Overview:

Advanced ISR Data Link Services

INTRODUCTION

Triad RF Systems has decades of experience working with world leading UAS companies to integrate, test, and troubleshoot links with the help of our High Power Radio Systems, range extending BDAs, and auto-tracking antenna systems. A brief sampling of our past successes can be found at the link below:

Triad RF Systems ISR Link Heritage

Most high-data rate, long distance UAS links struggle to achieve the link distance and data throughput they were designed for. Nearly all performance issues can be attributed to one (or several) of the below factors:

- Drift over temperature and drift across frequency of gain, power, and signal to noise ratio of active components in the link, such as radios and amplifiers.

- Incorrect video encoder optimizations required for reliable over-the-air links.

- Errors in configuring specific radio settings for long distance operation.

- Shielding issues that allow EMI to emanate from the vehicle, GCS system, and other circuitry.

- Co-channel or near-channel RF interference with other radios.

- Insufficient RF and/or DC bus filtering to mitigate EMI / RFI arising from the power supply.

- Sub-optimal cables, interconnects and antenna selection / positioning.

- Lack of a recurring maintenance plan, and pre- and post- flight tests and checks to ensure that the links are always working at peak performance levels.

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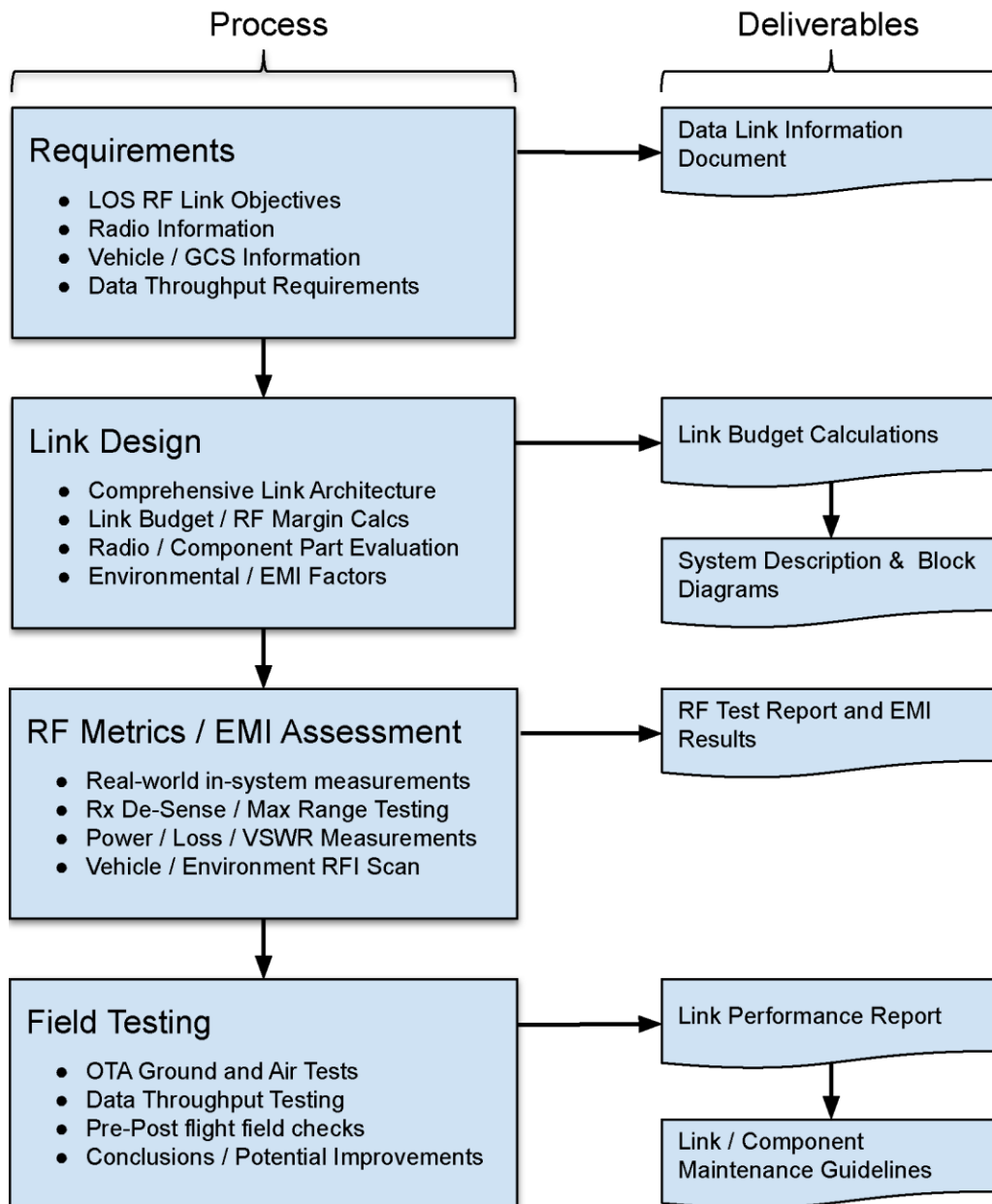
THE TRIAD ADVANTAGE

Triad designs and manufactures both the high power RF sub-systems and radio integration components of the link in-house. These parts have the highest effect on the overall weight and size of the ISR link. Triad's experience in designing the smallest bi-directional amplifiers in the industry, combined with our detailed integration experience with the most popular SISO and MIMO radios, yields the smallest size and lowest weight RF links on the market.

The design of a vehicle-tailored, ultra-lightweight high power radio system from Triad comes in at a lower total cost than specifying, purchasing, and undertaking the effort to integrate components from 3-5 (or more) different manufacturers. Furthermore, when the inevitable link problem occurs, working with Triad avoids the wasteful merry-go-round of discussions and finger-pointing with multiple vendors, all who will take little interest in finding a solution to your link issue, especially if they believe it is "not their component" causing the problem.

Our RF Applications team has expertise on all aspects of the ISR Data Link and can assist at any stage, from initial link design, to installation and field testing. For links currently in operation, we analyze the current performance of the link and indicate if there are any areas for improvement. We then provide a comprehensive performance improvement package, with solutions for achieving longer link distance, greater throughput and better immunity to interference.

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OUR PROCESS

Accuracy and repeatability are paramount in achieving consistent link performance. Our ISR team's processes have been tested and proven, and have been used to design many of the world's longest distance, highest data throughput ISR links currently in deployment worldwide. Contact us via our ISR links page, to see how your team can achieve first-run link success with Triad.

Process

Requirements
- LOS RF Link Objectives
- Radio Information
- Vehicle / GCS Information
- Data Throughput Requirements

Link Design
- Comprehensive Link Architecture
- Link Budget / RF Margin Calcs
- Radio / Component Part Evaluation
- Environmental / EMI Factors

RF Metrics / EMI Assessment
- Real-world in-system measurements
- Rx De-Sense / Max Range Testing
- Power / Loss / VSWR Measurements
- Vehicle / Environment RFI Scan

Field Testing
- OTA Ground and Air Tests
- Data Throughput Testing
- Pre-Post flight field checks
- Conclusions / Potential Improvements

Deliverables

- Data Link Information Document
- Link Budget Calculations
- System Description & Block Diagrams
- RF Test Report and EMI Results
- Link Performance Report
- Link / Component Maintenance Guidelines

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CONCLUSION

Proper and meticulous integration of all components is crucial to a successful high power data link. Triad RF Systems Data Link Services can save weeks or months of potential troubleshooting headaches, as well as give you the comprehensive tools to ensure successful continuous operation. All of this is essential for a successful project, where timelines and results are critical in a proper system implementation.

Using its decades of comprehensive experience and expertise with integrating, testing, and troubleshooting alongside world leading UAS companies, Triad RF Systems is able to deliver robust turn-key Data Link systems capable of operating in some of the most demanding and challenging environments. Employing proper Standard Operating Procedures and test methods also allows Triad to supply accurate and repeatable test reports on these Data Link Systems to ensure success right out of the box.

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