

Tait System Design Services

Assured network communications

Service Description

CONTACT INFORMATION

Tait Communications Corporate Head Office

Tait Limited
P.O. Box 1645
Christchurch
New Zealand

For addresses and telephone numbers of regional offices, refer to <http://www.taitradio.com/>.

COPYRIGHT AND TRADEMARKS

All information contained in this document is the property of Tait Limited. All rights reserved. This manual may not, in whole or in part, be copied, photocopied, reproduced, translated, stored, or reduced to any electronic medium or machine-readable form, without prior written permission from Tait Limited.

The word Tait and the Tait logo are trademarks of Tait Limited.

All trade names referenced are the service mark, trademark or registered trademark of the respective manufacturers.

THE CASE FOR TAIT DESIGN SERVICES

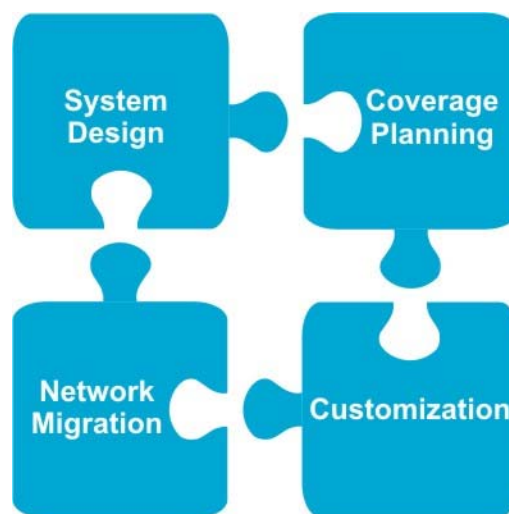
A new radio network must address coverage issues, meet regulatory requirements, support your legacy equipment and seize the opportunities that new digital technologies bring. Few network operators have the resource and expertise to identify requirements precisely, predict future need and design a solution.

Tait System Design Services deliver a complete solution, selecting products, services and applications while addressing the network architecture, coverage and performance, modules and interfaces of your radio network. We can define and develop standard and non-standard network elements and provide a precise, fully integrated solution that meets current and future expectation.

Tait System Design is unique in that it is fully customizable. Design experts engage with you and your preferred suppliers, to understand your requirements precisely. They will analyze your performance criteria and benchmark key parameters to deliver the right network architecture, products, services and applications for measurable performance benefits.

This document describes the Tait System Design Services:

- How does Tait Design Services work?
- Three good reasons to choose Tait Design Services,
- System Design
- Coverage Design,
- Network Migration,
- Customization,



HOW DOES TAIT SYSTEM DESIGN WORK?

Tait Design Services Portfolio offers customers a range of expertise and experience in every aspect of communications solution design. Flexibility is at the heart of the Tait System design approach. With more than four decades of radio communications solutions behind us, we know that one size does not fit all.

Our customers experience a uniquely flexible approach that works to their timeframes and budgets, their technology and supplier preferences, operating procedures and interfaces. Where possible, Tait will incorporate legacy equipment into the design.

Four key design services are discussed in this document:

- System Design
- Coverage Design
- Network Migration
- Customization

Because every solution is unique, the role an individual service plays can vary with the application. Your system design will involve only the services you require, to precisely match the needs of your radio communications network.

THREE GOOD REASONS TO CHOOSE TAIT DESIGN SERVICES

Reduce capital expenditure

Flexibility is at the core of every Tait design and can mean significant savings on capital expenditure.

Optimally-positioned sites can significantly reduce capital expenditure. Tait coverage experts will accurately assess your coverage needs for a more cost-effective solution that requires fewer sites and less infrastructure.

Often, legacy equipment can be retained and reused with custom interfaces and gateways between existing and new technologies. Equipment can be customized to operate according to familiar processes and protocols, reducing training requirements while increasing user adoption and acceptance.

Staged migration keeps legacy equipment in operation for a longer useful life, delaying capital expenditure and aligning with budget and funding cycles.

Align communications with your organizational objectives and processes

Tait System Design aligns communications technology with your broader organizational objectives. This is demonstrated at requirements definition and capture stage, when our Design Engineers engage with your organization to analyse and specify requirements.

Tait brings deep industry understanding and four decades of system design experience to the partnership, which will inform the design. As a result, your radio communications solution can produce measurable performance efficiencies, increased productivity and safety.

Optimize network performance for a safer, more efficient workforce

To meet your defined operational parameters, key performance indicators and strategic objectives, Tait System Design Engineers bring technical excellence, industry experience, flexibility and innovation.

Optimized availability, stability and performance across the communications network means workers are safer and more efficient, and communities are protected, with reliable communications they can trust.

SYSTEM DESIGN

Expert System Design is where Tait demonstrates a depth of industry understanding and expertise to significantly improve your operational processes and exceed your network performance expectations.

Tait System Engineers engage with you and your preferred suppliers, to understand your requirements precisely. They will analyse your performance criteria and benchmark key parameters to deliver the right network architecture, products, services and applications for a solution that delivers measurable performance benefits across your organization.



While the design of a communications solution will incorporate other design services, key activities of the System Design stage are:

Network planning and analysis

The Tait Design Services prioritize this important first step, taking the time to fully understand your communication requirements. From your broader organizational objectives to specific network performance criteria, we will provide a comprehensive analysis of your current network, and plan for future data and voice traffic, coverage and availability requirements.

Network optimization

Tait experts will compare your traffic, frequency, fleet, software and hardware parameters against benchmark performance levels, and make recommendations to optimize performance of the new network.

IP system design

With a clear understanding of your requirements, Tait will present a specific design proposal to address each aspect of your business and operational requirements.

Your unique solution may include elements of other Tait Design Services – Coverage Planning, Migration Planning and Customization.

Example: **Public Safety System Design**

With 9,000 officers, this national police service needed the efficiency and security of a P25 digital network. Geographical challenges and budget constraints dictated a staged, region-by-region rollout, while maintaining critical communications.

- Tait designed, developed and installed a customized network gateway between existing analog dispatch equipment and the P25 trunked network. The organization has retained its existing analog dispatch equipment and still has access P25 functionality.
 - Reuse of the analog equipment avoided disruption to critical communications during the rollout. Training overhead for dispatchers and officers was dramatically reduced, together with a significant cost saving from the infrastructure reuse.
-

COVERAGE DESIGN



Vital communications rely on coverage reliability and availability. Planning and predicting network performance through coverage modelling, then validating and verifying it on a live operating system represents a challenge that is likely to fall outside your core business scope.

Tait coverage design experts understand coverage issues and have the right tools to predict, plan and verify a network coverage plan that meets or exceeds your organization's performance measures.

Tait will deliver a robust coverage design plan, addressing geographical diversity, meeting regulatory challenges within your operating environment and ensuring efficient allocation of your capital and operating expenditure.

Requirements definition

Coverage Design begins with a feasibility study and consultation between key personnel in your organization and our experienced Coverage Design Engineers. This establishes clear definition and understanding of your radio communications objectives, operational requirements and identifies potential issues.

Coverage prediction

At Tait Centres of Excellence, Coverage Design experts apply theoretical modelling techniques and product understanding to develop high resolution coverage prediction for your network. They are supported by a suite of specialized technologies and unique coverage prediction tools, and deep product understanding.

Coverage analysis and verification

Once the network is in place, the surrounding sites are surveyed to ensure coverage meets your organization's requirements and the agreed plan. Survey data is reviewed against the prediction plan to verify coverage. This may result in a prediction review that will refine the coverage model and optimize your network performance.

Example: Public Transport Coverage Design

A large metropolitan bus fleet of 10,000 vehicles was undergoing a comprehensive upgrade of its obsolete radio technology. Tait was tasked with identifying coverage requirements to deliver seamless coverage across their service area.

- Tait coverage experts were able to identify a number of existing sites that would no longer be required in the new network.
 - The company's infrastructure and maintenance overhead was significantly reduced by 36% because only 10 sites were required, rather than the original 16.
-

NETWORK MIGRATION



Understanding your future communications needs and successfully implementing a new communications solution involves a complex web of logistical and technology projects.

Tait Network Migration combines expert planning, industry experience and extensive radio communications knowledge in a migration plan for a seamless transition to your new communications network. Tait migration specialists assess technologies, align your budget constraints, meet critical timeframes and mitigate outage risk to ensure continuity of communications throughout the critical changeover process. As your trusted partner, we can negotiate with industry regulators and your chosen suppliers.

Upgrading your communications network with Tait is based on a staged, seamless upgrade path. Tait will plan and execute a transition that minimizes complexity, risk and operational impact.

Network and site assessment

Your existing network infrastructure is assessed to determine its ability to support the changes. Assessment includes existing system technologies, legacy and third-party equipment, as well as capacity, distribution and prediction for future expansion.

Technology assessment

Tait will assess the capabilities and compatibilities of each technology to ensure trouble free migration within your acceptable level of service interruption.

Regulatory liaison

Tait can liaise between your organization and regulatory bodies to manage the complexity of government frequency regulation changes and ensure full compliance.

Planning

Tait plans for deployment and completion at your pace and budget, including maximum re-use of existing sites and equipment, resulting in lower site-related costs. The plan includes staged rollout of site equipment, power supply, network infrastructure applications and radio units.

Migration

Tait will manage end-to-end migration through to handover, effectively dealing with any challenges, to reduce migration time and provide a smooth transition to your new Tait solution. Radio users can be migrated in a staged approach for greater control over the timing of the migration process.

Example: Utilities Network Migration

Critical trunked radio infrastructure behind this large telecommunications business was becoming obsolete and required urgent upgrading to Tait trunked technology. The organization was operating a mixed fleet of 30,000 radios from multiple vendors.

- Tait developed a complex series of custom gateways to keep communications flowing to all terminals - regardless of technology or vendor - across both the legacy and new trunked networks.
 - The organisation avoided the upfront cost of upgrading their extensive radio fleet and enjoyed consistent, robust operation during the deployment of the new Tait trunked network.
-

CUSTOMIZATION



The significant investment you make in your radio communications network must return improved efficiency, cost-effective communication and greater safety of your workers.

Tait Customization puts your organizational requirements at the forefront. Unlike radio solution vendors that offer pre-packaged or one-size-fits-all solutions, Tait customization service designs radio system elements that precisely fulfill your requirements, adhere to your constraints, and work within your budget.

Tait design and build custom components and deliver a network in line with your specified outcomes, tailoring every aspect, irrespective of the challenges you face. This can mean retaining legacy equipment where appropriate, with innovative integration solutions ensuring that the solution is not compromised.

Committed to rapid turnaround, the experienced, multi-disciplined team has specialists in the following disciplines:

Design consultancy

The Tait Design Services team formulate innovative, fit-for-purpose, cost-effective options. Tait can offer new software and hardware, based on existing Tait products, integrate with new or existing third-party equipment or develop new radio products.

Hardware design

The Design Services team can carry out significant hardware changes to existing products or design new products. With a fully integrated, flexible manufacturing plant, hardware components can be prototyped and produced easily within a short timeframe.

Software design

The microprocessors that control Tait products provide the flexibility to modify operation and functionality. Design Services' software engineers can modify the operation and functionality of existing or new products.

New applications include radio programmers, simulators, prediction modelling and specific online training modules to support network operation and radio users.

Industrial and mechanical design

Tait industrial and mechanical design teams follow leading industrial design principles and techniques to create custom products with robustness and usability.

Technical publications

Technical communication specialists deliver a full suite of product and system documentation for customized products and new developments. These include installation and service manuals, individualized user guides and online help.

Example: **Utilities Customization**

A large state-wide utilities organisation was planning to upgrade their radio communications to a Tait trunked network. Their requirements for industry-specific user interfaces and talkgroup management could not be met by the standard equipment.

- Tait clarified the requirements shortfall and re-designed the radio network interface in line with the customer specifications. Radio firmware was customized to bring all equipment in line with the demands of managing a large workforce across a wide area.
 - The customized network met the requirements of the utilities industry, increasing user adoption rates and immediately improving customer satisfaction levels.
-

THE TAIT SYSTEM DESIGN PROCESS

Many customer projects involve all four key design services. While each service is scoped and defined separately, Tait experts in each field work as a cohesive team to design your unique communication solution. Regardless of complexity or scale, Tait experts observe a rigorous design process that focuses on the outcomes your organization seeks.

Requirements definition

Every system design begins with a preliminary consultation between your key personnel and our experienced system design engineers. This collaboration will develop an understanding of your objectives, operational and regulatory requirements, and potential issues, to establish a clear requirements definition.

Requirements capture

The Systems Engineer documents your functionality and performance requirements in the customer requirements specification. Throughout the process, the engineer is your point of contact with Tait, and will work closely with your organization to understand and agree on all requirements.

Proposal

With a clear understanding of your requirements, Tait will present a specific design proposal to address each aspect of your business and operational requirements. Your unique solution may include elements of other Tait Design Services – Coverage Planning, Migration Planning and Customization.

Detailed design

With a formalized partnership in place, Tait will design the communications solution that precisely addresses your requirements and agreed outcomes.

Acceptance

After a comprehensive review of the design and its deliverables, your acceptance confirms that this stage of the project is complete.



