

# 20<sup>th</sup> RealTime CONSULTING

ENGINEERING REAL SOLUTIONS

## Capabilities

Alt 2693 ft Lat +33.54771 Lon -111.61153 Trk 067 GSpd 237 Elev (ft)

Track Angle 067

45.0 nm

Track Angle 067

Seq ID	Desc	Lat	Lon	Lag	Alt1	Alt2	Type
01	TORPU	39.5088	-107.9955	0F	12000	12000	+
02	SHTDO	39.5010	-107.9910	7F	12000	12000	+
03	DOWNY	39.5035	-107.9862	7F	11500	11500	+
04	TORPU	39.5143	-107.9741	7F	10500	10500	+

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Providing Engineering Services since 1997!

Aerospace Systems, Equipment & Software

Full Lifecycle Development Capabilities

- Program Management
- Requirements – Client, Concept, Systems & Software (High & Low level)
- Design – including Model Based Design and Agile Prototyping
- Implementation - Code/Integration/System & SW Verification
- Electronic Hardware/FPGA/IO/Board Support
- Labs/Tools/Development Environments/Simulations & Training
- Artifacts/Tracing/Validation/Audits/Certification

Experience on a wide range of  
**Commercial Aircraft Black Boxes**

# RTC Overview

11,200+ Sq. Ft. – DD-254 Capable

3 Top Secret Bays, 1 Top Secret Lab

3 Top Secret Conference Rooms



70 Engineers - Avg. 20 Years Experience  
2013 INC 5000 Fastest Growing Companies



Certified Small Business (SB)

24/7 Badge Entry, Security

DVR Cameras & Recorder



# Engineering Services



## Core Capabilities

- Systems & Software
- Program & Project Management
- DO-178 B/C Certification Consulting
- Verification & Validation

## Additional Capabilities

- Complex Electronic Hardware Design & Integration
- Lab Development & Hosting
- Safety Assessments
- Controls
- Testing & Simulation
- Tools Development
- Training
- Rapid Prototyping
- Hardware



# The RTC Advantage

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## **Experience**

Our staff averages over 20 years of experience developing innovative safety-critical, embedded electronics, software, sensors, controls and network connectivity that enable devices to collect and exchange data to support your Internet of Things (IoT) initiatives

## **Interactive Communication**

Real Time Consulting maintains the highest industry standards by working directly with clients to understand and control fast-paced, high-profile projects. Customized reports are offered for monitoring project and program progress

## **Security**

Our facilities offer program and project security with badge-only access, separated DD-254 work bays and is ITAR and EAR controlled

- ARP4754 Processes
- Safety (ARP4761) including FMEA & FHA
- Use Case Scenario
- Reliability Analyses
- Human Factors Analysis/Effectiveness
- Requirements Analysis, Capture & Trace
- System & Functional Integration
- Model Based Development
- Architectural Definition
- Configuration Identification
- Acceptance Test Criteria
- Full Lifecycle Development



- Software Architecture
- Requirements (High & Low Level)
- Software Design & Allocation
- Multiple Software Languages
- Code Generation (Manual & Automated)
- Documentation with Tracing
- Software/Hardware Integration
- DO-178B/C Development Processes
  - Criticality Level A => D
- Embedded, Windows, Tablet Apps, BSP, & Drivers

>>> Core Capability <<<





# Program Management

- Active Management of:
  - Resources, Content, Schedules & Budgets
  - Client, Cert Authority & Suppliers
  - Scope, Objectives, Deliverables, Milestones
- Provide Technical Leadership
- Progress, Metrics, & Reporting
- Risk Management & Recovery Planning
- Track Record of Success: Client Processes or RTC Processes



Small to Large Programs

Short to Long Programs

Remote Programs

>>> Core Capability <<<



# Verification & Validation

- Certification Planning
- Reviews & Audits
- Test Plans & Procedure Creation
- Test Execution & Results Analysis
  - Manual & Automated, Desktop & Lab-Based
  - Requirements-based, Regression Analysis
  - Coverage (Statement, Decision, Modified Condition/Decision)
  - Acceptance Testing, Compliance Analysis
- Tool Qualification (DO-330/ED-215)
- Outsource Oversight & Coordination
- Customer & Cert Authority Meetings
- Certification Document Submittals



>>> Core Capability <<<

- Project Certification Documents
  - PSAC & PHAC (Project Start) to SAS & HAS (Project End)
  - Configuration Index Document (CID)
  - Open/Closed Problem Reports & Justifications
  - Verification Test Plan & Results (VTPR)
  - Trace Matrix
  - All Deliverable Artifacts
- Audit Support
  - Project/Client/Cert Authority
  - Stage of Involvement (SOI) Audits



>>> Core Capability <<<

# Electronic Hardware Engineering

- Hardware Solutions developed with our Alliance Members

- Hardware Architecture
- Analog & Digital Design
- RF Design
- Documentation with Tracing
- DO-254 & DO-160 Processes
- CPLD & FPGA & ASIC to FPGA Conversions
- Custom FPGA Development
- Mechanical Design
- Packaging Design



Hardware Supplier Management

# Development Expertise

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- Software – C, C++, ADA, Assembler, Python...
- Applications, OS Enhancements, Embedded Systems...
- Hardware Platforms – 29xxx, 68xxx, 80xxx, MPC8xx...
- RTOS – DEOS, Integrity, VxWorks, VRTX, Custom...
- 2D & 3D Graphics, Windows, Linux, Android...
- Product Requirement Tools – DOORS, Team Center...
- Configuration Management – Clear Case, PVCS, Subversion...
- Change Control – Clear Quest, Mantis, JIRA...

Full Line Card Available on Request



- Supported Standards Include
  - DO-178B/C, DO-254 (Avionics)
    - Criticality Levels A => D
  - SAE ARP 4754 (Systems), ARP 4761 (Safety)
  - DO-160, DO-200, DO-260 (Avionics)
  - IEEE/EIA 12207 (Software Lifecycle)
  - FDA/CDRH 510(k), IEC 62304, IEC 60601 (FDA)
  - ISO DIS 26262 (Automotive)
  - Many More, including ARINC, AUTOSAR
- Agile Development Methods



## Flight Regime and Flight Management

### Guidance

#### Lateral

- Leg Sequencing

#### Vertical

- Takeoff, Climb
- Cruise
- Descent
- Approach

### Navigation

#### Position Determination

- GPS
- Inertial
- Radio
- Celestial

#### RNP

A424 Nav Database

### Control

#### Actuators/Motors

#### Target Determination

#### Closed-Loop

#### Model-based

#### Sensor Feedback

### Communications

#### CNS/ATN

#### Datalink/SATCOM

#### ATM

### Surveillance

#### ADS-B

- TIS-B
- FIS-B

#### Transponder

#### TCAS

#### TAWS

### Mission Planning

#### Input Processing

#### Waypoint Management

#### Departures/Approaches

#### Flight Legs

#### Display Data Delivery

### Performance

#### Trajectory (4D)

#### Predictions

#### Path Generation

#### TOLD

#### Aero/Engine Database

## Flight Deck Equipment Development

### IO

Data and Signal

- Validation
- Packaging
- Routing

Data Acquisition

Signal Routing

### Displays

MFD

PFD

Synoptics

Touch Screen

2D/3D Imaging

### MCDU

Page Presentation

Key Processing

Flightplanning

### Onboard Maintenance

Centralized Maintenance

Maintenance Information Systems

FOQA

MOQA

### Built-In Test

Power On Self Test

Continuous

### Board Support

Bootloaders

Device Drivers

OS Initiation

### Operating System

Safety Aspects

- Time Partitioning
- Space Partitioning
- Criticality Partitioning

Multiple RTOS platforms

- GreenHills - VxWorks
- DEOS - Others

### Power

Electrical Power Distribution

## All Projects

Secure Data via Secure Server Share

Secure Configuration Management

Secure Change Control Processes

Only Project Personnel Have Data Access

Physical separation of project data available

Physical separation of personnel available

Hardware/Software Firewalls & Secure VPN



## Secret/Top Secret

Locked Down DD-254 Bays & Lab, Training

Isolated Servers, Printer, Fax



## Protocols:

ARINC 664

ARINC 429

ARINC 424

ARINC 629

ARINC 717

ARINC 653

ARINC 739

TCP/IP

Williamsburg

RS-485

RS-422

RS-232

MIL 1553

USB

CAN

and more...

**Loadable Databases:** Navigation, Aero/Engine, Terrain, Obstacles,  
Aircraft-Personality, Airline-Specific

# ITAR/EAR Approach

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International Traffic in Arms Regulations (ITAR) & Export Administration Regulations (EAR) are Important to our Clients & to RTC

RTC's Approach Provides:

- ITAR/EAR Compliance and Per-Project Instructions
- Secure IT Infrastructure
  - Access Controlled Shares
  - Layered Firewall Protections
- Physical Separation and Notifications
  - Badge-only Access with Separated Work Bays
  - ITAR/EAR Signage posted at Entry to Data Sensitive Areas
  - Project-specific Secure Printers

# Contact



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Let's discuss how we can assist in  
making your program a success

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# 20<sup>th</sup> RealTime CONSULTING

ENGINEERING REAL SOLUTIONS  
1997 - 2017

