



Nokia Research Center
Innovations That Make A Difference

1986

NRC established and Viljo Hentinen, the head of the R&D unit, becomes NRC's first director.



NRC starts participating in GSM standardization. This creates the foundation for a large variety of wireless research activities for many years leading to radio, protocol, network architecture and application layer innovations.

Nokia delivers its first digital test system based on narrow-band TDMA access method to the Paris tests.

1987

Nokia establishes Nokia Cellular Systems which concentrates on GSM infrastructure research and development.

Nokia launches the Mobira Cityman, the first handheld analog NMT phone.



1988

ATM definition work starts in EU program (Technology for ATD) and standardization (CEPT/ETSI; CCITT/ITU-T; ATM Forum) leading to core transport technology of 3G networks.

EU program RACE started. This is the first activity to explore 3G system requirements. NRC is involved from the beginning.

1989



Nokia in the vanguard of GSM's development, delivering its first commercial GSM network to the Finnish operator Radiolinja.

1990

The world's first Radio Data System (RDS) and Mobile Search (MBS) text pager.

1991



Short Message Service Center (SMSC, the store-and-forward server for GSM short messages) product development work started, also applicable to WAP.

Developed automatic roaming handling.

1992

Jorma Ollila becomes President and CEO of Nokia, focusing the company on telecommunications.

1993

First SMSC (Short Message Service Center) into commercial use (in Europolitan's Nokia network).

The world's first credit card size cellular modem card developed with AT&T Paradyne.

Packet data channel set-up method developed.



Nokia launches its first GSM hand-portable, the Nokia 1011, the first GSM car phone, the Nokia 6050, and the first TDMA (D-AMPS) phone, the Nokia 6000.

Packet data concept work begins.

1994

Research, development and standardization of Enhanced Full Rate (EFR) speech and channel codecs for GSM. This codec is in almost every GSM phone sold today.

CDMA and High Speed Data research begins.



The Nokia 2100 is the world's smallest and lightest family of digital products.

Speaker Independent Name Dialing (SIND) development began at NRC Tampere and went on to become the de-facto voice dialing solution for Nokia GSM devices from 1998-2005.

The world's first satellite call is made, using a Nokia GSM handset.

First power amplifier designed in Nokia using Gallium Arsenide technology, providing significant improvement in the talk times of mobile phones.

Contribution to lead-free solder paste material developed, and tested for production on Nokia 2110 series phones. The lead-free soldering method is widely implemented in electronics industry today.

1995

Nokia PrimeSite, the world's smallest base station for GSM/DCS cellular mobile networks.

The USA's standardization bodies adopt the Enhanced Full Rate (EFR) speech codec developed by NRC with the University of Sherbrooke, Canada as the standard for the PCS1900 system. In autumn of the same year, ETSI selects the EFR as the standard also for GSM.

First PCS/GSM 1900 order for the US market

Web based Video-on-Demand over IP/ATM network demonstration implemented and demoed in several international occasions including Telecom 95 to promote Nokia's IP/ATM networking capabilities.



NRC begins creating standards for electromagnetic emissions from mobile phones, SAR (Specific Absorption Rate).

1996

Contribution to MPEG standardization in the development of the AAC codec, that became the high-end file format choice of numerous music services.

First VoIP over Nokia Intranet set-up operational between NRC Boston and NRC Helsinki.

The first digital multimedia terminal in the world, the Nokia Mediamaster.

Nokia Research Center heads new EU Multimedia Project - focusing on video conferencing, tele-education, tele-working and interactive advertising.



First all-in-one communications tool, Nokia 9000 Communicator.

1997



The Nokia 6110 is the first phone to feature Nokia's Snake game. Snake and its successors eventually appear on more than 350 million mobile phones.

Designed and productized radio frequency integrated circuit for TETRA system. The chip is the key enabler for the mobile TETRA terminal.

Linus Torvalds, creator of the Linux OS, receives 1997 Nokia Foundation Award.

Significant research results and IP creation in the area of mobile app stores.

1998

WellMate is a wireless e-health service for disease management with focus on diabetes and later asthma. NRC researchers develop the commercial service platform and runs large-scale field trials with end-users and health professionals in Finland.

Speaker independent name dialing (SIND) began development at NRC Tampere and NRC Beijing. More than one billion Nokia Symbian/S40 phones have been sold with this technology. SIND remains the one and only mobile speaker-independent speech recognition system that can support more than 50 languages.

Nokia works on AMR (Adaptive Multi-Rate) creating essential IPR in the field of multi-rate codecs.



Extensive research and IP creation in mobile web browsing.

ATM technology transfer to 3G network elements (a core backend data technology for early telecommunications services).

1999

Nokia completes the world's first WCDMA (Wideband Code Division Multiple Access) phone call through a public switched telephone network.

Developed phone slide automatic opening powered by spring barrel with oil dampening mechanism for product implementation in 2002.

Starts miniaturized camera optical zoom mechanism based on piezo actuator technology development.

Partners with IBM to develop bilingual (Finnish and English) conversational systems and multimodal demonstration as part of a large-scale project for the EU.

2000

The Nokia 3310, the first mobile phone with a chat function that allows the user to have a conversation similar to the chat services on the Internet, with the other party by using short messages.

Nokia, a founding member of the SyncML initiative, announces that it had successfully demonstrated the world's first wireless Internet synchronization using the SyncML protocol.



Nokia and NRC starts active pre-work for DVB-H standardization, which enables digital TV services to handheld terminals.

3GPP (Third Generation Partnership Project) chose AMR-WB speech codec as the new standard for wireless systems, Nokia a major contributor.

Developed haptics solution based on piezoelectric actuator enabling software controllable tactile feedback for touch screens and joysticks.

World leading role in defining and promoting Mobile IPv6 technology in standards conferences and trade shows, as well as in customer events associates with working code and demos.

2001

Nokia makes the world's first 3G WCDMA voice call on commercial 3GPP system.

Developed finger position recognition based on capacitive technology applied for keypads, covers and displays. Enables the touch sensitive double action keypad solution.

Wild Terminal proximity middleware for Series 60 enabling local peer-to-peer connectivity between phones and servers productized.

Research on image enhancement algorithms began, a first 3D engine from Nokia ships in 2002 (on the Nokia 3430).

Led the standardization and development of the Scalable Polyphony MIDI (SP-MIDI) synthetic audio format. SP-MIDI has become the most widely used synthetic format in the mobile industry and has been adopted by MMA, AMEI and 3GPP standard organizations.



Linux terminal prototype created with Mobile IPv6 and SIP based VoIP, presence and messaging.

2002



Nokia launches its first 3G phone, the Nokia 6650, Nokia's first phone with a built-in camera, the Nokia 7650, and its first video capture phone, the Nokia 3650.

NRC laboratories contributes to the Java Mobile Media API industry standard, the first completely Nokia-driven extension to mobile Java.

The design of the Nokia DVB-H chip is finalized in 2004. It is a further development of Nokia's DVB-T chip releases in 2002.

2003



Significant research and IP in touch sensitive screen technologies.

Developed Visual Radio concept: Nokia multimedia device displays information about songs and performers that airs on the radio.

Nokia demonstrates world's first dual stack IPv4/IPv6 CDMA handset.

NRC creates the TCP/IPv4 and v6 stack for Symbian OS.

Developed solutions for stereo widening and 3D audio.

Advanced Video Codec (H.264/AVC) standardization. Nokia is a significant IPR holder in the H.264/AVC standard, the most modern video codec used in mobile TV and other mobile video services, high definition DVD, television and portable players such as iPod.

2004



NRC leads the standardization of the Mobile 3D Graphics (M3G) API for Java, and implements it for all Nokia platforms. The first device with M3G is the 6630.

Nokia announces the Nokia NFC (Near Field Communication) shell, the latest step in the development of innovative products for mobile communications, letting consumers exchange information with a simple touch gesture.

Multi-radio antenna design (quad-band GSM, WCDMA, WCDMA diversity, GPS, BT/WLAN and DVB-H antennas).

Develops the advanced Car Hands-free accessory HF-6W, first in the world utilizing adaptive multimicrophone beamforming technology.

NRC originates AMR-WB+ voice codec standards.

NRC reaches breakthrough in mobile Web browsing usability with Mini Map web page navigation methods, pioneers use of Open Source Software in mainstream smart phone application in Nokia, and supports S60 in bringing to market the most advanced mobile web browser.

2005



Nokia sells its billionth phone a Nokia 1100 in Nigeria.

Significant research and patent portfolio development efforts in next generation of wireless LAN technologies resulting in over 100 inventions declared essential to wireless LAN standards in 2011.

The world's first viable video editing solution for mobile devices which is launched with Nokia 7610.

NRC designs and tests analog-to-digital converter enabling low-power receivers for GSM/CDMA/WCDMA/3.5G. Results show a clear silicon area and power reduction compared to traditional solutions.

Business Card Reader - using the camera of mobile devices to read contact information into the phone.

SensorPlanet, a project on mobile-centric large-scale wireless sensor-networks begins. The project focuses on new types of utilization of mobile devices, being stand-alone sensor devices or gateways to other independent sensors in the proximity.

2006

Nokia and M1 complete the first HSPA data call with Nokia Flexi WCDMA Base Station.

Voice Aid: First implementation of voice feedback, providing eyes-free use of mobile core functions including feedback from the contact list, phone logs, voicemail and by number dialing using joystick or keypad.

Research on High Accuracy Indoor Positioning begun as a result of the BTLE positioning principle. HAIP contributed as part of BT 5.x spec.

Nokia Podcasting application for Symbian allows you to find, subscribe and download podcasts over the air with a Symbian handset.



Bluetooth®

BTLE (Bluetooth Low Energy) based positioning principle proven in NRC. Wibree consortium spun-up and transferred to BT SIG. Now a core part of the Bluetooth 4.x spec.

2007

Nokia N95 is the world's first device combining GPS and wireless broadband (HSDPA/WLAN).



REUTERS

NRC and Reuters introduces a mobile journalism application to transform how journalists capture stories in the field. The mobile application allows reporters to file and publish multimedia news stories from handhelds.

2008

NRC and UC Berkeley launch Mobile Millennium project to capture real-time traffic information using GPS enabled mobile devices.

Nokia to work with two Swiss Federal Institutes of technology on research and open Nokia Research Laboratory in Lausanne, Switzerland - focused on "Internet of Things".

NRC plays a key role in the Long Term Evolution (LTE) first release (Rel 8), completed in 2008.

World's first demonstration of a mobile 3D video player (software and hardware) using MVC codec on N800.



NRC and University of Cambridge launch Morph, a nanotechnology concept device, featured in the MoMA online exhibition "Design and the Elastic Mind".

Nokia introduces its first ever LTE capable internet modem. Developed by NRC, the modem is based on Nokia's own LTE modem technology development.

Nokia candidate selected as the baseline for the Superwideband & Stereo extension to the G.718 and G.729 voice codec standards.

2009



NRC in partnership with VTT Technical Research Center of Finland present NoTA Open Architecture Initiative concepts - enabling product and system companies to shorten research and development cycles through fast integration of third-party technologies - and open licensing model at Mobile World Congress.

NRC develops Continuous Handwriting Input (simplified Chinese and English) and Handwriting Calculator - software preloaded on N97.

NRC works with UCLA's Center for Embedded Network Sensing on the personal environmental impact report project, conducting a number of internal tests, with software available as a download for any GPS-enabled phone, allowing individuals to monitor their own carbon impact.

NRC work on WAMR (Wideband Adaptive Multi-Rate) becomes part of LTE releases. AMR is the original GSM voice spec.

2010

NRC presents “Smart-M3” open source platform, allowing multiple applications to share ad-hoc information across numerous domains, enabling cross platform interoperability.

NRC in collaboration with Cambridge University and Helsinki University of Technology publishes Nanotechnologies for Future Mobile Devices: A book which explores the potential for nanotechnologies to transform future mobile and Internet communications.



NRC unveils Nokia Instant Community, a way for communities to socially interact instantly when in close proximity, without the need for WLAN infrastructure, Bluetooth or cellular connections.

NRC demonstrates Indoor Navigator at Nokia World 2010 based on a research concept called Nokia High Accuracy Indoor Positioning.

2011



Nokia demonstrates Kinetic UI, a bendable stretchable device following on from Nanotechnology research.

NRC demos Explore and Share, enabling wireless transfer speeds between devices of 100 Mbits per second.

NRC demos Nokia Shoot & Tag, a clever video application that automatically creates scene chapters in your video while recording.

NRC Developed “Terminal Mode” becomes industry standard named MirrorLink. This technology connects mobile devices to in-car infotainment system, and is developed in collaboration with a range of automotive partners, including the Consumer Electronics for Automotive working group (CE4A).

NRC participates in the Graphene Flagship, a large European Union activity aimed at making the graphene-based revolution happen.