Airport and Infrastructure Engineering

Pushing Innovation
Sky High

ncs
making IT happen
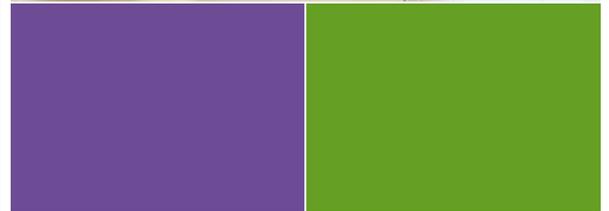
Your Partner in Airport and Infrastructure Engineering Systems

Operating an airport in today's environment is extremely challenging. As the aviation traffic expands, airports are under increasing pressure to improve efficiency, attract more regional traffic and meet passengers' demands for better security and reliability. Hence, there is an increasing need to integrate new solutions with existing, isolated and independent applications and networks for greater efficiency and effectiveness.

NCS Communications Engineering (formerly known as SingTel Aeradio), a subsidiary of NCS Group, can help you to undertake this complex and daunting challenge of achieving a smoothly integrated airport and infrastructure system. We have extensive experience and a proven track record in providing services covering the entire spectrum of aviation from consultancy, integration, implementation, maintenance, training and education services.

We play a key role in the development of civil aviation in Singapore, from 1950s at the Kallang Airport all the way through today's Changi Airport Terminal 3. We have been serving Civil Aviation Authority of Singapore (CAAS) and Changi Airport Group (CAG) in consultancy, project management, system integration and facilities management for both Passenger Terminal Building facilities and Air Traffic Control systems. Similar services are rendered to other Singapore Government departments including the Meteorological Service, Maritime and Port Authority of Singapore and Ministry of Defence. We also provide aviation services and solutions to many airports in China, Middle East and Southeast Asia.

NCS has the ability and expertise to install and manage a complete aviation system. We leverage on various technologies such as radar, automation, weather, training and simulation, CCTV and control access systems to tailor the best solutions to fit our customers' unique needs.

Our comprehensive offerings include :

- Air Traffic Control & Management Systems

- Airport Operational Database (AODB)

- Flight Information Display System

- Gate Management System

- Network Infrastructure e.g. Structured Cabling, Wireless LAN

- Telecommunication Infrastructure e.g. Transmission Network, GSM/GPRS/3G Network and Coverage

- IT systems e.g. HR, Finance, Resource Management

- Communication Systems e.g. Intercom system, Voice Switches & Recording, Air-to-Ground Ground-to-Ground Communications, Satellite Communication Systems & Facilities

- Public Address System

- Security Systems e.g. CCTV, X-Ray Machines, Security Screening Systems, Fence Intrusion Systems, Explosive Detection Systems, Access Control Systems

- Intelligent Building Management System

- Power Facilities

- Navigational Aids e.g. ILS, DVOR, DME

- Meteorological Doppler Weather Radar

- Runway Visual Range/ Automatic Weather Observation System / Wind / Low Level Wind Alert Systems (RVR/AWOS/WIND/LLWAS)
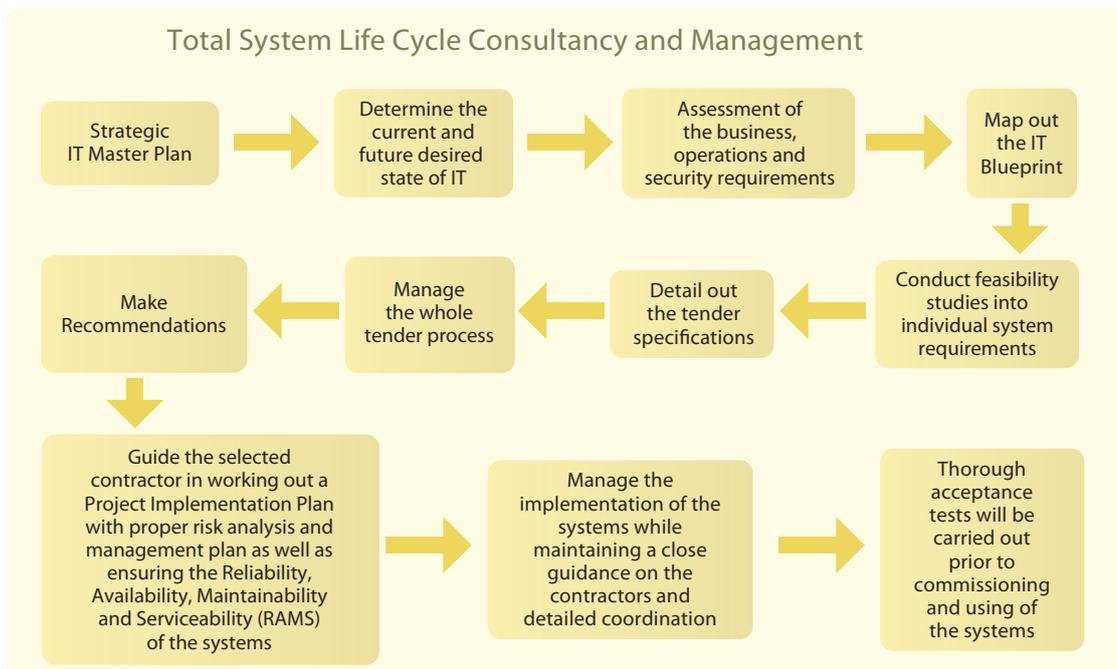
Consulting Services

NCS combines deep domain knowledge in consulting, technology and outsourcing with broad client experience in the aviation to help airport operators achieve high performance. Our active participation in standard's development and implementation like ICAO and IATA ensure that our consulting services are always steeped in thought leadership and industry best practices.

We have been involved in several aviation consultancy projects in the Asia Pacific and Middle East regions.

In Singapore, we provide consultancy services in the planning, design, procurement, supervision, and project management of key electronic and communications systems for Singapore Changi Airport's Terminal 3. Our role is to ensure that Terminal 3 uses the state-of-the-art technology while at the same time ensuring that the technology used is practical and stable, and gives visitors a pleasant experience through these touch points.

Besides providing airport systems life cycle consultancy, we also specialise in IT security and disaster recovery consultancy services, as well as business continuity planning to serve the specific IT needs of different airports.

Together with our proprietary value-based methodology, Bizval™ and our partnership with the best-of-breed technology equipment/systems providers, we will ensure that you get a total integrated solution that meet your needs.

Total System Life Cycle Consultancy and Management

Strategic IT Master Plan → Determine the current and future desired state of IT → Assessment of the business, operations and security requirements → Map out the IT Blueprint → Conduct feasibility studies into individual system requirements → Detail out the tender specifications → Manage the whole tender process → Make Recommendations → Guide the selected contractor in working out a Project Implementation Plan with proper risk analysis and management plan as well as ensuring the Reliability, Availability, Maintainability and Serviceability (RAMS) of the systems → Manage the implementation of the systems while maintaining a close guidance on the contractors and detailed coordination → Thorough acceptance tests will be carried out prior to commissioning and using of the systems

Turnkey Project Implementation Services

NCS has vast experience in infrastructure, electronic systems and application development, and implementation projects. Our foremost strength is our people. We have a large pool of qualified Project Managers. Our engineers, consultants and project managers are professionals with experience in strategic IT planning; infrastructure design; and systems integration.

Leveraging on our extensive service delivery experience, we can quickly and efficiently handle even the most complex issues. In addition, the domain knowledge acquired by NCS will ensure the systems are seamlessly integrated. Airport operational considerations which are imperative to the success of systems implementation such as aesthetics, passenger flow, space optimisation, security, safety, contingency handling and facilitation of airlines' hubbing functions are incorporated in our systems design and implementation. Overall Reliability, Availability, Maintainability and Serviceability (RAMS), as well as expandability and scalability are the standard key features in NCS' systems design.

With our proven and systematic ISO9001 certified project management methodology, SDMS methodology and process management disciplines, our projects are implemented and integrated seamlessly, in the safest approach with the highest quality.

Facility Systems Maintenance Services

Systems maintenance is important as it ensures that your system remains effective at all times. NCS, with its extensive experience in meeting high SLA maintenance agreements and experience in relevant systems like converged networks, Flight Information Display System (FIDS), Airport Operational Database System (AODB), Closed-Circuit Television System (CCTV), Public Announcement (PA) System and so forth, will ensure the security, reliability and efficiency of your systems so that you can focus on your core operations.

Our proven tools and processes for incident and performance management, ITSM methodology and compliance to international practices (e.g. ISO9001, ISO/IEC20000, ISO/IEC27001, CMMI Level 5) will ensure high availability of your airport systems. Whether it is the setting up and management of a fault reporting centre or the management of systems response teams, NCS has accumulated more than 50 years of experience in these aspects. Our trained managers and engineers bring with them a wealth of experience in managing your critical airport systems through well-planned preventive maintenance and immediate corrective maintenance.

NCS has the capability to design, source, manage, install, integrate and maintain aviation and airport solutions. Our areas of expertise include:

Air Traffic Control Systems

NCS has more than 50 years of experience in providing sophisticated Air Traffic Control (ATC) and radar systems to airports, including one of the world's best - Singapore Changi Airport. Our proven track record, expertise and commitment speak volumes and are the hallmarks of our services to our valued customers.

NCS provides value to world class ATC operations through our proven management and maintenance capabilities and methodology. We have the capability to integrate leading edge technologies such as Multilateration and Aeronautical Message Handling System (AMHS) to ATC systems and provide 24x7 maintenance services, keeping it compliant to ICAO standards. We will ensure that your ATC system meets the growing airspace demand.

With NCS, you can be assured of a robust and reliable Radar and Air Traffic Control Systems.

Communications Systems

A pivotal component for the safe and smooth operation of any international airport is its communications system. We have the relevant technical capabilities and extensive experience to deliver comprehensive communications systems for airports including Aeronautical Message Handling System (AMHS) and Aeronautical Fixed Telecommunication Network (AFTN) Message Handling System.

The Aeronautical Fixed Telecommunications Network (AFTN) is a worldwide integrated network that links all aeronautical fixed stations and enables exchange of aeronautical and meteorological messages. The Aeronautical Message Handling System (AMHS) is a new standard for message handling in ground-to-ground communications between airports, air traffic control facilities and airline companies based on X.400 profiles.

NCS has the expertise to manage and maintain 24x7 AMHS/AFTN Operation Centre. We are currently operating the AMHS/AFTN Operation Centre for CAAS.

High Frequency/Very High Frequency/Ultra High Frequency Communications

The use of satellite telecommunications for aeronautical communication service is an emerging technology. The current aeronautical communication systems are primarily High Frequency (HF), Very High Frequency (VHF) radio links to ground stations.

NCS has supplied, installed and maintained critical communication systems like HF, VHF and UHF radio systems which are essential for integrated ground-to-air communications between pilots and controllers, and ground-to-ground communications among controllers and air traffic control centre for airports like the Singapore Changi Airport.

We have a strong team of dedicated satellite communications engineers and a comprehensive suite of satellite communications products and services, ranging from the supply and installation of VSAT and "Fly-away" equipment to consultancy and turnkey implementation of earth stations. Fine-tuning of your existing earth stations power utilisation is also available through our proven uplink monitoring and power controller. For Changi Airport, we also project managed, implemented and maintained the satellite based Search and Rescue Antenna system.

In-Building/Outdoor Radio Frequency (RF) Coverage

We have provided project consultancy service to the Changi Airport operator for the supply, installation and commissioning of the paging, UHF radio and trunked radio services. We have also successfully installed new communications infrastructure to support iDEN and Tetrapole radio coverage for service providers. Our service begins from the selection of equipment site; coverage, frequency, capacity and parameter planning; conducting RF propagation test; determining distribution topology, cable and antenna types; calculation of link budget; to construction, performance tests and optimisation.

Two-way Radio Systems

Our engineering competency has enabled us to implement the trunked radio system which provides two-way "press-to-talk (PTT)" communications for specific geographical boundaries. Some of our customers include government departments and agencies, ground handling organisations, airlines, maintenance and service operators and the military. In Changi Airport, we extended the coverage area of the trunked radio system and helped the airport operator, its ground handlers and airlines such as Singapore Airlines to migrate the analogue radio system to digital radio system, thereby enabling the IP-based applications to be introduced to the handheld sets.

Passenger Terminal Building Systems

In today's high intensity airport environment, it is an ever increasing challenge to meet the growing demands of air travel passengers all over the world. The many different complex systems found in an airport generate lots of data on a daily basis. It has becoming an increasing need for airport operators to implement effective and integrated systems to ensure ease of operations and maintainability of these systems.

NCS has accumulated the necessary knowledge and expertise to provide you with systems that will fulfil the most advanced requirements such as:

• Airport Operational Database System (AODB)

The AODB is the information hub of today's modern airport. It is central repository of all the data generated in the daily operations of an airport. The AODB provides the storage and sharing of these data in a logical and structured manner while ensuring the integrity of the airport information.

Features

- **Centralises data warehousing**
- **Streamlines data distribution**
- **Eases data synchronisation**
- **Facilitates trend analysis**

Benefits

- **Enables multiple platforms integration**
- **Lowers integration risk**
- **Improves operational efficiency**

• Flight Information Display System

All around the world, flight and operational information must be processed and presented quickly and cost-effectively for an ever-growing number of viewers. In addition, with airports migrating to a common use and shared tenant services environment, directional signage at the terminals, check-in desks, gates, and baggage carousels must be distributed in a dynamic format to facilitate the changing operational environment.

The Flight Information Display System (FIDS) is thus a vital component of the airport's overall "way finding" program. It provides airport management with automated control to distribute and display critical information to the travelling public, airport tenants, and airport operational staff. It also provides visual paging for the hearing impaired and supports the display of weather information, promotional and advertising information.

The FIDS system is a key component of the airport's integrated operational systems and is directly connected to the Airport Operational Database and Resource Management System. The closely coupled system allows for the automated displaying of critical information to those who need it, when they need it with little or no manual intervention.

The computerised real-time system uses LCDs, plasma displays, colour TVs, split-flap boards, and message input devices to display continuously updated flight and related information. The FIDS software is an open system concept and offers the flexibility of operating on a variety of display devices according to customers' preferences through simple configuration. It is able to support common international languages.

Features

- **Supports multiple types of display devices**
- **Enables efficient data distribution via the use of IP networks**
- **Eases data synchronisation**

Benefits

- **Optimises passenger flow**
- **Allows multiple display formats**
- **Improves operational efficiency**

• **Resource Management System**

Airport operators are facing ever increasing pressure to increase the profitability of their operations. Making use of existing resources/facilities more efficiently is one way to achieve better results.

The Resource Management System (RMS) is a solution designed for the efficient assignment of airport's assets such as airline ticket counters, gates and airline's back offices as well as kiosks operating in both Common Use Self Service (CUSS) and dedicated use mode as well as baggage reclaim carousels. The RMS is an increasingly critical tool that makes essential contribution to airports by enhancing the flexibility of the airport properties and facilities. The RMS provides the functionality to meets the requirements of an airport's planning/operations department and all common business needs of the airport.

Features

- **Allows accurate scheduling of resources**
- **Optimises resource utilisation**
- **Allows auto-detection of resource problems/conflicts**

Benefits

- **Manages multiple classes of resources**
- **Greater operational flexibility**
- **Reduces operational costs**
- **Allows staff to concentrate on critical tasks**

• **Common Use of Terminal Equipment System (CUTE) and Common Use Self Service (CUSS)**

Airports are increasingly looking for ways to "do more with less" in terms of utilisation of the facilities. The application of increasingly affordable, technology-based solutions allows airports to attract and handle more business, process passengers and their baggage more efficiently, improve security, and save money.

Features

- **Allows airlines to run the check-in and boarding software of their choice**
- **Fully functionalises common use environment**
- **Eases integration**

Benefits

- **Reduces airport and airline operational cost**
- **Enables comprehensive remote monitoring and management**
- **Reduces implementation timeline**

- **Airport Operations and Crisis Centre**

In today's airport environment, processes are increasingly interdependent. This is clearly evident in the stringent security checks that passengers are put through on a daily basis. Delays caused by this interlink of processes resulted in higher costs and customers' dissatisfaction. In addition, with the increasing security threats present all over the world, airports are also under the strain to step up security. To address the challenges of rising customers' demands and cost pressures, airport management teams have to look for new and effective ways to efficiently manage and deploy their manpower resources and equipment while ensuring that they are able to manage any security crisis.

An Airport Operations and Crisis Centre (AOCC) thus aims to achieve this streamlining by providing a common platform which seamlessly integrates all the traditionally individual systems within an entire airport infrastructure. These include BHS, BMS, CCTV, Communications Systems, FIDS, etc. This integrated platform will provide the stakeholders up-to-date, real-time information that enables the airport management team to proactively prevent and manage any interruptions that may arise, thereby resulting in a more efficient and cost effective airport. With an integrated platform, security concerns will also be better managed. All relevant information is available in a central location allowing quick assessment of situation and response strategy formulation and communications. The AOCC will allow swift and decisive actions to be taken ensuring a quick resolution to any crisis.

Features

- **Centralises location where airport sub-systems can be monitored and controlled**
- **Ensures ease-of-operations via common platform**
- **Integrates system**

Benefits

- **Streamlines and integrates airport operations**
- **Allows comprehensive monitoring and management**
- **Platform for crisis management**

- **Converged IP Infrastructure**

It is important that the network infrastructure remains robust and reliable in the face of changing business landscape, increasing business demands and evolving security risks.

NCS' value proposition lies in our expertise and skill sets in the IP and optical networking domain. We have a pool of best-of-breed technology partners who we can easily tap on to cater for solutions that are designed on different technologies or approaches. With our breadth and depth in network technology, and our experience in implementing numerous large scale projects, our customers can be assured that they receive the most relevant solutions that meet their long-term e-business needs.

- **Public Announcement System**

The Public Address System (PA system) is state-of-art acoustic and audio equipment used for announcing flight arrivals and departures, paging for passengers in the terminal buildings, for emergency calls and broadcasts, and playing of background music in public areas.

NCS is able to implement a turnkey PA system drawing on our partnership with various renowned brands of suppliers. We installed and commissioned the PA system in Changi Airport's Terminals 1 and 2. We designed the system, modifying the hardware and software to suit the airport's customised requirements. The PA system comprises of a several sub-systems with each performing a unique function, making them a sophisticated system. Each system is designed as a dual redundant system consisting of a main and hot-standby system with automatic switchover facility. When the main system or sub-system malfunctions, the switchover facility will enable a change over of the system. The PA systems in both terminals are maintained by NCS.

- **Integrated Security System**

On a daily basis, every airport faces many different security threats. These threats exist in many different forms and include intrusion, smuggling of contraband items, terrorism, fire, etc. An airport must be able to prevent and react to any such incidents in a timely and effective manner, while taking into consideration the speed of passenger, baggage & cargo movement.

Features

- **Integrated systems control**
- **Centralised command and control**
- **Single situational picture**

Benefits

- **Increased security level**
- **Reduced surveillance personnel costs**
- **Improved reaction time**

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