

FORCING FUNCTION LLC

CAPABILITY STATEMENT

CAPABILITIES

Forcing Function LLC is a certified minority, woman-owned engineering consulting firm based in the Washington DC metro area. We work with clients in the public and private sector across the US to provide system specific solutions. We specialize in the engineering, execution and commissioning of solutions and services for the transportation sector. Our main areas of expertise include Railway Systems Engineering, Technical Project Management, Railway Electrical/Mechanical Engineering, Satellite Communications, Private Radio (WiMAX), Cellular (3G/4G/5G), Wi-Fi, IP Networking, CMS, NMS, On-board information/ entertainment systems, vehicle-to-shore connectivity, connected vehicles, trackside radio systems, PTC systems, railway cab signaling, train control, condition-based monitoring using sensors, Signal Processing and Deep learning,

DIFFERENTIATORS

- Involved in all phases of the project lifecycle from procurement, system specification and analysis, risk assessment, integration management, testing, project management, deployment and performance evaluation
- Engineering expertise that spans 20+ years across multiple continents including USA, Canada, UK, Norway, Netherlands and India. Principal is a PE licensed Electrical Engineer in MD and CA.
- Real world railway system deployment and operational background including PTC and other vital and non-vital systems
- Specialist telecommunication experience across multiple technologies including satellite, land radio and cellular technologies

PAST PERFORMANCE

- Design, development and deployment of:
 - PTC communication system
 - Transit (train/ bus) connectivity using public /private networks
 - On train Wi-Fi and passenger infotainment and CBM
- SME for Satellite communication, VoIP, Signal processing, railway switch control
- Technical project management of:
 - Trackside radio surveys
 - Digital signage specification and evaluation
- Research and Development Grants:
 - SBIR DOT Phase 1 and II: Condition monitoring of traction motors
 - TRB: Subsurface analysis of concrete lined tunnels using UAS mounted GPR-on-a-chip



COMPANY DATA

- P.E. License: 0047091
- Federal ID: 47-3287565
- NAICS codes: 541330, 541690
- DUNS 08-023-9434
- MBE, DBE, SBE
Certification References:-
Maryland: 16-301
California UCP: 45798



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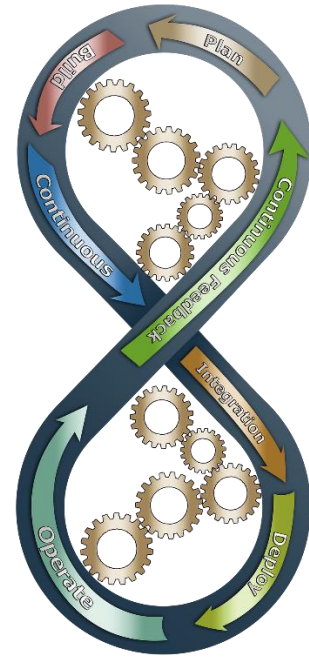
System Engineering and Integration

Detailed system engineering design undertaken on new and legacy vehicles for:

- On-board technology and Vehicle-to-shore infrastructure
- End-to-end system design and analysis
- Backward compatibility and future proof strategy

Coordinating efforts of multidisciplinary teams during all stages of the V-Model for System Engineering including:

- System Requirements Specifications
- API and ICD definition
- System Detailed Design
- Unit/Sub-System/System Validation
- System Commissioning
- Supporting the selection, development and configuration of NMS/CSS and CMS systems
- Specialist field support during the integration and deployment phases of complex projects



RFP Generation and Analysis



Specialist technical support throughout the RFP process:

- Evaluation of stakeholder requirements
- Develop procurement technical specification
- Technical support during vendor bid and vendor evaluation phases
- Lifecycle cost modeling for comparison of competing bids

Risk Assessment and Life Cycle Cost Analysis

Independent risk assessment and RAMS analysis in accordance with IEC 62278.

Full system Life Cycle Cost (LCC) analysis.

Support and recommendations to aid with prioritization, re-design and mitigation strategies.



Product Assessment / Performance Analysis



Analysis of vendor products for functional and conformance requirements including detailed testing and independent witness support.

Support for system benchmarking, capacity measurements, security analysis, reliability verification and statistical analysis.

Consulting support as well as design/development of proprietary analytical models and tools.

GAP Analysis

Functional and performance related GAP analysis at system and sub-system levels.

Defining corrective action or design remediation to meet requirements based on the analysis results.



Bid Support



Creation of a competitive technical response that complies with the requirements and expectations of a tender.

Representation at bid meetings.

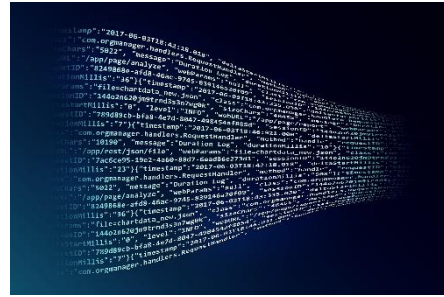
Regulatory Standards Compliance



Verifying compliance with various transportation/telecommunication regulatory boards and standards including but not limited to the FCC, FAA, DOT, FRA and AREMA.

Protocol/ Standards Development

Specifying, improving and documenting project specific IP based protocol extensions and proprietary messaging protocol definitions.



Study of Industry Trends



Comparative study of various industry trends for defining the optimal solutions for customer projects. SWOT analysis of the various trends as they pertain to the customer project.