



# CELENIUM

solutions architects and systems engineers

## ARE YOU 5G READY?

### WHO WE ARE

**Solutions Architects & Engineers** offering **5G-readiness test** and **verification** to accelerate the path to **IoT innovations**, and frontend engineering for **communication networks** and **IT modernization**.

### CELENIUM

Established 2009  
DUNS: 967747275  
CAGE: 7FDV6  
NAICS Codes:

- 541330 - Engineering Services
- 541715 - R&D in the Physical, Engineering, and Life Sciences
- 541690 - Other Scientific and Technical Consulting Services
- 541990 - All Other Professional, Scientific, and Technical Services
- 541511, 541512, 541519 - Computer Related Services

SeaPort-e N00178-16-D-8631



### WHAT WE DO

CELENIUM provides professional services in wireless communication network systems and their applications, spanning **5G-readiness test & verification** to solutions architecture for **digital transformation**. We deliver the **due diligence** to **manage** changes, **reduce** risks, **save** costs, **navigate** options, **simplify** solution, **preserve** the know-how, and **monetize** services for your business profitability, while you focus on core business operation and efficiencies.

### WHAT WE DELIVER

CELENIUM delivers the project driving documents, as well as test and verification services to support product line managers and development teams:

- Systems analysis, use case and technical requirements (RFI/RFP) development
- Solution Architecture and Systems Engineering design documents & test plans
- Solution prototyping, interoperability and performance testing
- Testing on carrier-grade 5G-ready private network
- Indoor and outdoor verifications on licensed & CBRS frequency bands
- Production configuration development and deployment
- Programmatic support, vendor management, feasibility, gap and risk analysis

### PAST PERFORMANCE

- Sprint, KS: Engineering roaming DIAMETER signaling system, 3.5 Y
- Cricket, CO: Charging System Migration to 3GPP PCC Model, 1 Y

### KEY PERSONNEL EXPERIENCE

- Call One, IL: SD-WAN Service introduction, IT infrastructure migration to HCI platform, Fixed wireless last mile service prototyping, 2 Y
- Sprint, VA: 3G to 4G/LTE network transformation, 1 Y
- Lucent, IL: IMS Online & Offline Charging System (2Y), and FLEXENT Platform Performance (2Y). Common Wireless Platforms Systems Engineering & Architecture, 4 Y
- Computer Solutions Inc., MN: Hexcel's Extensible Composite Materials, Caterpillar's Axel Breaks, and Mikuni Carburetor Test Systems, 2.5 Y

### CONTACT

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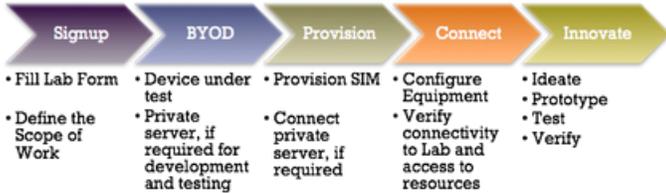
### DIFFERENTIATORS

- Faster Time-to-Value: save ~**15%** in frontend engineering with **95+**% accuracy
- Solid reputation of Excellence, Leadership, Perfection & Quality
- Solid experience in solving mission critical, high visibility complex problems
- Solid foundation for future growth through detailed quality documentation
- Go-getters attitude and iron resolve
- Diversity Strength: Access to top talents pool and Teaming Partners' resources

## WORK STATEMENT

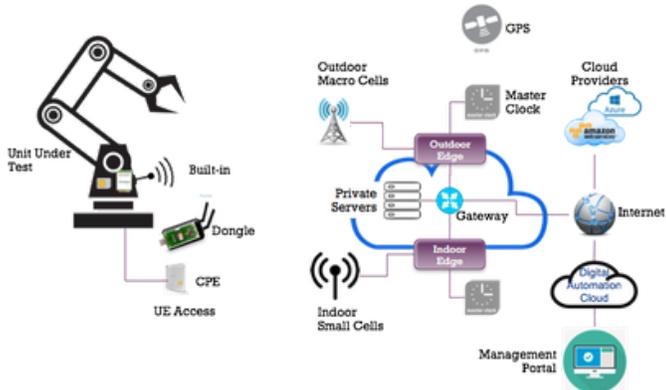
### EXPEDITE THE PATH TO 5G INNOVATIONS

CELENIUM offers 5G-readiness prototyping, test and verification services in verticals and use cases that include IoT, robotics, drones, autonomous vehicles, AR/VR, smart cities, healthcare, utilities, retail, telematics, warehousing, energy, farming, automation, education, and others.



### 5G-READY COMM-LAB NETWORK

5G-ready carrier-grade lab provides minimum latency and maximum performance. The indoor setup supports multiple 3GPP and unlicensed frequencies in both FDD and TDD technologies.



The outdoor lab provides open pit and fixed wireless testing, 360° coverage with 3 sectors, 3x20MHz carriers each, seamless handovers, 2x2 MIMO BTS, UL and DL carrier aggregation, DL256QAM and UL64QAM. It supports TDD 3550-3590, 3650-3700, 3550-3700 MHz, 2.4 GHz, and MulteFire. mmWave options are planned.

### APPLICATION USE CASES

**Connected Fleet:** Telematics for Cost Effective Operations, Mobile Weather Monitoring for Road Safety Management.

**Smart IoT:** Pedestrian Detection & Notification, unmanned water/wastewater/flood monitoring.



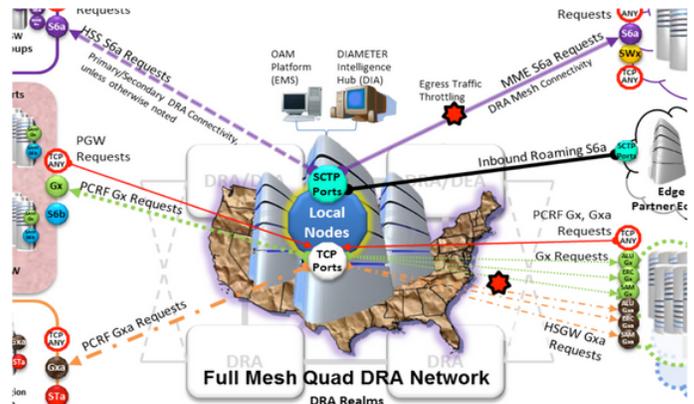
### INFRASTRUCTURE CASE STUDIES

**SD-WAN and Hyper-Converged Infrastructure:** Our SME researched and authored encompassing RFPs, managed vendors, conducted feasibility and SWOT analysis, supported POC testing and delivered superior technical choices at **50% savings** and up to **60% discounts**. The solutions simplify management, automation, and big data analytics through a single-pane of glass, without locking company into proprietary HW or interfaces.

### SPRINT 3/4G-LTE TRANSFORMATION

Over a **10 months** period, subcontracted by Alcatel-Lucent, our SME was the key player to that aspect of the overall success of the 3G to 4G/LTE network transformation. He led many multi-vendor discussions, shaped the service requirements, and wrote a standards-grade technical specification used by Sprint and its vendors as the eCSFB reference. The solution covered the architecture and requirements, end-to-end call scenarios, capacity and performance budgets, as well as test strategy to support mobile data, initiated and terminated calls, SMS, Multimedia message, Location Based Services, E911, as well as CMAS over 4G-3G access.

Subcontracted by Oracle, CELENIUM provided Sprint with full lab professional services on Tekelec DIAMETER Signaling Router. CELENIUM prototyped, tested, verified roaming DIAMETER signaling use cases for S6a, S6b, STA, SWx, and Gx interfaces with all of Sprint RAN/EPC vendors. Our SME rolled out the first prototype within **two months**, starting from ground zero.



### CALL US FOR A CONSULTATION

Solutions@Celenium.com

630-865-6861

Comm Lab Form: <https://forms.gle/3dQTgQ2qbfCDHRf77>

## PROCESS & QUALITY

### CELENUM WORK OBJECTIVES

CELENUM aims to deliver the best value to customers by:

- Shifting business decision risk from 50% error to better than 90% technically and feasibly sound choices
- Delivering the best Total Cost-Time-Value to results
- Minimizing impacts on customer resources to help them focus on core business operations and productivity

### 1. ENVISION

- Understand business long term vision in relation to present status
- Capture high-level strategy of business objectives
- Align on first in line project scope and approach
- Obtain buy-in from project owner on time and budget

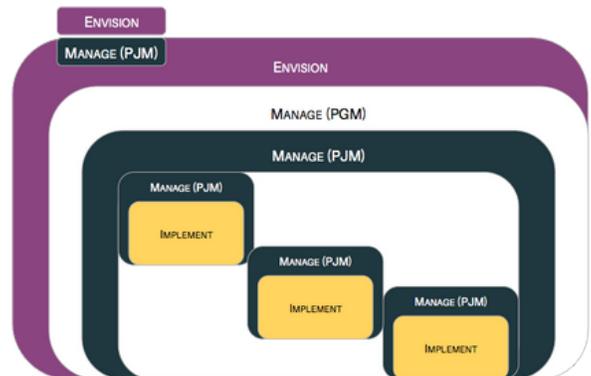


### 3. IMPLEMENT

- **Initiation:** Define High-level specs & align team
- **Engineering:** Develop detailed design, architecture, gaps and customization, prototype, test plans, bill of material
- **Construction:** Procure, integrate, test & validate, MoP
- **Deployment:** Cutover plan, field installation, acceptance test, knowledge transfer, final documentation
- **Production:** Provide user support, monitor KPIs, report on SLAs, log requests, resolve issues

### THE PROCESS

CELENUM uses an adaptation of Oracle Unified Method (OUM) and the Unified Process (UP) to ensure the end results meet business objectives. This process is 1) Business Process and Use Case-Driven, 2) Architecture-Centric, 3) Iterative and Incremental, 4) Risk-Focused, and 5) Fit-for-Purpose. OUM is composed of three focus areas:



### 2. MANAGE

- Develop the Project Management Plan to document project controls including Scope, Schedule, Changes, Cost, Risks, Change, Communication, Quality, Issues, Configuration, Procurement, Staffing, Infrastructure, etc.
- Create the Work Breakdown Structure
- Establish the Project Management Workbook to monitor and control the project
- Manage the Project Startup, Execution, and Close phases

### DRIVES: A COMMITMENT TO QUALITY

CELENUM approach in delivering high quality project artifacts is comparable to ISO 20000 quality feedback loop Plan-Do-Check-Act (PDCA)

1. Develop Initial project artifact
2. Review with stakeholders for errors and comments
3. Incorporate corrections and reissue
4. Verify fixes. Repeat steps 2-4, if needed
5. Enhance presentation
6. Sign off approval and baseline

**SCHEDULE A DISCOVERY MEETING**

[Solutions@Celenium.com](mailto:Solutions@Celenium.com) | 630-865-6861

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## ENDORSEMENTS

Performance endorsements of CELENIUM's principal, Ahmad Sultan, for his frontend engineering work, as posted on his LinkedIn profile, <https://www.linkedin.com/in/ahmadsultan>

### SPRINT 3/4G NETWORK TRANSFORMATION

*"His work on the front end development was key to that aspect of the overall success of the eCSFB program. This program changed the way voice calls are signaled to the CDMA phones, via the LTE radio channel."* **Phil Kopp, Director - Network Development at Sprint.**

*"I worked with Ahmad for 2 years. He is a customer-focused and detail-oriented engineer. He possesses strong skills in designing and integration testing of wireless core; he works very hard to deliver a quality product on-time."* **Akbar Aman, Network Design Engineer at Sprint.**

### LUCENT COMMON WIRELESS PLATFORM

*"Ahmad has always proactively initiated, led, and coordinated both his efforts and the efforts of others to deliver on-time, high quality front-end results that exceeded commitments for Lucent. His work leading the Lucent Performance Cross Functional Team (CFT) and all associated activities were highly acknowledged by his peers and by management across multiple departments. Ahmad was solicited for several Technical, Front-end processes, and cross departments improvement projects during his time at Lucent. He was a very strong team player with leadership roles on multiple CFTs. Ahmad always delivered features requirements on schedule with high quality. Ahmad's dedication to detail and accuracy greatly minimized development confusion. He was frequently sought after by his peers to moderate technical meetings. Ahmad was also always willing to expand his work efforts to fill critical functionality not presently staffed."* **Jerry Rog, Technical Commodity Manager at Alcatel-Lucent.**

*"Ahmad worked me in a systems engineering and performance analysis capacity while at Alcatel-Lucent. He was an integral part in setting standards for our performance and in ensuring we met the performance characteristics specified. He was very detail oriented, documented his work carefully, thoroughly, and in a very understandable fashion. He was easy to work with, and people sought him out for his expertise. He would be a welcome addition to any system solutions team!"* **Jim Hoch, Director, Wireless Platform Development at Lucent Technologies.**

### COMPUTER SOLUTIONS: TEST & MEASUREMENT

*"He has a rare combination of advanced education (PhD) and an ability to communicate with people at all levels. His engineering talents in electrical (as opposed to electronic) engineering and LabVIEW software development were very strong. I would work with him again if the situation presented itself."* **Steven Vetter, CEO Computer Solutions, Inc.**

*"He was the key player in many multi-vendor discussions where he was shaping the technical requirements, guiding the vendors while referring to the 3GPP specifications that he knows very well. He eventually wrote a standard grade technical specifications document that was used by different organizations within Sprint and its vendors as the CSFB reference."* **Sameh Naguib, LTE/EPC SME and Team Lead Alcatel-Lucent.**

### CRICKET COMMUNICATIONS

*"Ahmad worked for me for about a year and assisted in the deployment of our PCRF platform. His unparalleled attention to detail and willingness to do any task were instrumental in the success of the project."* **Chris Burke, Manager, Applications Planning & Engineering Cricket Communications**

### CALL ONE

*"I have had the pleasure of working with Ahmad for the last few years. He is a talented and thorough engineer who can make the most complicated concepts appear simple. Ahmad embraces collaboration and team success and makes doing business a productive and pleasurable experience."* **Tom Kolletis, Product Manager at Call One.**

**CALL US FOR A QUOTE**

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