UWB 레이더 센서
소개 자료

2016

NOVELDA AS

- A fabless semiconductor company specializing in **Nanoscale** wireless low-power technology for ultrahigh-resolution impulse radar
- Developing **CMOS** impulse radar standard components, as well as Application Specific Integrated Circuits
- Applications for our technology spans a wide range of areas from **medical** and **industrial** high precision sensors to **personalized wireless** healthcare and more

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COMPANY BACKGROUND

Founded in September 2004 by:

- Dag T. Wisland – CEO/Associate professor **Univ. of Oslo**
- Tor Sverre Lande – Professor **Univ. of Oslo**
- Einar Nygård – Industrial IC management / Entrepreneur
- Eirik Næss-Ulseth – Business developer / Entrepreneur

Mission to develop:

- Single chip CMOS systems based on impulse radio technology
- Low-energy, short-range, high-precision, high speed, impulse RADAR
- Unique implementation, based on high-speed continuous-time signal processing
- R&D driven development
  - EU/RCN/IN projects

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THE RIGHT PEOPLE AND PARTNERS

- **Competence** – 3 Ph.D, 11 M.Sc
- **Creativity** – Have fun at work
- **Cooperation** – Universities, research institutes, customers, subcontractors and internally

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Novelda XeThru™ Advantages

Penetration Properties

- See through objects and dirt

High Range Resolution

- Find small or narrowly spaced objects

High Speed

- Measure at driving speeds

Low-power

- Extremely low radiation
- Battery operated sensors

Bluetooth headsets has 1000X higher radiation than XeThru™

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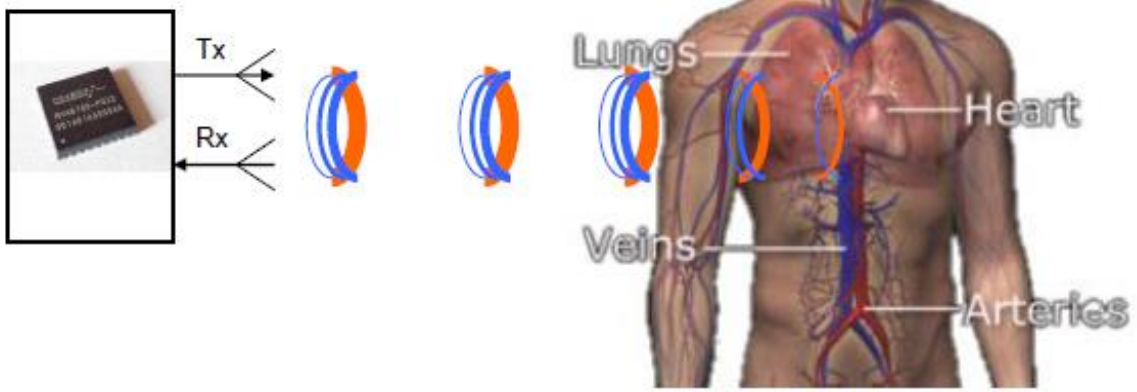
IMPULSE RADAR PRINCIPLE



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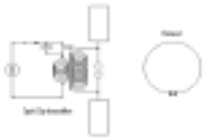
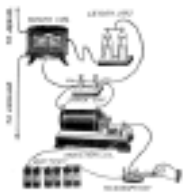
FROM RESEARCH TO PRODUCT

Samuel Morse – Pulse coding



Heinrich Hertz – Pulse comm.



Guglielmo Marconi – Radio system

Idea

Market need

Enabling technology

People – Competence

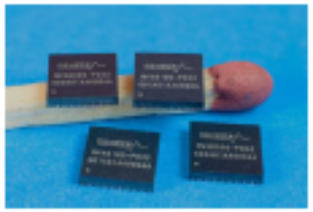
R&D

Soft funding

VC funding

Subcontractors

Competitive advantages



Novelda NVA6100

Nanoscale Impulse Radar

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DEVELOPMENT KIT VERSIONS

NVA-R6XX

Novelda NVA-R661 :

- Based on NVA6200 CMOS Impulse RADAR IC
- Transmit bandwidth (-10dB) from **6 GHz to 10.2GHz**
- Designed for **ETSI/FCC** compliance < FCC Part 15 limit

Novelda NVA-R631 :

- Based on NVA6100 CMOS Impulse RADAR IC
- Transmit bandwidth (-10dB) from **450 MHz to 3.55 GHz**
- Targeting **GPR, medical and military** non-regulated use < FCC Part 15 limit

Novelda NVA-R641:

- Based on NVA6100 CMOS Impulse RADAR IC
- Transmit bandwidth (-10dB) from **0.85 GHz to 9.55 GHz**
- Ultra low RF emission, Designed for FCC compliance < FCC Part 15 limit

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NOVELDA RADAR PRODUCT

Development Kits

-RF design with SPI and SMA interface, IO module
-Antennas
-Software library, toolbox, GUI

OEM

Original Equipment Manufacturer

OEM Application Platforms

- Application specific platforms ready for OEM customer extension/integration

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Modules

- SPI, 100MHz PRF, FLASH
- Small, cost efficient (FR4)
- Design files available for customers

ICs

- Standard 90 nm CMOS
- EU (FCC)
- FCC (3.1GHz – 10.6GHz) and low band

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SMART SENSOR MARKET TRENDS

- **USD 8.2BN WITHIN 2015**
- Market drivers
  - User-interface
  - Intelligent-home
  - Industrial
  - Automotive
  - Security
  - Medical
  - GPR

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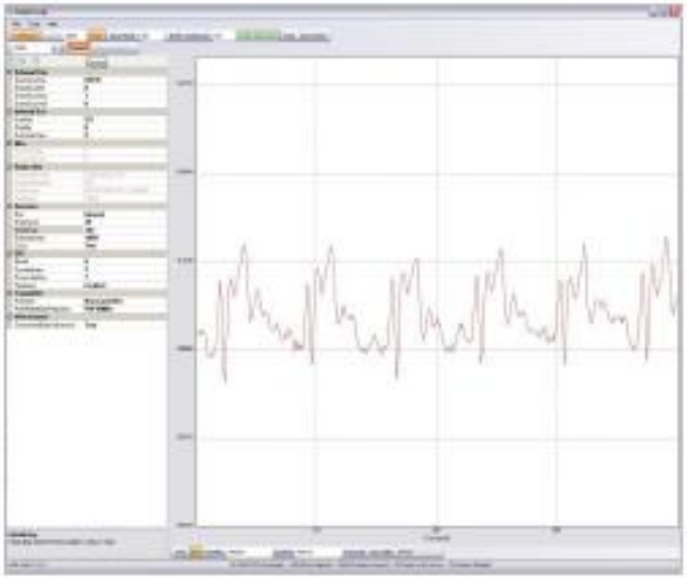
APPLICATION EXAMPLES
REMOTE PULSE MEASUREMENTS

- Non-invasive
- Measures mechanical movement
  - Improved diagnostics quality
  - Early sign disease detection
- Skin/Fat/Tissue penetration
  - Ultra Wideband Radio
- Low cost (Single IC)
  - Physicians
  - Sport/Leisure
- Low energy / Small size
  - Long battery lifetime
  - Sport watch



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XeThru™ Compact

Applications

- Motion and presence detection
- Security and building automation
- Robot vision
- Parking space presence detector
- Radar sensor extention to mobile phones
- Small, mobile, stand-alone motion and presence detector
- Distance and velocity meter
- Handheld, wall-penetrating radar (WPR)

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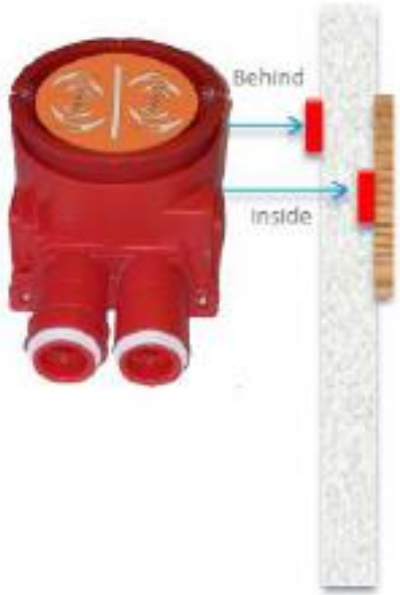
XeThru™ Compact

Sensor Hidden inside or behind the wall



Sensor Placement Behind Painting

Sensor purpose;

Detects presence of objects & missing objects

XeThru can trigger for example audio messages and alarms dependent of distance to a person

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CUSTOMER EXAMPLE KBOR

Measurement of ice and road construction thickness

Through-wall Imaging device

Ice Thickness Indicator

Pavaement Survey Device

КБОР

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CUSTOMER EXAMPLE SAMSUNG THALES

Land Mine Detector

- http://www.samsungthales.com/eng/product/product.asp?idx=36

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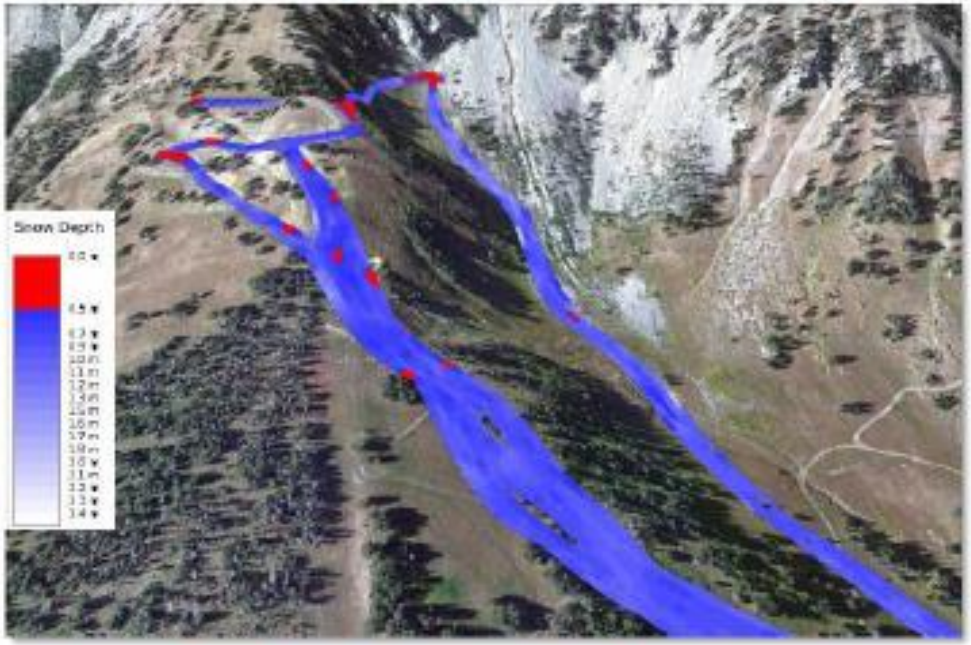
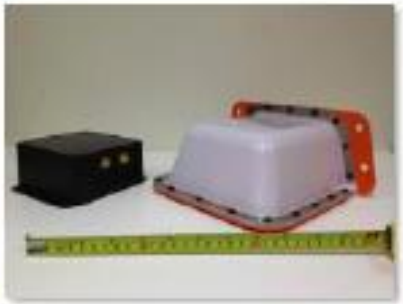
CUSTOMER EXAMPLE FLAT EARTH

Ski Area Snow Depth Maps Embedded in Google Earth





Bridger Bowl Ski Area Snow Depth Map. Snowcat 353.
February 19, 2013

flatearth
910 Technology Blvd
Bozeman, Montana 59718

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APPLICATION EXAMPLES

- Level
- Automotive
- Proximity sensor

- Vital signs: breath, pulse, sleep

- Energy automation

- Line of sight
- Through the wall

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COMPETING TECHNOLOGY

Dimension	Ultra-sound	Laser	Infra-red	X-Ray	Novelda Impulse Radar
Penetration	partly	no	no	yes	yes
Non invasive	no	yes	yes	yes	yes
Range	short	long	short	short	short/ medium
Frame-rate	N/A	high	N/A	low	high
Dirty environment	no	no	no	yes	yes
LOW POWER	no	yes	yes	no	yes

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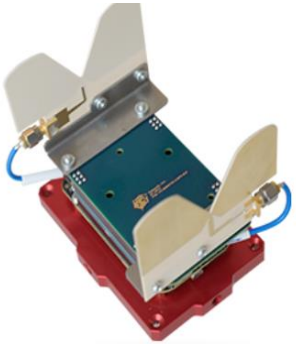
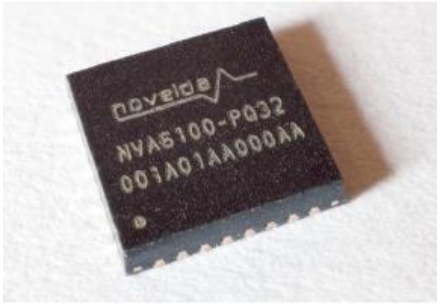
국내 사용가능한 적합성평가 무선기기 제원표

9. 차량충돌방지용 레이더	24.25-26.65GHz	-41.3dBm	차량충돌방지용 신호기	무선설비규칙 98조
	76-77GHz	10mW		
11. UWB, 용도미지정, 고정점대점	**3.1-4.8GHz, 7.2-10.2GHz**	**평균 -41.3dBm**	초광대역(UWB) 기술 적용한 것만	무선설비규칙 101조
	57-64GHz (용도 미지정 무선기기)	100mW (무지향성안테나 사용)		
	71-76GHz, 81-86GHz	3W		
13. 물체감지센서용	10.5-10.55GHz (옥내 사용에 한함)	25mW	자동문 개폐, 차량속도감지기	무선설비규칙 103조
	24.05-24.25GHz	100mW		

Sales Item

1. Development Kit
2. Inspiration module
3. Chips+Salsa dev. Kits
4. CMOS Radar IC
5. Costumed module & product