ICT Strategy 2017-2022

Northern Ireland Ambulance Service Trust

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Contents

Chief Executive's Foreword 5

Management Summary 6

1. Overview 7

1.1 Introduction 7

1.2 Responsibility for Strategy 7

1.3 Process used to develop this strategy 7

1.4 Who should read this strategy? 7

2. About NIAS 8

2.1 NIAS Mission 8

2.2 Our values 9

2.3 Aim of ICT Strategy 9

3. Strategic context 9

3.1 Digital Age 9

3.2 E Health and Care Strategy 10

3.3 Northern Ireland Electronic Health and Care Record 10

3.4 Transformation and Modernisation 11

3.5 Shared Services 11

4. NIAS ICT environment 12

4.1 ICT Resources 12

4.2 ICT Systems 12

4.3 NIAS Digital Maturity (pathway to paperless) 14

4.4 Digital Maturity Analysis 14

4.5 Digital Maturity benchmark 14

5. NIAS ICT department and resources 18

5.1 Roles and responsibilities 18

5.2 Purpose of informatics at NIAS 18

6. Review of ICT strategy 2010-15 19

6.1 Where are we now 19

6.2 Emerging Strategic Themes 23

6.3 Our focus over the next 5 years. 23

7. Strategic themes 24

7.1 Theme 1 – Improving System Integration and data management 24

7.2 Theme 2: Enabling improvement in performance management and access to clinical decision support through ICT and data management. 25
7.3 Theme 3: Using informatics and analytics 26
7.4 Theme 4: Building an ehealth environment and culture 27
7.5 Theme 5: ICT enabling Transformation and Modernisation 28
8. Core Projects 28
9. Key Challenges 29
9.1 Technology Landscape 29
10. Governance Arrangements 29
11. Guiding Principles 30
12. Equality and Human Rights Considerations 30
13. Conclusion 31

Chief Executive's Foreword

The pace of change within the world of ICT is unrelenting, new models of delivery in all sectors means that our lives are becoming digital, even if sometimes we don't notice it happening. The process of shopping, travel and banking, to name but a few, have changed dramatically through technological innovations. These technological and societal changes set the expectations for the people we serve. Patients expect us to have their information at our fingertips, the public expect clinical decisions to be evidence based and available to us, wherever we are treating them. Our commissioners and Department of Health expect us to have accurate and timely information to plan and base decisions on. Given these increasing demands, it is of fundamental importance that we grab the opportunity that technology presents to deliver world class care. This strategy must be viewed as one of the key building blocks of our success over the next five years.

I believe that our approach to ICT must be twofold. Firstly we must allow new technology to shape our thinking, therefore being open to ideas around new ways of working, mobile technology and social media will be fundamental. Secondly we must set the direction for the service, and then ICT must step up to the mark to enable our service ambitions to be realised. I think this strategy sets the path to deliver both of these approaches.

I hope that you will find this strategy exciting and interesting, and I look forward to working together to deliver this important agenda.

Mr Shane Devlin
Chief Executive

Management Summary

The purpose of this document is to provide an Information and Communication Technology (ICT) Strategy for the Northern Ireland Ambulance Service (NIAS). The ICT strategy provides a roadmap for the next five years and takes forward a number of themes which will help NIAS achieve its vision for the future embracing new and next generation technologies delivering innovative solutions to support its models of care.

The document describes a strategic framework for ICT and is aligned to the organisation's Trust Delivery Plan which will guide the work of the ICT Department in supporting proposals for Service modernisation, Performance Improvement and Achieving Financial balance.

The strategy highlights the current situation, key achievements from the previous strategy and the critical internal and external strategic drivers facing ICT for NIAS. This provides the context for the presentation of a strategic framework in terms of five strategic themes with corresponding objectives and actions linked to each theme.

These key strategic themes are:

Theme 1. **Improving system integration and data management**

Theme 2. **Enabling improvement in performance management through ICT and data management**

Theme 3. **Using information and analytics**

Theme 4. **Building an ehealth environment and culture**

Theme 5. **ICT enabling transformation and modernisation**

1. Overview

1.1 Introduction

The ICT strategy sets out how the Northern Ireland Ambulance Service will develop its information and communications systems and data management and governance processes to support the strategic aims and objectives of the Trust. The strategy will build on the implementation and achievements of the previous strategy 2010-2015 and will be a key enabler in supporting NIAS' Transformation and Modernisation programme. The updated strategy covers the period 2017-2022.

1.2 Responsibility for Strategy

The Chief Executive, through the Director of Finance and ICT is responsible for ensuring that NIAS uses a common and systematic process for identifying, evaluating, specifying, procuring, using and safely maintaining ICT in accordance with NIAS overall strategic plan and HSC ICT policies and strategy. The Director of Finance and ICT is responsible for ensuring that an appropriate ICT strategy is developed to support the Trust aims and objectives supported by the development and review of policies and procedures to provide data and information which is appropriate, secure and confidential in compliance with the Data Protection Act 1998 and meeting the legislative requirements of the Freedom of Information framework and other associated statutory requirements.

1.3 Process used to develop this strategy

The ICT enabling group with a cross directorate membership and chaired by the Assistant Director ICT has [through a series of workshop meetings] developed the strategy. The strategy supports service development as well as NIAS' Transformation and Modernisation Programme and takes cognisance of ICT initiatives within HSC NI and other UK ambulance services.

The draft strategy was presented to the Information Governance Steering Group chaired by the Director of Finance and ICT.

1.4 Who should read this strategy?

This strategy is for all NIAS staff involved in managing and implementing service delivery and service improvements for whom ICT is increasingly a key enabler in carrying out their duties in an effective way ultimately for the benefit of the patient and the wider service users.

2. About NIAS

The Northern Ireland Ambulance Service, established in 1995, provides ambulance care, treatment and transportation services to the people of Northern Ireland 24/7, and 365 days per year. NIAS meets the needs of a population in excess of 1.8 million in a pre-hospital environment employing over 1270 staff across 59 ambulance stations/deployment locations and 2 ambulance control centres (for emergency and non-emergency calls).

2.1 NIAS Mission

The Northern Ireland Ambulance Service exists to improve population health and wellbeing, and applies the highest levels of human knowledge and skill to preserve life, prevent deterioration and promote recovery.

The Northern Ireland Ambulance Service will provide safe, effective, high quality, patient-focussed care and services to improve health and wellbeing by preserving life, preventing deterioration and promoting recovery.

NIAS Mission statement

Improved health and wellbeing for the Northern Ireland community through safe, effective, high quality care and services provided by the Northern Ireland Ambulance Service is an integral part of the whole healthcare system

NIAS Vision

The Vision will be achieved through the delivery of a plan that embeds the following themed outcomes:

"We will create an organisation that

- Has a motivated, empowered and involved workforce
- Has a delivery model that gets the resource to the patient quickly
- Has clear evidence of improving experiences and outcomes for patients
- Has clinical excellence at the heart of our organisation
- Will be recognised for its innovation
- Has an approach to leadership which is effective, ethical and collective

"each person as an individual"

"safety..confidentiality… integrity"

"learn from our mistakes.. build on our successes"

"excellence and professionalism"

"patients first"

"we all have a part to play in making ourselves and our communities healthier"

2.2 Our values

The values of the Northern Ireland Ambulance Service provide a common ground for cooperation to achieve shared aspirations. NIAS is committed to "living" those values every day in our engagement with patients, public and colleagues providing healthcare services.

- Compassion
- Integrity
- Learning & improvement
- Respect

2.3 Aim of ICT Strategy

The principle aim of the ICT strategy is to produce a framework plan for the use of current and new technologies to support delivery of services, underpinned by the mission and values of the organisation and aligned to the corporate aims and objectives as set out in the Trust Delivery plan, which will guide the work of the ICT department over the next 5 years.

The ICT strategy will become the roadmap for the effective development and implementation of innovative information and communications technology within the Trust and throughout our integration across the wider HSC network. The strategy will prioritise appropriate projects and resources in the short, medium and long term involving a wide range of stakeholders to provide NIAS with enhanced information and communications technologies to fulfil its mission in providing safe, high quality patient focussed care.

3. Strategic context

3.1 Digital Age

We live in an increasingly "information society" where approximately 76% of the population use "smart" technology[1] and over 80% of households have access to the internet[2]. Services are enhanced and enabled by advances in technology and healthcare services are no different. The pace of change is relentless and NIAS faces many pressures to stay in step with new and advancing technologies not least in the delivery of safe and quality patient care and the demand for "real time" accurate and timely information which supports clinical decision making processes as well as informing business processes. Healthcare enabled by technology is at the heart of "next generation" healthcare delivery. Leveraging the innovations provided by information and communications technologies will enable new models of care by supporting more effective and efficient ways of operating and delivering services.

[1] Deloitte: Mobile Consumer 2015: The UK Cut Game of Phones
[2] http://media.ofcom.org.uk/facts/

3.2 E Health and Care Strategy

The Northern Ireland HSC ehealth and care strategy[3] promotes the use of information that is needed by people and care professionals to make better decisions about prevention, treatment and care. It outlines how ehealth will support people and services and help information flow around the system to improve decision making for better care. It describes how ehealth will support changes that must be made to improve health and wellbeing in Northern Ireland with delivery of ehealth on the basis of "Once for NI"

The strategy is underpinned by 5 key principles:

- Citizen centred: supporting your health and well being
- Connections: Across NI, making information available in the right place, at the right time to support the best care, with the right safeguards in place.
- Consistency: technologies and the way they are used should be designed and rolled out in one way for Northern Ireland: any variations from this will need to be justified.
- Creativity: driving innovation and promoting best practice
- Cost effectiveness: investment must add value and support efficiency.

The NIAS ICT strategy embeds many of the principles of the ehealth strategy. It takes into account how healthcare is evolving in the 21st century. It aims to leverage innovative technology to support the demands on the ambulance service to drive efficiency and improve patient outcomes especially in the context of a patient centric, outcome focused, integrated care model. NIAS is s a regional service and any ICT developments will naturally fit the "Once for NI" ethos.

3.3 Northern Ireland Electronic Health and Care Record

There are regional plans to develop integrated electronic health and care records (EHCR) as part of the ehealth and care strategy driven by the need for transformational change. This is enabled through ehealth technology and builds on the successes [and recognised limitations] of the NI Electronic Care Record (NIECR) as well as the practicalities of needing to replace hospital systems approaching end of economic life in the most efficient way.

The development plans for the EHCR draw the distinction between the EHCR as a concept and the EHCR as a system. As a concept the EHCR would encompass every element of data relating to the care history of a patient/client presented in a single view; the data may be drawn from a variety of separate but linked systems. As a system the EHCR refers to the management and presentation of patient /client data through a single system.

The development of the EHCR is driven by the immediate need to replace aging and end of life patient administration systems within the hospitals.

Within the concept of the EHCR, NIAS is clear about its position and the need to have a central integration point, however the feasibility of NIAS patient reporting being part of a single EHCR system is largely unknown and is not fully explored in the EHCR research[4]. The 5 year

[3] eHealth and Care Strategy for Northern Ireland: Improving health and wealth through the use of information and communication technology.

[4] An electronic Health and Care record for Northern Ireland: Report of the Electronic Health and Care Records Research Group 9th October 2015

development plan for EHCR presents added risk to NIAS timescales. NIAS' strategy continues to focus on its plans for an electronic patient record accessible at the point of care and internal infrastructure for data management taking cognizance of these developments. This points towards earlier implementation of a NIAS electronic patient information system which will integrate to the regional EHCR solution.

3.4 Transformation and Modernisation

NIAS continues to face challenges, namely increases in service provision and developing new thinking on how its services are delivered aligned with changes across the wider HSC network. Transforming Your Care[5] proposes that professionals provide health and social care and work together in a much more integrated way to plan and deliver consistently high quality care for patients.

NIAS has introduced protocols for "hear and treat" "treat and leave" and "treat and refer" which means that increasingly, there are a number of patient not conveyed to hospital who are either left at home or referred to an alternate pathway. As the volume of pathways and patient throughput grows, it is apparent that these need to be supported by ICT enablement in the most efficient way to optimise best patient outcomes.

The ICT strategy will consider the requirements not just for accurate data collection and analysis but also an increasing need to manage efficient data input and exchange. This aims to support necessary changes to system infrastructure, and any system replacement as part of a wider strategic plan, to develop the digital maturity within the ambulance service maintaining focus on information security and strong governance aspects.

3.5 Shared Services

In December 2015 the BSO commissioned Deloitte to conduct an assessment of the ICT organisation across all HCSNI Trusts to ascertain the feasibility of expanding the shared services remit of the BSO. There is significant potential for shared services to deliver more efficient and more effective ICT services within HSCNI. This is based upon the current federated approach to ICT service delivery which has some duplication of applications and infrastructure and generally, a disjointed approach to investment. The HSCNI will be following in the footsteps of many other organisations in the public and private sectors who have already reaped the benefits of implementing shared services. It is clear from the stakeholder consultation undertaken as part of the review that there is considerable concern from HSC Trusts in particular about any move to ICT shared services. ICT shared services are different to HR/Finance/Procurement in that the operation of the health service is critically reliant upon ICT on a 365/24/7 basis. The Trusts currently have the majority of the ICT staff within HSC and a lot of the knowledge and skills required to successfully operate the ICT services required.

A key challenge in implementing shared services therefore will be to ensure that Trusts are fully engaged and involved from the outset in the design and implementation of the shared

[5] Transforming Your Care, A review of Health and Social Care in Northern Ireland (Dec 2011)

services model. NIAS will continue to work with all HSCNI Trusts and BSO to develop an agreed blueprint/roadmap for ICT within HSCNI to potentially move to an ICT shared service model. Any agreed blueprint/roadmap for shared services must not impact on delivery of ICT services locally.

4. NIAS ICT environment

4.1 ICT Resources

NIAS is a mature user of ICT and has its own ICT department within the remit of the Director of Finance and ICT. The ICT team currently consists of 7 WTE staff members including the Assistant Director with responsibility for ICT. This team manages the IT help desk, servers, communications, infrastructure and network, Command and Control Systems, Information Systems security, mobile working and telephony. The team also manages new technology implementation and provides first-line support to all 3rd party applications.

As Ambulance Control Systems receive and support emergency calls from the public they need to be permanently available without any disruption to service. A full on-call programme is provided by the NIAS ICT team to respond promptly to any disruption out-of-hours on a 24/7 x 365 basis.

This small ICT team has multi-functional staff who have attained a wide range of skills across multiple applications and developed expertise in the diverse range of tasks relating to ICT delivery. There are clear objectives, roles and responsibilities set for each member of staff. This helps ensure that important 'housekeeping' of information systems such as password control, access control, ICT security, data validation do not lapse due to multiple demands and priorities.

4.2 ICT Systems

NIAS has a modern and dynamic ICT estate that is expanding and growing. The challenge facing the ICT department is to offer a first class service to its customers while providing assurance at all times on the integrity, confidentiality and security of its network, data and services.

The Command and Control system **(MIS C3)** is the core Ambulance control system used to log incidents and despatch an appropriate ambulance resource to the scene of the incident.

An Integrated Command and Control System **(ICCS)** – presents radio and telephony communications through a touch-screen system in the Ambulance control room

AMPDS (Advance Medical Priority Dispatch software) integrates with the Command and Control system. Based on pre-determined questions and flows this allocates a dispatch code for the call.
Incident data is sent to a **Mobile Data Terminal** (MDT) in the vehicle. The **AVLS** (Automated Vehicle Location System) locates the nearest available ambulance. This is integrated with C3 and allows dual transfer of information e.g. crew status information / times etc. MDTs operate over a private encrypted 2 Mb private data network.

NIAS currently avail of the PSNI's Digital Trunk Radio (DTR) System **(Barracuda)** for voice communications between Ambulance Control and Crews. Radio and Telephony are presented to Ambulance control through the Integrated Communications Control System (ICCS) which uses touch screen technology.

Business Intelligence – NIAS can produce performance analytics based on information from MIS C3. This system holds limited clinical information other than a "chief complaint" which is determined by the initial call information.

Clinical information Systems – Patient report forms (PRFs) are completed (paper based records) by attending crews to incidents. They contain levels of clinical and medical information which are of a personal and sensitive nature. PRFs are scanned using the **Formic** system which uses OCR (optical character recognition) technology. This enables digitisation of paper patient report forms stored in a searchable database. This is a standalone system with none of the advantages which an accessible, timely electronic patient reporting system such as those provided in other ambulance services.

Other in vehicle communications – **cardiac defibrillator monitors** (CDMs)– record patient physiological data and diagnostic patient monitoring. The CDM is able to transmit ECG data in real time using Bluetooth and wi-fi technologies across the secure NIAS network. Data is transmitted via NIAS servers to pPCI units in an email as a PDF attachment.

All of the above systems are currently in place and have point to point integration within NIAS with MIS C3 as the central hub (apart from the clinical formic scanning system). Most of the client systems use Windows OS, the mobile data system uses Linux.

Other systems include the regional **HRPTS** system for online HR, Payroll, travel and subsistence.

GRS (Global Rostering System) is a system to manage shift rostering with a self-service portal for staff to query their personal details, annual leave and volunteer for overtime and enter overtime claims.

Directory of services (DOS) – software for NIAS to manage information on services available across the HSC to support the functions of the clinical support desk (CSD) in control. The DOS is also web based for access in the mobile environment.

Datix – local and web based patient safety and risk management software for healthcare incident reporting and adverse incidents.

Microsoft Office suite is also used in the organisation and staff have access to Word, Outlook, Access, Excel, PowerPoint etc.

CCTV is also in operation in vehicles and stations across the Trust.

4.3 NIAS Digital Maturity (pathway to paperless)

The healthcare system in Northern Ireland has ambitions to be paperless by 2020 through the regional "pathway to paperless" project. In England, the drive is to be paper free at the point of care with "fully interoperable" electronic patient records by 2020. In order to assess their position to achieve this, all NHS including ambulance services in England have carried out a digital maturity self-assessment.

An organizational Digital Maturity Self-Assessment builds on existing evidence about how investing and effectively using IT can achieve better patient outcomes, reduce bureaucracy, improve patient safety and deliver efficiencies. It also provides a road map to progress the digital efforts, visualizing the pathway and setting priorities for process improvements. Whilst there isn't a regional exercise in Northern Ireland, as a benchmark for good practice NIAS has carried out a similar (if not more simplified) exercise to inform its own position in a developing ehealth and paperless environment across the HSC.

Relevant statements were listed based on the larger English based survey and responses to these were graded as follows.

Not sure	Not developed	Emerging	Focused	Advanced	Optimised
0	1	2	3	4	5

4.4 Digital Maturity Analysis

A full schedule of statements can be found at appendix 1. In summary, NIAS strategy is aligned to corporate objectives and its programme for transformation and modernisation as well as the wider strategic alignment with the eHealth and Care strategy. In this respect the level of digital maturity is focused and clear about what is to be achieved. From an operational and implementation perspective the level of digital maturity is not developed. In terms of patient records and the digital mobile environment, NIAS has a lot of work to do, however this sets out the basis of achieving the roadmap to maturity and eventually working towards "paperless".

4.5 Digital Maturity benchmark

Using the same standards and scoring mechanism, NIAS carried out a benchmarking system with other UK ambulance services to assess their position in relation to other services.

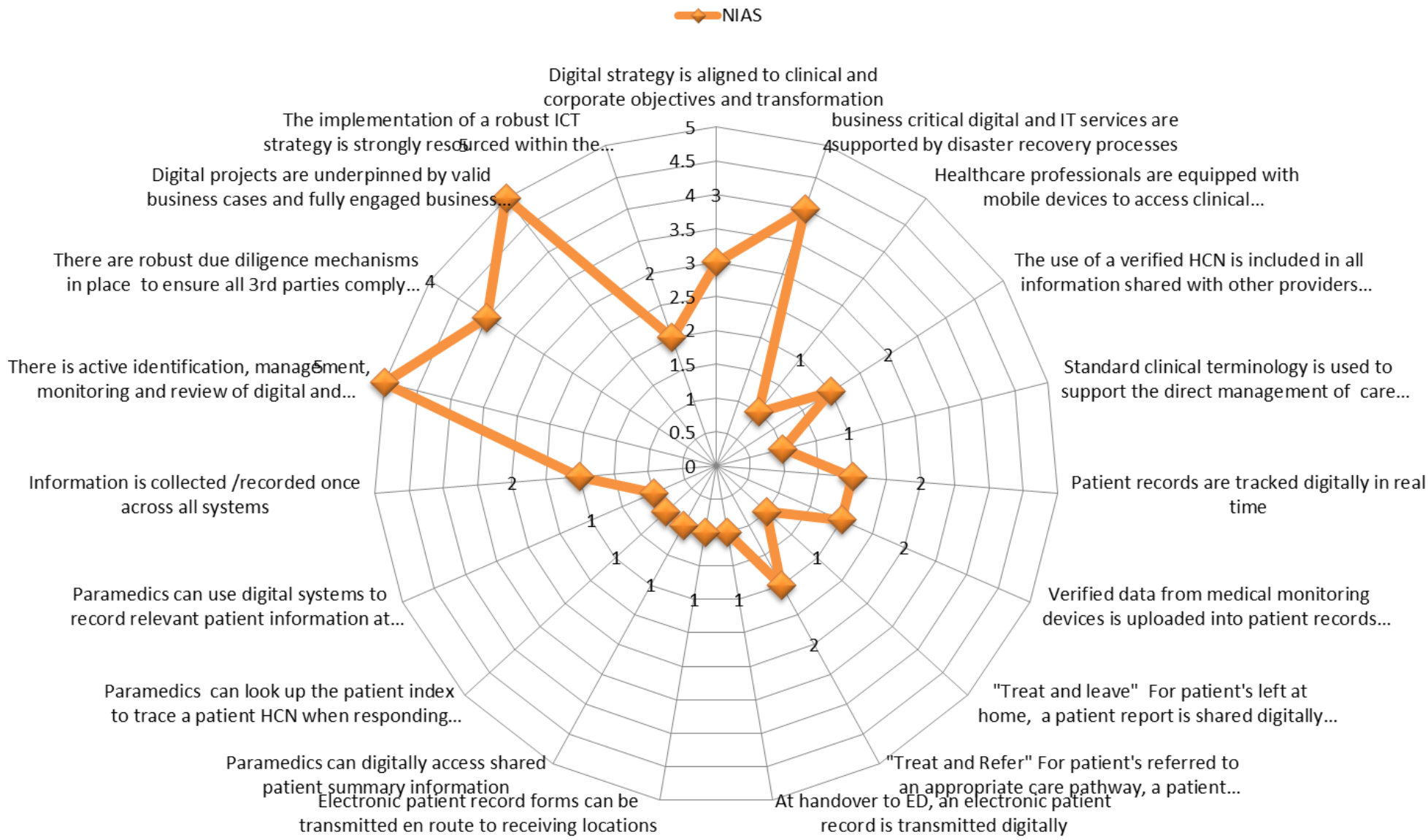
Responses were received from, Scottish Ambulance Service, West Midlands Ambulance Service, East Midlands Ambulance Service, North West Ambulance Service and South East Coast Ambulance Service.

The following table shows NIAS' position as benchmarked against these services.

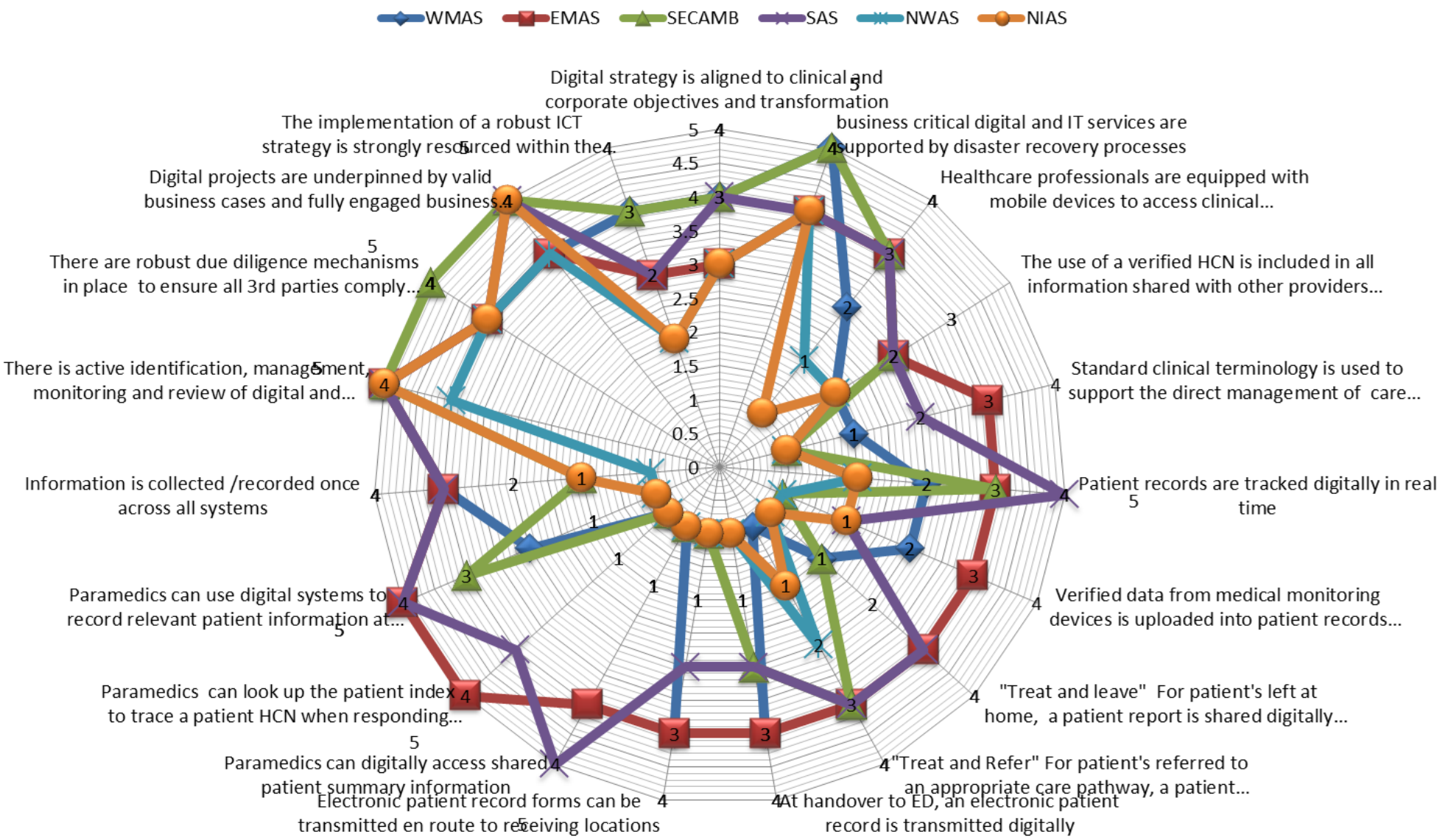
In summary:

- All services have a digital strategy aligned to their organizational aims and objectives which ranged from focused to advanced.
- NIAS was the only organisation not to be equipped with mobile devices to access clinical applications and information at the point of care. (NWAS have reverted back to paper records whilst they are scoping a new electronic patient reporting system).
- Services are working towards collecting information once across all systems as an emerging development.
- Not all services share information digitally at the point of care however these systems are in development. Scotland and East Midlands are more developed in this area followed by SECamb.
- This pattern follows with the use of a single identifier (NHS number, equivalent to the HCN no in Northern Ireland) which underpins the ability to confidently share patient data and records. This is more developed in Scotland and East Midlands.
- All organisations without exception had strong risk management in terms of cyber risks and disaster recovery processes in place.

NIAS Digital Maturity (Full description at Appendix 1)

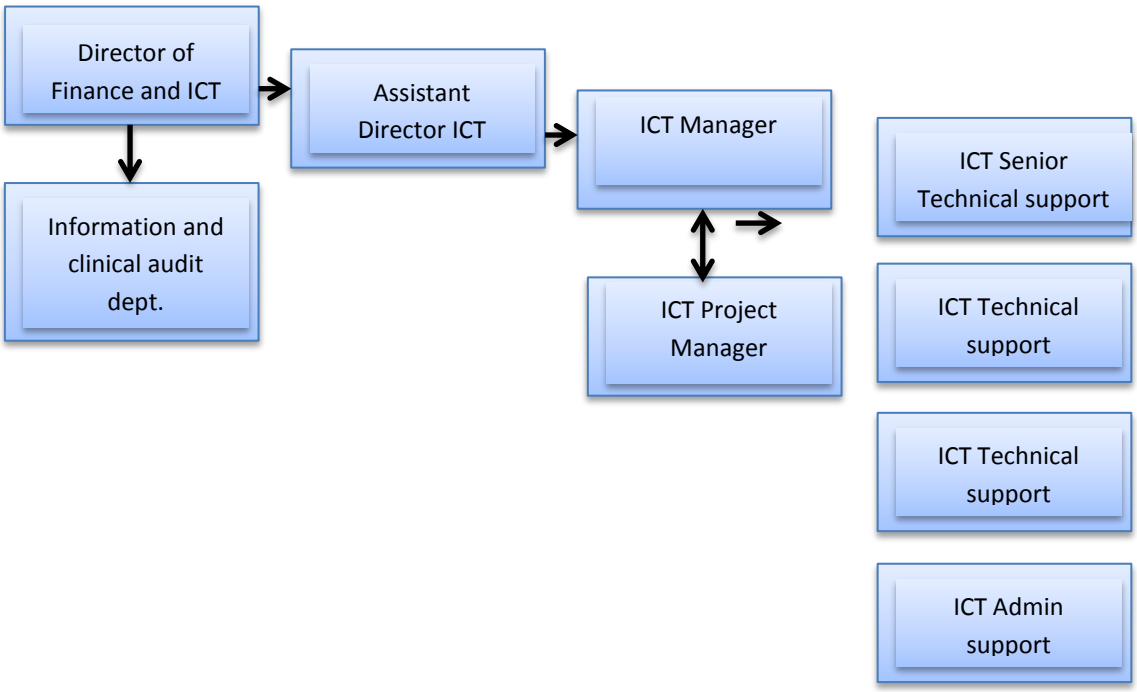


NIAS benchmarked with other UK ambulance services (full description at Appendix 1)



5. NIAS ICT department and resources

ICT department organisational chart



5.1 Roles and responsibilities

NIAS fully recognises the importance of Information Technology and Information Governance needs throughout the organisation and has in place staffing arrangements to fully develop and support these areas of management. The Director of Finance and ICT is responsible for the management of staff operating within the areas of Information Technology and Information Governance who work together to maintain legal obligations and to meet the business needs of the organisation.

The Assistant Director of ICT has a focus on the development of the ICT infrastructure, hardware, software and associated systems

The Corporate Manager is responsible for ensuring the development and implementation and delivery of the Information Governance Framework developing, monitoring and overseeing the implementation of IG policies and procedures including data protection, freedom of information, records management and providing the mechanisms for supporting access to information compliance.

5.2 Purpose of informatics at NIAS

Information Technology underpins the operational functions within the organisation. As an enabler, it is key to the delivery of new models of care by supporting more effective electronic communication processes and the capture, management and sharing of essential patient and incident data both for real time operations and analytics.

Information technology must also support decision making by enabling access to reliable, accurate and timely performance and clinical information. It must deliver the tools and clinical decision support for the delivery of safe and quality patient care at the point of care.

6. Review of ICT strategy 2010-15

6.1 Where are we now

The digital Maturity index, provides a level of self-assessment for the organisation and outlines where we are now and also where we want/need to be.

The table below outlines the achievements since the last strategy and the current position

Theme:	What we set out to achieve	Current position and key challenges
Improving System Integration	• Create a single repository for data within the organisation. • Improving the availability of corporate information to users. • Explore opportunities to integrate NIAS systems with those of the other HSC organisations	Key to achieving the objectives of this theme is the implementation of an ePRF which would provide much of the infrastructure and platform for data management, analysis, communication and further integration with other HSC organisations. The project has been in development since 2014 and is under review by the Department of Health. The alternative pathways developed as part of TYC are relying more and more on system integration across other HSC organisation in order to facilitate the appropriate exchange of patient information to further enable "Hear and Treat", "Treat and Leave" and "Treat and refer" protocols. There are regional plans to introduce an EHCR which proposes a single platform across all Trusts. Given the prevalence of system integration this theme is continued in the current strategy.
Enabling Improvement in Performance Management through ICT	• To enhance our ICT infrastructure to allow the organisation to access information to meet its performance management objectives. • Enable access to real-time information to allow pro-active decision making.	Key to achieving this objective is the development of an infrastructure that allows staff and users to access systems and information via their desktop and in the mobile environment. NIAS has implemented a project for a WAN upgrade, improving the network services for local ambulance stations. Ongoing work involves the upgrade of Citrix and introduction of Safeword to enable remote access for service users.

	• To provide relevant information to external stakeholders.	The infrastructure enabled by the ePRF project will facilitate a mobile working environment. There is a focus on providing mobile communications for operational staff by developing a vehicle Wi-Fi hub in every ambulance. This communication hub will provide corporate network accessibility for application devices and medical equipment. The use of wireless networks for the provision of clinical systems is now embedded in network designs across HSCNI. NIAS are contributing resources to a regional project team tasked with exploiting new and emerging Wireless technology in a way that will deliver real benefits for its staff and patients by increasing the ease of access to Clinical Systems, as well as facilitating new ways of communication and integration. The updating and redesign of the Trust's website has improved the public interface and information to external stakeholders. This work continues through the use of social media and redevelopment of the Trust's intranet site. Real time performance monitoring is available to NIAS Managers via a web based module of the Command and control system providing information on performance, activity and resources within their area of management This theme is continued in the current strategy.
Embedding an Information Governance ethos in the Organisation	• To promote a culture of corporate openness and transparency. • Ensure the protection and use of personal identifiable information in compliance with legislation and guidance.	The Information Governance Framework introduced a framework of accountability for information risk with the mandated appointment of a Board level Senior Information Risk Owner (SIRO) who takes responsibility for managing information risk within the Trust and for providing assurance to the Accountable Officer on the content of the annual Statement of Internal Control in regards to IG. This is in place along with the appointment of trained Information Asset Owners and

	• Improve systems and processes for the effective management of records.	Information Asset Assistants to manage information governance aspects in local Directorate areas. The Trust has in a place a suite of IG policies and procedures relating to areas including Data Protection, Freedom of Information, Records Management. All staff are also trained at induction and thereafter through e-learning, workbooks. The Trust maintains annual Information Management Controls Assurance Standards and which are currently substantive along with reviews carried out by Internal Audit.
Enhancing ICT skills and knowledge	• Improve staff awareness of corporate policies and procedures in relation to access and use of information. • Enhance staff skills and knowledge in the use of ICT systems and applications based on identified need.	NIAS continues to embed good practice in Information Governance by identifying opportunities to improve awareness of all corporate policies and procedures through exploiting digital technologies. As technologies are refreshed/replaced training plans are developed to coincide with their implementation/rollout. A dedicated IT training room has been equipped at NIAS HQ which provides an appropriate learning environment for members of staff across all Directorates within the Trust. We continue to explore opportunities to benefit from eLearning practices such as Apps development for smart phone or personal devices. An ICT Enabling group chaired by Assistant Director ICT and represented across Directorates has been established to support the Transformation and Modernisation program of work. Representation by the NIAS Learning and Development Officer on this group encourages discussion and innovation in the delivery and communication of learning methods.

Building an e-information culture	• Maximise access to corporate and service information for the Trusts Key stakeholders and the public. • Improve and promote communication and minimise the distribution of paper based information for the organisation	The updating and redesign of the Trust's website has improved the public interface and information to external stakeholders. This work continues through the use of social media and redevelopment of the Trust's intranet site. An online booking system for Patient Care Services has been developed and rolled out to HSC Trusts. Further plans are in place to expand this rollout to GP services and in time this will be the preferred method of booking non-emergency Ambulances. A Directory of Services (DOS) system has been implemented in the Emergency Ambulance control (EAC) to support care protocols developed for 'treat and leave' or 'treat and refer'. This is currently only available locally. An Aide Memoire outlining clinical pathways developed under the Transformation and Modernisation Programme for front line staff has been created in PDF format and available for download to personal mobile devices.
Developing ICT services Staff	• Provide ICT services staff with development opportunities so that the team has in place skilled staff with recognised capabilities. • Create an environment in which staff continuously strive to improve their effectiveness and performance • Strive to achieve HPSS/IT industry recognised quality standards to offer assurances on ICT services delivery to NIAS Chief Executive and Trust Board.	We facilitate and support continuous learning and professional development for all ICT Services staff within the context of the Knowledge and Skills Framework (KSF). A regional HSC Microsoft Enterprise Agreement provides NIAS ICT staff with training courses and access to professional support services. ICT projects where new technologies are deployed are supported by a business case which includes a provision for ICT technical training.

6.2 Emerging Strategic Themes

Following review of the previous ICT strategy, some of the themes continue to be relevant whilst others have been consolidated and updated in the context of a developing ehealth environment to meet the needs of NIAS and the Transformation and Modernisation Programme as well as mirroring developments across other UK services.

1. Improving system integration and data management
2. Enabling improvement in performance management through ICT and data management
3. Using information and analytics
4. Building an ehealth environment and culture
5. ICT enabling transformation and modernisation

6.3 Our focus over the next 5 years.

Our key focus across all the themes will be:

- Building an appropriate infrastructure for accessibility of patient records at the point of care.
- Developing access to a central point of integration with ECR/EHCR.
- The development of the "smart" ambulance making use of wi-fi communications infrastructure
- Exploring the opportunities of telemedicine to enhance the quality and safety of patient care
- Bi-directional data sharing across all systems within NIAS and across the HSC.
- Data Management planning to include sources of data, quality of data, storage, business intelligence and analytics.
- Interoperability of command and control on a national basis for contingency.
- Improving integration of systems (especially in the renewal of existing systems and equipment CAD, MDT, medical equipment, server environments and potential use of cloud etc.)

It is crucial that ambulance clinicians have appropriate access to devices, information and systems that allow them the greatest opportunity to influence the outcomes of the situations they deal with on a daily basis. The development and deployment of the "smart" ambulance (a connected communications hub for technology and clinical devices) and an electronic patient report system enables opportunities for real time exchange of clinical data at the point of care supporting "treat and refer" or "treat and leave" protocols. NIAS is uniquely placed supported by the right technology to define the most appropriate care pathway and reduce unnecessary conveyance to ED.

7. Strategic themes

7.1 Theme 1 – Improving System Integration and Data Management

Enabling improved interoperability between all systems both within NIAS and across the wider HSC network.

Strategic Objective	How will it happen
7.1.1 **Embed appropriate enterprise system architecture to deliver the technology to support service change**	• Review current systems architecture and interfaces and identify any gaps, weaknesses and opportunities to streamline data exchange and information sharing. • Review current MS licensing platform as part of a wider HSC initiative to identify any gaps and develop a roadmap to maximise the benefits of a regional enterprise agreement. • Expand the NIAS Virtualised server environment where appropriate to do so. • Explore the use of a data integration engine to centralise data and reduce duplication and multiple entry points providing comprehensive analytics and "real time" reporting. • Create a centralised location for all training records - HRPTS L&D function will be rolled out across the Trust in 2017. This will become the centralised location for all NIAS Training records and will replace a number of systems currently used by training providers across directorates. • Explore the availability of an LMS for the Education, Learning and Development department.
7.1.2 **Support the delivery of safe and effective care through the provision of innovative ICT solutions which enable transformation and modernisation.**	• Continue to pursue the approval and implementation of an electronic patient reporting system. • Review current network infrastructure and assess improvements needed to enhance electronic communications and to enhance the ability of staff to work in the mobile environment or remotely.

7.1.3 **As part of a patient centric approach, explore opportunities to integrate NIAS systems and the wider HSC**	• Develop links with HCN master patient index to use HCN as a single patient identifier across NIAS systems. • Develop the "smart" ambulance introducing mobile wi-fi communication hubs to maximise network coverage and aggregated bandwidth for mobile data transfer and access to web based tools and apps. • Develop a central link between NIAS and the ECR (or EHCR as it develops) for bi directional exchange of patient information. • Explore the interoperability of CAD systems on a national basis for call passing.

7.2 Theme 2: Enabling improvement in performance management and access to clinical decision support through ICT and data management.

Supporting all staff to access relevant information to make informed clinical decisions and to enable performance management support.

Strategic Objective	How it will happen
7.2.1 **Enable a single view of Trust wide data to provide managers and staff with relevant performance information**	• Explore opportunities to consolidate data storage /warehousing across systems to enable Trust wide analytics and information reporting and sharing. • Review the management and redesign the Trust intranet site as a key source of organisational information and developments for all staff. • Make use of Trust wide performance dashboards as part of the development of analytics.
7.2.2 **Enable access to timely, consistent and relevant information to inform clinical decision making and to support training**	• Provide a robust system for real time clinical information and audit. • Develop a central link between NIAS and the ECR (or EHCR as it develops) for appropriate access to patient summary information Develop the "smart" ambulance introducing mobile wi-fi communication hubs to maximise network coverage and aggregated bandwidth for mobile data transfer and access to web based tools and apps. • Explore the availability of shared Cloud based storage for all staff to access training resources • Explore the use of digital learning technologies to deliver learning which is more effective, efficient and responsive.
7.2.3 **Deliver the tools and the knowledge base required to support clinical decision making at the point of care and to support training needs.**	• Explore opportunities in the mobile environment through the use of new in-vehicle technologies (MDT, tablets, smart phones) to provide electronic communications, tool, apps to staff to assist clinical decision support at the point of care as well as opportunities for elearning and training.

	• Explore the use of in vehicle technologies and infrastructure to enable staff to access a web based applications. • Use appropriate and modern communication technologies to enable staff to access the right information at the right time in the right place and to promote learning

7.3 Theme 3: Using informatics and analytics

Enabling the real time electronic capture, sharing and analysis and interpretation of data with appropriate information governance structures to support patient care and planning of patient services.

Strategic Objective	How it will happen
7.3.1 **Enable timely access and analysis of accurate performance and clinical information to support decision making, patient care and service development**	• Put in place systems to allow the electronic capture of patient data at the point of care e.g. ePRF • Invest in emerging in- vehicle communications technology to support the capture, transmission and integration of data. • Make use of business intelligence tools to enable Trust wide analytics and information reporting and sharing. • Support the role of information management in the reporting, interpretation and analysis of data to guide service development.
7.3.2 **Improve the quality and reliability of real time information across the service and the wider HSC.**	• Explore how data capture and structure can be standardised and centralised for improved real-time analytics. • Develop and use key standardised clinical and performance reporting across the service. • Provide flexibility within the system for timely bespoke reporting and analysis. • Engage with other services and innovative technology solutions to provide a benchmark and maintain pace with local and national developments. • Enable local access to information to support real time clinical audit and quality improvement plans and training
7.3.3 **Ensure that information governance processes support and enable ehealth and electronic records in compliance with relevant legislation and guidance**	• Establish, maintain and communicate policies, procedures and processes in compliance with current legislation and guidance. • Promote effective information governance and confidentiality practice to staff through the provision of appropriate training • Develop information governance policies to facilitate the development of ehealth solutions, information access and sharing to include working in the mobile environment.

7.4 Theme 4: Building an ehealth environment and culture

Continuing to invest in new technologies as key systems are renewed and replaced to build a streamlined, reliable and robust ICT infrastructure for the 21st century to meet the needs of the organisation, staff, patients and the HSC network.

Strategic Objective	How it will happen
7.4.1 **Promote the use of "smart" technologies, apps and web based tools throughout the organisation**	• Work towards a "paper free" culture through the digitisation of manual processes as much as possible. • Continue to work towards the implementation of electronic patient records and opportunities offered by telehealth • Explore the opportunities for personal issue devices for clinical data capture and the potential for using the devices for other e-benefits. • Develop the "smart" ambulance introducing mobile wi-fi communication hubs to maximise network coverage and aggregated bandwidth for mobile data transfer and access to web based tools and apps. • Explore and exploit opportunities for e-learning both locally and remotely via an appropriate integrated Learning Management System (LMS). • Develop a mobile workforce, with access to systems, information and communications in the mobile environment.
7.4.2 **Ensure that there is capacity building across ICT systems which supports the wider ehealth and care strategy.**	• As new systems are renewed / replaced, review the functionality and infrastructure and the potential through new technologies to realign and streamline systems, server infrastructures, data input, integration and data exchange. • Engage with other services and innovative technology solutions to benchmark and maintain pace with local and national developments. • Develop the organisation's "digital maturity" in order to integrate across the wider HSC network and have bi-directional information sharing within the ehealth environment. • Collaborate with other HSC Trusts and organisations to promote and exploit the benefits of an integrated health and care system in the delivery of safe and quality patient care and in the wider context of EHCR development

7.5 Theme 5: ICT enabling Transformation and Modernisation

Using and adopting innovative technologies to underpin and enable transformation and modernisation meeting the needs of a changing service.

Strategic Objective	How it will happen
7.5.1 **Support innovation through engagement with Transformation and Modernisation leads**	• Engage staff with changes in business processes and the adoption of new technologies to effectively manage change. • Provide assurances and a forum for effective cross-partnership working across all projects with an ICT component through the ICT enabling group
7.5.2 **Ensure that the transformation and modernisation programme at NIAS is enabled by a robust and reliable ICT infrastructure.**	• Engage with other services and innovative technology solutions to benchmark and maintain pace with local and national developments • Promote the use of ehealth technologies and mobile and electronic communications in the delivery of quality and safe patient care to support transformation and modernisation.

8. Core Projects

At the point of writing the Strategy, this is the ICT core work plan. The plan is fluid and will be subject to change and development at key review points in the ICT strategy and its implementation. Some of projects are contingent on additional capital and revenue funds being made available:

- Introduction of wi-fi communications within the ambulance
- Replacement of Mobile Data Terminals with Smart technology across all fleet
- Replacement of Cardiac Defibrillator Monitors in vehicles incorporating wi-fi communications
- Introduction of electronic patient records in an ehealth environment and integration with EHCR project
- Data management and integration opportunities afforded by these core developments
- Opportunities for app developments
- Command and control systems update and development
- Regional wi-fi across the ambulance estate and in vehicles
- Shared services

9. Key Challenges

Following identification and prioritisation of NIAS key projects the key challenge for ICT is to enable this transformation and modernisation across the service and large scale change whilst delivering business as usual. The increasing HSC and local demand for wide ranging and high quality information and data provision requires a systematic and adequately resourced strategy for ICT investment supported by appropriate policies and procedures.

9.1 Technology Landscape

The ICT environment is probably the most rapidly changing environment facing all organisations, not just healthcare. Rapid change versus speed of decision making and the financial constraints at various levels across the wider health and social care infrastructure in Northern Ireland presents its own challenges.

NIAS will need to consider how it manages and meet the organisational needs in terms of ICT infrastructure considering:

- The speed of change and development across technology platforms and solutions
- Changing landscape involving mobile communications and data platforms and cloud computing services
- Ability to continue and evolve legacy applications and interfaces
- Ability to support systems on a continuous basis 365/24/7
- Ability to develop and maintain services specifically tailored to NIAS's needs
- Ability to meets the needs of NIAS within the wider developments across the HSC
- Limited ICT resources

10. Governance Arrangements

The ICT Strategy is underpinned by robust organisational governance. Governance is concerned with the process by which decisions are made, and the roles and responsibilities of those who make them.

An annual ICT Implementation Plan will be produced setting out the actions required in that year to deliver against each of the strategic themes and objectives.

Where appropriate a formal project management methodology based around the concepts of PRINCE2 will be adopted for individual project implementations which will be guided by and consistent with the principle of 'Once for NI'.

The development and delivery of the ICT strategy is the responsibility of the Director of Finance and ICT who will charge the Assistant Director ICT and Corporate Manager with the implementation of the appropriate projects. ICT plays an increasingly integral part in the delivery of the organisation's overall objectives and the successful implementation of the ICT strategy will require the full involvement and commitment of all staff throughout the organisation.

11. Guiding Principles

A set of principles to guide implementation decisions has been developed. These are to assist in ensuring NIAS takes a common approach, recognises resource constraints and has the likelihood of success. The principles are listed below and will be used as assessment criteria in considering proposals, business cases and project plans.

NIAS will maximise opportunities offered by technologies both "tried and tested" as well as new innovations to support delivery of services and patient care. There are a number of guiding principles that we will adopt in taking forward plans for implementation.

1. Confidentiality and security of all personal information will be recognised as a fundamental requirement across all implementation plans.
2. All projects will be led by senior staff from the relevant business area with appropriate levels of project management and technical support. The use of regional, UK and international ICT technical and data standards will be applied with new standards adopted as they are developed and published.
3. Projects will support service delivery, transformational change, continuous service improvements and benefits to patients and clients.
4. An approach to defining common, region wide solutions and procurement opportunities (where appropriate) will be applied supporting the principle of Once 4 NI and value for money.
5. Partnership working between HSC, other emergency services, the wider public sector and private sector solution suppliers will be crucial to the success of the implementation of the strategy,
6. ICT expenditure will not be regarded as a separate area of investment but as a core and integral part of service delivery expenditure when new developments are being planned.

12. Equality and Human Rights Considerations

NIAS is committed to fulfilling its duties under s.75 of the NI Act 1998, the Disability Discrimination Act 1998 and all other relevant equality and non-discrimination legislation. This ICT Strategy 2017-22 is principally a statement of the organisation's approach to internal ICT development in technical terms. It is integrally framed within the Department of Health's eHealth and Care Strategy for Northern Ireland and the BSO's policy on the Electronic Health and Care Record for Northern Ireland, as well as within NIAS's Corporate Strategic Aims. Each of these frameworks has been developed in the context of equality considerations.

NIAS has considered the ICT Strategy 2017-22 at a high level and it has been screened out from full equality impact assessment. The core projects relate to the replacement and updating of technical facilities, including wi-fi communications, Smart technology and defibrillators. No substantive equality considerations arise for NIAS at this stage of the strategy's development. The resulting annual ICT Strategy Implementation Plan will be subject to equality screening as appropriate, under the delivery of the Information Governance Steering Group. Opportunities to embed social returns in public procurement will also be considered on a case-by-case basis.

13. Conclusion

The ICT strategy sets out a challenging agenda and will be implemented in a context of significant change for the organisation and the HSC over the next five years. The strategy provides the roadmap to meet the technology needs of the Trust and its stakeholders in continuing to deliver quality and safe patient care now and in the future. A business plan identifying targeted pieces of work from the ICT Strategy will be developed each year. This will measure achievement of the objectives outlined under the five key themes in the strategy and reported to Assurance Committee.

Appendix 1

Assessing Digital Maturity

Digital Maturity Assessment provides a framework for assessing the extent to which healthcare services are supported by the effective use of digital technology. It helps to identify key strengths and gaps in the provision of digital services at the point of care and an initial view of NIAS' position in relation to other UK ambulance services. In doing so it supports NIAS ICT strategy in developing its systems and infrastructure in an eHealth environment.

The following scoring has been used.

Maturity level	Score	Rationale
Unknown /not sure	0	Self explanatory - unknown
Not developed	1	Processes and systems have not been developed
Emerging	2	Processes/ resources /systems are at an early stage
Focused	3	Processes/ resources /systems are focused on their achievements but not fully realised
Advanced	4	Processes/ resources /systems are at an advanced level of development
Optimised	5	Processes/ resources /systems are at optimised and fully embedded within the organisation.

NIAS Digital Maturity	Maturity level	Score	Rationale	Benchmark UK Ambulance service				
				NWAS	EMAS	SAS	SecAMB	NWAS
Digital strategy is aligned to clinical and corporate objectives and transformation and modernisation	Focused	3	NIAS is reviewing its current ICT strategy and developing strategic objectives to meet business needs and enable transformation and modernisation	4	3	4	4	3
Business critical digital and IT services are supported by disaster recovery processes	Advanced	4	NIAS has in place disaster recovery processes for its main emergency control systems and has just invested in new DR hardware and software for its corporate systems. There is further development work to ensure full DR for non-emergency systems in particular telephony resources	5	4	4	5	4

NIAS Digital Maturity	Maturity level	Score	Rationale	Benchmark UK Ambulance service				
				NWAS	EMAS	SAS	SecAMB	NWAS
Healthcare professionals are equipped with mobile devices to access clinical applications and information at the point of care.	Not developed	1	This is part of the strategic vision, however this work is still to be developed	3	4	4	4	2
The use of a verified HCN is included in all information shared with other providers directly involved in the patient's care	Emerging	2	NIAS has traditionally not requested the patient HCN, however in non-emergency ambulance control, it is now routinely gathered. Part of the strategic plan will be to join up this data across other systems in NIAS and HSC.	2	3	3	3	2
Standard clinical terminology is used to support the direct management of care and recording of data in patient records. SNOMED - CT, dm+d.	Not developed	1	This is not yet developed in NIAS, however it will be part of the requirements in developing electronic care records and integration across the wider HSC.	2	4	3	1	1
Patient records are tracked digitally in real time	Emerging	2	NIAS can track patient data in real time through the CAD system and the MDT system, however the level of clinical information is limited.	3	4	5	4	2
Verified data from medical monitoring devices is uploaded into patient records automatically.	Emerging	2	NIAS uses Bluetooth technology to send ECG data via the mobile phone in the ambulance to receiving pPCI units. This still sits outside the main patient care record.	3	4	2	1	1
"Treat and leave" For patient's left at home, a patient report is shared digitally with the GP.	Not developed	1	These processes and systems are not developed.	2	4	4	2	1
"Treat and Refer" For patient's referred to an appropriate care pathway, a patient report and referral is shared digitally with other healthcare professionals.	Emerging	2	NIAS do not have electronic patient records; in the interim for patients that are referred, a secure email is sent to the relevant Healthcare Professional via a Paramedic phonecall to command and control.	1	4	4	4	3
At handover to ED, an electronic patient record is transmitted digitally.	Not developed	1	These processes and systems are not developed.	4	4	3	1	1
Electronic patient record forms can be transmitted en route to receiving locations.	Not developed	1	These processes and systems are not developed.	1	4	5	1	1
Paramedics can digitally access shared patient summary information.	Not developed	1	These processes and systems are not developed.					

NIAS Digital Maturity	Maturity level	Score	Rationale	Benchmark UK Ambulance service				
				NWAS	EMAS	SAS	SecAMB	NWAS
Paramedics can look up the patient index to trace a patient HCN when responding to an emergency call.	Not developed	1	These processes and systems are not developed.	1	5	4	1	1
Paramedics can use digital systems to record relevant patient information at the point of care.	Not developed	1	These processes and systems are not developed.	3	5	5	4	1
Information is collected /recorded once across all systems.	Emerging	2	The CAD /MDT and telephony systems are fully integrated however there are opportunities as part of the strategic vision explore how data capture and management across systems can be better streamlined.	4	4	4	2	1
There is active identification, management, monitoring and review of digital and cyber security risks.	Optimised	5	NIAS has appropriate firewalls and security monitoring processes in place.	5	5	5	5	4
There are robust due diligence mechanisms in place to ensure all 3rd parties comply with the law and central guidance and provide sufficient guarantees that personal data is handled safely and protected from unauthorised access, loss damage or destruction.	Advanced	4	NIAS has appropriate Information Governance policies and procedures in place. Patient records are still paper based and require physical storage and transportation which increases risk around unauthorised access, loss, damage or destruction.	4	4	4	5	4
Digital projects are underpinned by valid business cases and fully engaged business owners and interdependencies are assessed by an ICT enabling team.	Optimised	5	NIAS has a team in place which monitors ICT projects across all directorates.	4	4	5	5	4
The implementation of a robust ICT strategy is strongly resourced within the organisation	Emerging	2	ICT is an enabler across the whole organisation; the growth of ehealth and demands for an increasingly integrated healthcare environment impacts on NIAS ICT resources with a greater demand on time, manpower, existing and new skillsets to meet the business needs.	4	3	3	4	2