<b>Mr. Deepto Roy, Non-Exec Director</b> Sr. Partner at Shardul Amarchand Mangaldas specializing in Corporate Law. BA, LLB Hons from WB National University.		<b>Mrs. Puneet Arora, Head HR</b> 12 years of diverse HR experience. MBA in HR Management from IFIM, Bangalore.
	<b>Mr. Hardeep Singh Banga, Non-Exec Director</b> Managing Director of Victora Auto Pvt Ltd. 34 years of experience in Auto industry.		<b>Mr. Jagjit Singh, CFO</b> Financial and Strategy Planning, Managing Profitability, Forecasting, Corporate Finance, Developing Budgets
	<b>Mrs. Preeti Grover, Non-Exec Director</b> Company Secretary with 23 years of experience. Elected member of the Managing Committee - Noida Chapter of NIRC-ICSI.		<b>Col. Sanjeev Kaloty (retd), Legal &amp; Bus. Dev.</b> M.Tech Engineering (IIT-D) and BA LLB from Delhi Univ. 26 years of experience in the Corps of Signals. Trained at Thales facility for LIC EW

# Defence Industrial Licenses

- License Title (SIA No: 58/IL/2010): Manufacture of
  - Transmission Systems including Line, Radio, Satellite and accessories including Power Supplies/Power Distribution Units
  - Networking Equipment including Switches, Routers, Modems, Convertors, Multiplexers, Communication Gateways and accessories
  - Embedded Systems including Sensor Interface units, Interoperability Systems, Appliqué devices and Voice/ Video/ Data Acquisition Systems
  - Electronic Support Measures (ESM) Systems for Electronic Warfare
  - Antenna, Masts, Positioners and accessories
  - Shelter/ Platform integration
- License Title (SIA No: 57/IL/2010): Manufacture of
  - Military Cable Assemblies & Harness

# Major Accomplishments



Largest market share of 2 Mbps Telecom MUX in the BSNL network



Incumbent supplier of the Air Defence COM Network since 1998 to IAF



Supplier of the first ever "Mobile" ASCON node to Indian Army. Used in Ops Parakram in 2001-02



Selected by CAIR, DRDO to co-develop high grade crypto system for secure COMs for the Army



1<sup>st</sup> PVT sector co. to be accorded a Category part number on the War Equipment (WE) Table for a fully ruggedized Telecom MUX



PEL is entrusted to conduct I&C, integration and acceptance for the Core Network Switch on every new build warship of the Indian Navy



PEL is currently entrusted with I&C, integration and customer acceptance of critical sensors such as Radar, Sonar, EO, AIS and Datalink together with C4 SW to ensure Protection of Indian Naval Harbours



PEL has supplied MILCOM equipment in all Commands of the Indian Army

## Quality Standards : Process

- IPC-A-610-D (Acceptability of Electronics Assemblies)
- IPC-7711/21 (Rework, Modification & Repair of Electronics Assemblies)
- IPC-J-STD-001 (Joint Industry Standard, requirements for soldered electrical & electronics assemblies)
- IPC/WHMA-A-620 (Requirement & Acceptance for Cable & Wire Harness Assemblies)
- ANSI/ESD-S-20.20 (American National Standard Institute, Protection of Electrical & Electronics parts, assemblies & equipment)
- IEC/TS 61340-5-1 (International Electro-technical Commission, Protection of Electronics Devices from Electrostatic Phenomena – General Requirements)
- IEC/TS 61340-5-2 (International Electro-technical Commission, Protection of Electronics Devices from Electrostatic Phenomena – User Guide)
- IEC 61193-1 (2001-12) (International Electro-technical Commission standard – Registration and analysis of defects on PBA)
- MIL-STD-2000A (Military Standard for Requirement for Soldered Electrical & Electronics Assemblies)
- MIL-STD-1653B(AS) (Military Standard for Interface Standard for Power Cable Assemblies)
- MIL-STD-1390 (Military Standard for level of repair analysis)
- RoHS (Restriction of use Of certain Hazardous Substances)

# DESIGN : Embedded Systems Capability

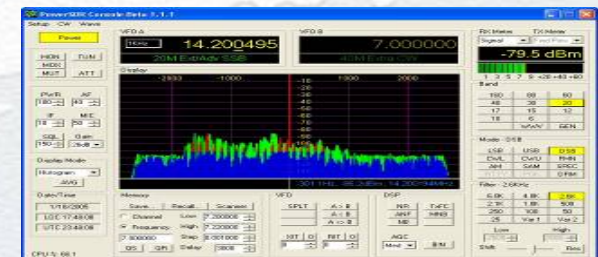
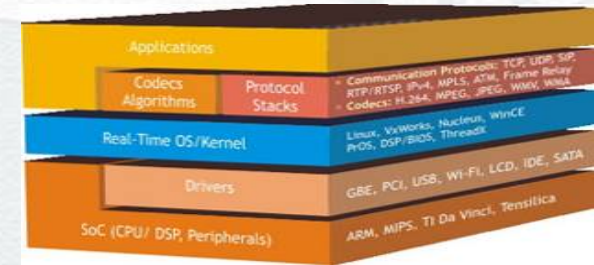
## Hardware

- Processor/Micro Controller based design
  - 8bit/16bit/32bit
  - Industry Std PC104 designs
- Design involving FPGAs and CPLDs
- Design involving analog & mixed signals
- Design PCB including schematic, layout and gerber generation upto 12 layers



## Software

- Data acquisition, processing, storage, analysis
- Firmware development (8/16/32 bit processors)
- Languages C, C++
- OS Ein CE, Windows
- NMS TCP/IP, SNMP V3
- Microsoft Visual Studio 2010
  - Dot Net Framework 4.0 and 3.5
  - Dev Express ver 10.0
  - SQL Server 2005
  - MYSQL 5.5
  - MS Access



# Testing & Validation

- Availability of Environmental testing infrastructure per MIL-STDs
- System validation encompasses testing via customized jigs and ATEs

**Facilities**



**Temperature Oven**



**Temperature Cycling**



**Salt spray Machine**



**Bump Machine**

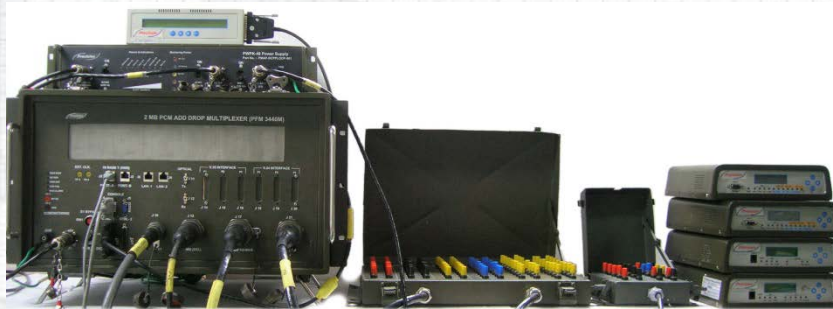


**Vibration Table**



# Build-to-Spec/ OEM Manufacturing

# Voice & Data Networking Systems



**PFM-3440M – Tactical Multiplexer with Cross Connect Switch for providing Multimedia services to Corps of Signals**



**DCH – Tank Intercom System and Control Harness for Armored Vehicles**



**PDM-30A: 30-channel primary multiplexer for Telecom Service Providers**



**Protocol Converters for conversion between IP, TDM (V.35, E1, E3, STM-1) and Serial (RS-232/422/485) interfaces**

# Transmission Systems



**PST-12M: Secure (SAG Grade-3) Radio Network for Homeland Security applications**



**PST-155M: Secure HCLOS Radio for Tactical and Strategic Networks. Supports up to 155 Mbps**



**Line Modems: For Industrial and MIL grade requirements. Capable of transporting Ethernet, V.35, E1 over Copper or Optical media at distances ranging from 1-50 kms**



**PEL Link: ISM band radio in 5.8GHz for Telecom Network backhaul. Up to 8xE1 throughput. Supports R2MF, SS7 and ISDN signaling.**

# Embedded Systems for C4I2SR



**DVDR – Voice Logger for Air Traffic Control, Homeland Security and Intelligence Agencies**



**Data Logger: used by the Railways to log, archive, analyze and replay all analog and digital sensor inputs at a train platform**



Indicative Image

**Appliqué Devices: Attachable or pluggable device on radio platform for providing application specific functionality such as processing, optimization and security of voice, video & data**



**Crypto Systems – to handle COMSEC and TRANSEC on MILCOM sub-systems. Available in stand-alone, pluggable and embedded form factors**

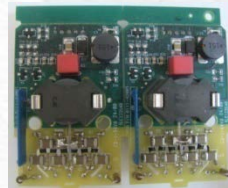
# Power Systems



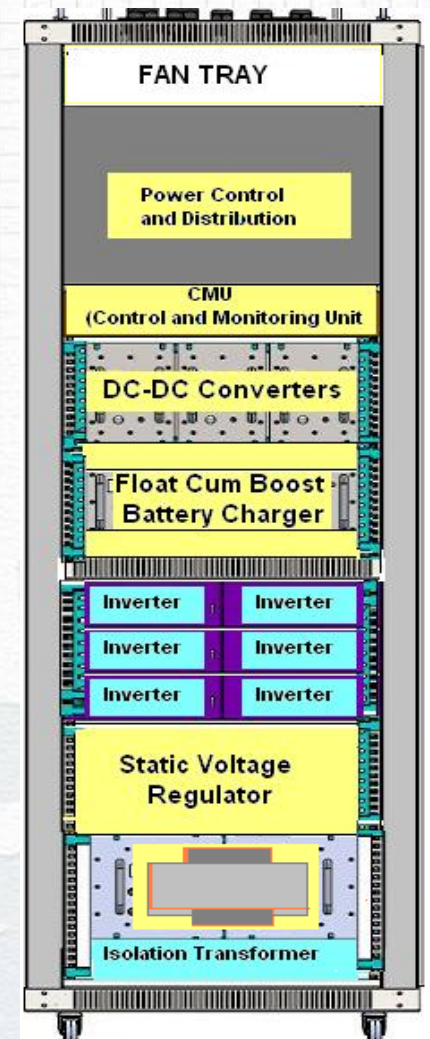
**Stand Alone Power Pack: MIL-grade SMPS based Rectifier with Power conditioning and Float/ Boost Charging**



**Rack Mounted Power Pack: MIL-grade SMPS based Rectifier with Power Conditioning, Distribution and Float/ Boost Charging**



**High Voltage Power Systems: Up to 60kV, highly accurate, low noise power supplies for Military, Industrial and Medical industries**



**Power Conditioning Rack (PCR) for Military C2 Shelters**

# Mast Systems



**Pneumatic Mast**



**Automatic Antenna Alignment:  
Self-aligning antenna positioner**



**Winch Mast**



**Electro-mechanical Mast**

**Telescopic Masts: Supplier of extensive range of Masts ranging from various head-loads, heights and construction materials**

# Build-to-Print Manufacturing

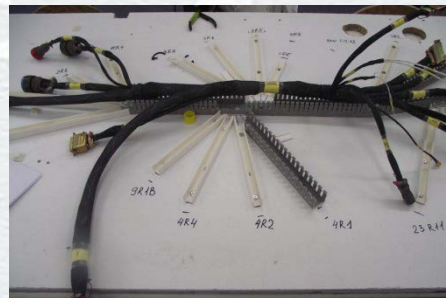
# Wire Harness

- Cable assemblies for carrying High Voltage, High Current, High Density, RF: from 2 MHz – 18 GHz, Data: Electrical and Optical
- Wire Harness: Wire to Wire, Wire to Board, Wire to Device
- Workmanship Standards: IPC-WHMA-A620A
- Quality Management Standard: AS 9100C

ERP controlled Stores



Comprehensive ATE Testing



# PCBA

- Capable of handling through-hole and Mixed SMT & T/hole in ESD controlled environment
- Can assemble BGAs, QFNs, CSPs, 0201, 01005, POP, and Press-fit components
- Workmanship standards as per IPC-A-610-D, IPC-7711/21 and IPC-J-STD-001

SMT Line



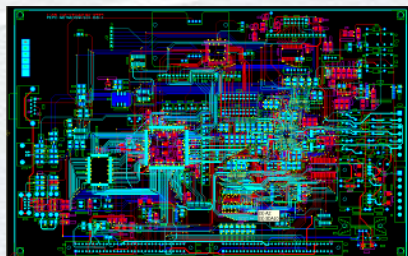
Wave Soldering



Flying Probe Tester



SMT rework station



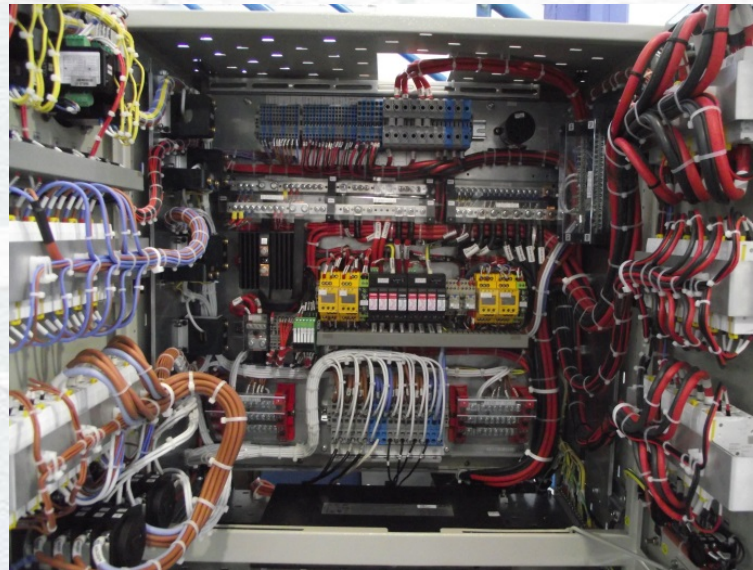
# Electrical and Electronic Assemblies

- Cable assemblies for carrying:
  - High Voltage
  - High Current
  - High Density
  - RF: from 2 MHz – 18 GHz
  - Data: Electrical and Optical
- Wire Harness
  - Wire to Wire
  - Wire to Board
  - Wire to Device
- Workmanship Standards: IPC-WHMA-A620A, IPC-A-610-D, IPC-7711/21, IPC-J-STD-001
- Quality Management Standard: AS 9100D
- PEL undertakes manufacturing of cable assemblies and wire harnesses on Built to Print as well as Built to Specs basis



# Power Management Units

- Complex Assemblies
- Built-to-Spec
- Built-to-Print



# Hi-Tech/ Healthcare



**PDU for Super  
Value CT-Scan**



**PDU for CT-Scan  
Machine  
developed in Israel  
for MEA & APAC**

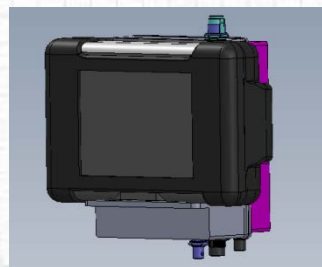
# Rugged Computing Devices



**Displays**



**DGPS**



**Soldier  
computer**



**Airborne  
recorder**



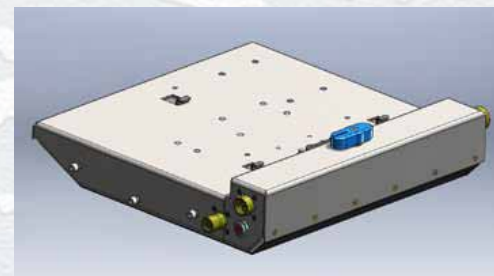
**L2/L3  
switch**



**Airborne computer**

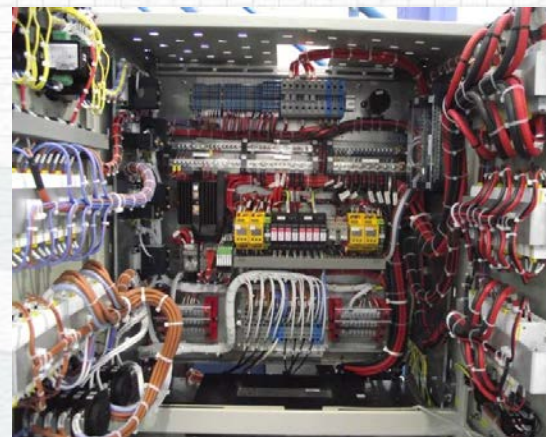


**VME/ cPCI card cage**



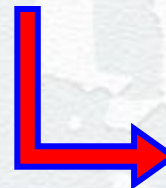
**Vehicle Docking Station**

# Defence & Security



UAV Ground & Air Sub-systems/ Assemblies

Integrated Ship-borne/  
Air-borne Racks



PDU for C2  
shelter



# Defence & Security: Complex Assemblies



**MOBILE ASCON NODE  
(ARMY)**

- Prime Contractor
- Army Division level asset
- Experience of Ops Parakram



**10/30 channel RR  
(AIR-FORCE)**

- Prime Contractor
- Air Defence Communication Nodes
- Links Mobile Radar Units to airfield



**Parikshak (TCS) Test Bed  
(ARMY)**

- Teamed with EADS DS to provide Platform Integration/ Entity Engineering
- Provided Systems Design expertise within consortium

# Engineering Services

# I&C– Core Network Integration on Warships

- Operationalize ship-borne Core network for P17 ships (new construction) and legacy Destroyer class ships to integrate
  - Weapons & sensors data to the CMS
  - Internal and external communications systems
- Configure ATM based network switches and network termination units.
- Monitor ship-based C3 system centrally (CMS, Core Network, internal and external communication systems) and debug for networking issues
- Support CDoT & BEL in FATs, HATs and SATs
- Coordinate with the design agency, production agency and the Naval agencies

**P-15A: Kolkatta Class**



**P28 ASW Corvette**



**P-17: Shivalik Class Frigates**



**SNF class INS Ranvir**



# Defence & Security – Turnkey



**Airfield Modernization:** Turnkey civil, electrical and networking to install Power ring, Navigational aids and AFLS at military airfields



Supply & Integration of V-UHF radios on AEWCS



**Harbor Security:** Turnkey I&C of Coastal Surveillance Radar, Diver Detection Sonar, EO Sensors, V/UHF Datalinks, AIS/ GPS and the C4I room at four (4) Naval harbours



**Battlefield Surveillance System: BTP/ BTS**  
Manufacturing, Project Management, Engineering Services

# Defence & Security – Services



On-site Calibration and Repair of I-Level UAV Depot



Maintenance & Repair of Integrated EW System



Maintenance of Precision Guided Munitions



Operationalize ship-borne Core network for P17 ships (new construction) and legacy Destroyer class ships



# Maintenance Depot

- PEL offers complete range of Maintenance, Repair and Overhaul services for Land and Naval C<sup>4</sup>I<sup>2</sup>SR Systems
- Scope of maintenance includes issues related to software, electrical, mechanical and marine
- Capable of on-site and in-house calibration services as per ISO 17025 for a wide variety of STE and ATE
- In-house, state of the art ESD-controlled lab of 300m<sup>2</sup> for troubleshooting, repairing, calibrating and testing ESD-sensitive electronics sub-systems
  - PEL's technicians are fully certified for Electronic Assembly and Soldering standards conforming to IPC-A-610E and IPC J-STD-001E respectively
  - Lab is equipped with:
    - Network Analyzer
    - Spectrum Analyzers
    - Oscilloscopes
    - Digital Communication Analyzers
    - PCM Channel Analyzers
    - Radio Communication Test Set (up to 1GHz)
    - Frequency Counters (up to 18GHz)
    - Regulated Power Supplies

# Thank You

## Contact Information

URL: [www.pel-india.com](http://www.pel-india.com)

**Marketing POC:**

Deepak Jagga

[Deepak.jagga@pel-india.com](mailto:Deepak.jagga@pel-india.com)

Cell: +91-9910383140

**Address:**

Precision Electronics LTD

D-10 Sector-3, Noida 201301

Uttar Pradesh, India