

# Near Field Communication Technology and its Utilization in Mobile Telephones

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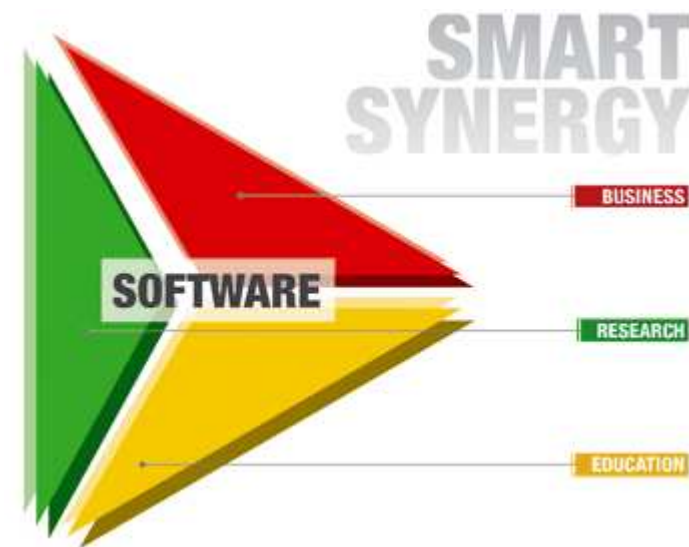
15<sup>th</sup> Oct. 2010

# Campus Hagenberg:



## Softwarepark Hagenberg

- Research, Business & Education
- > 1.400 students
- >1.000 employees
- FH-Hagenberg R&D  
Competence Center GmbH  
(50 Researchers)
- Very good infrastructure  
for IT projects



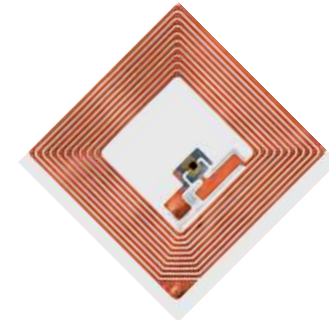
## NFC Research Lab Hagenberg

- Research on NFC since 06/2005
- NFC Research Areas
  - Hardware & Software Systems für NFC
  - NFC Applications und Infrastructure
  - Security and User Experience with NFC
- NFC-Forum Member
- Partner



# NFC – Near Field Communication

- Contactless Communication (10 cm)
- Based on RFID-Smartcard Standards (e.g. ISO 14443)
- 3 different NFC Modi:
  - Tag-Emulation: Mobile Phone is a smartcard
  - Reader/Writer: Buy Tickets with SmartPosters
  - Peer to Peer: Enabling BlueTooth/WiFi Pairing
- New Business Models



## NFC Trial Hagenberg

- 75 active participants
- NFC Phone: Samsung SGH-X700n & Nokia 6131NFC
- Services
  - Micro Payment System
  - Access Control
  - Loyalty Card with NFC phone
  - Information-Services
- Experiences from users:
  - Very good acceptance



## NFC Trial - Participants

- Total: ~ 1.400 Students/100 Lectures
- NFC Group: 50 Students/25 Lectures & Administration
- High/medium affinity to technology
- User Experience Studies
  - Online Plattform (60 entries)
  - Online diary (8 students, 3 lecturers)
  - Focus group workshops
  - Idea Workshops



## Micro Payment

- Pre-Paid System with OTA Top-up
- Clearing with A1 Bank (mobilkom)
- mobilkom-phone bill or bankcollection
- E-Cash is stored in the secure element
- Payment at Campus Hagenberg
  - Cafeteria
  - Coffee and Coke-Vending Machines
  - Top-Up Machine



## Micro Payment

- Over the Air Top-up
  - Very nice feature
  - „Get Money“ Just-in-time
  - Billing at the end of the month
- Vending Machines are most popular POS
  - No small coins needed
  - No queuing, very fast
- Learnings
  - Training for service personell
  - „History“ on the phone is necessary



## Access System

- 78 Access Points with contactless readers
- User have NFC phone or card
- „best“ Service, very good rating
- Users more often use their mobile phone instead of the cards (55 % to 45 %)
  - Mobile phone is partly in handbag
  - Garage: 15 % Card, 85 % Mobile Phone



# Video

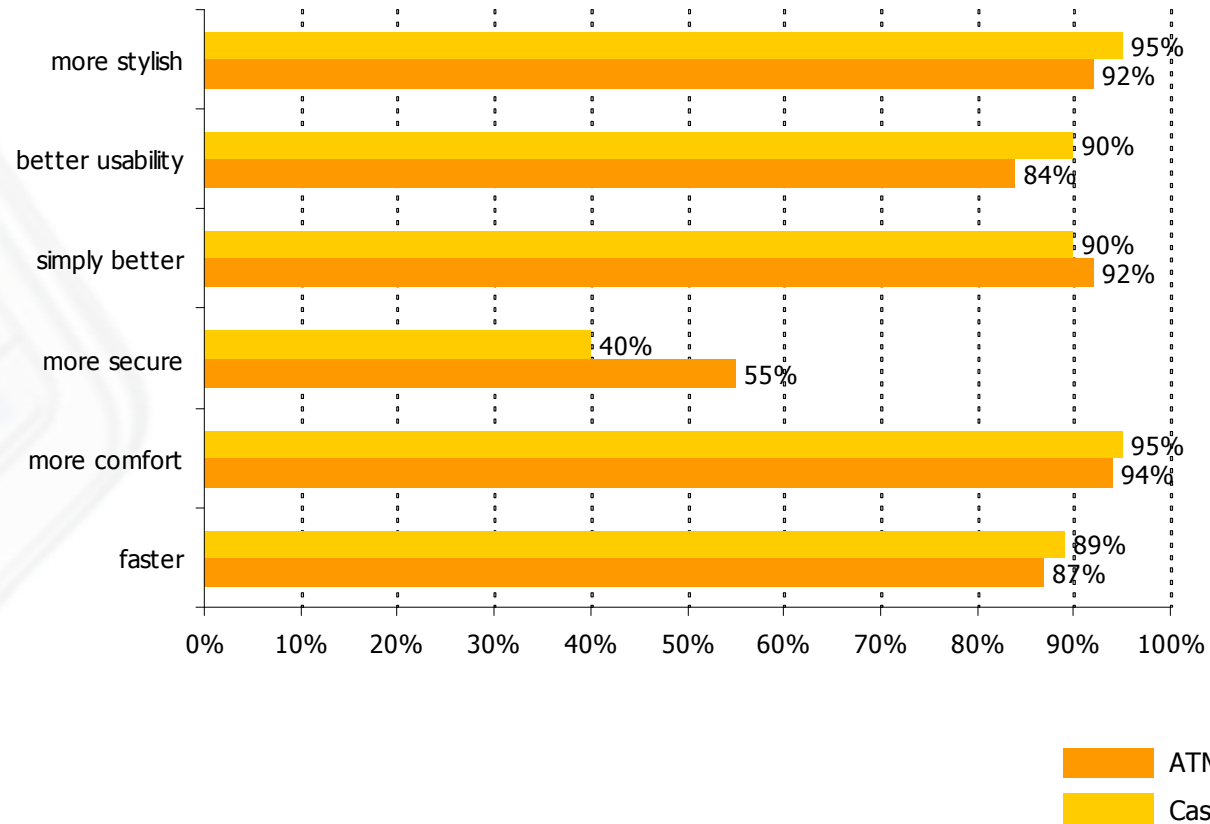
[Video Hagenberg](#)

## User-Feedback

- NFC phone as „all-in-one“ solution ist well accepted
- NFC is noticed as
  - convenient
  - innovative
  - new
  - representable
  - simple
- But also
  - technically
  - Challenging for the user
  - A little bit incalculable

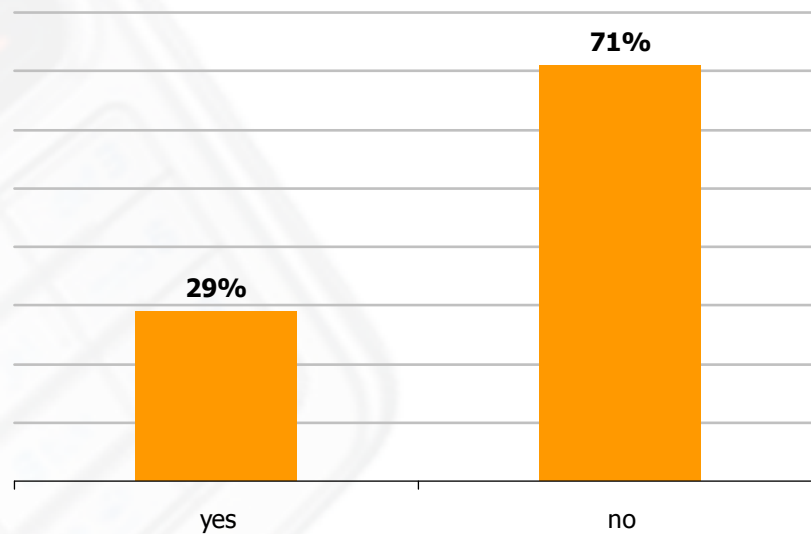
# User-Feedback

- In comparison to other means of payment, NFC is ...

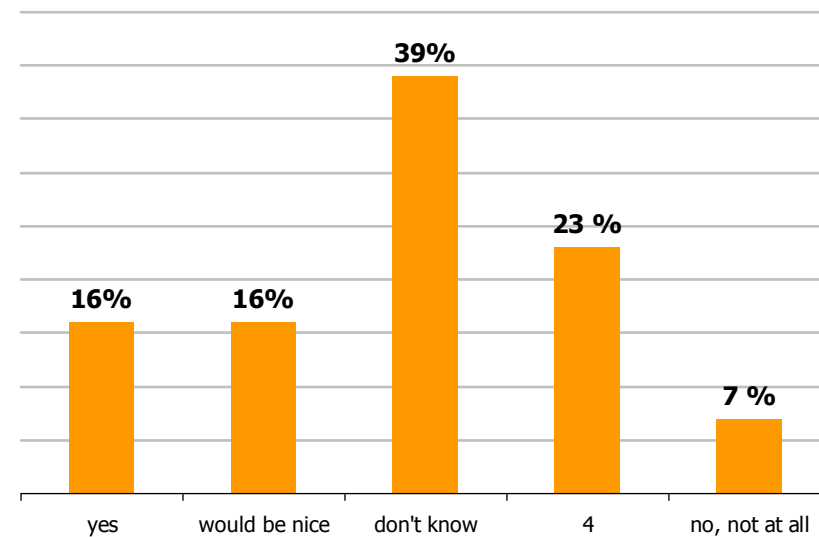


# User-Feedback

Question: Did you run out of battery and could not use a service?



Question: Do you think a battery off mode is necessary?



## Learnings

- NFC phone shall work even when the battery is off
- „Beep“ + green signal with every transaction
- Duration of transaction tolerable within 1 sec.
- Samsung not up to date (Battery, Quality of speech, ...)

## Most important wishes of Trial Participants

- More NFC phones
- More Vending Machines, Places to use the phone
- More Functionality (Railway, Cinema, ...)
- Direct-Debit instead of PrePaid/“History“ on the phone bill

## Other NFC projects (e.g. Oulu)

- Bus ticketing
- Worktime management
- Drivers diary
- Lock management in public sport hall
- Elderly meal service



## Other NFC projects (e.g. Oulu)

- Parking and parking inspecting
- Service in restaurants
- Info tags in city environment (about 1.000 tags)
- NFC in school environment
- Hybridi food market at home
- Blood glucose meter

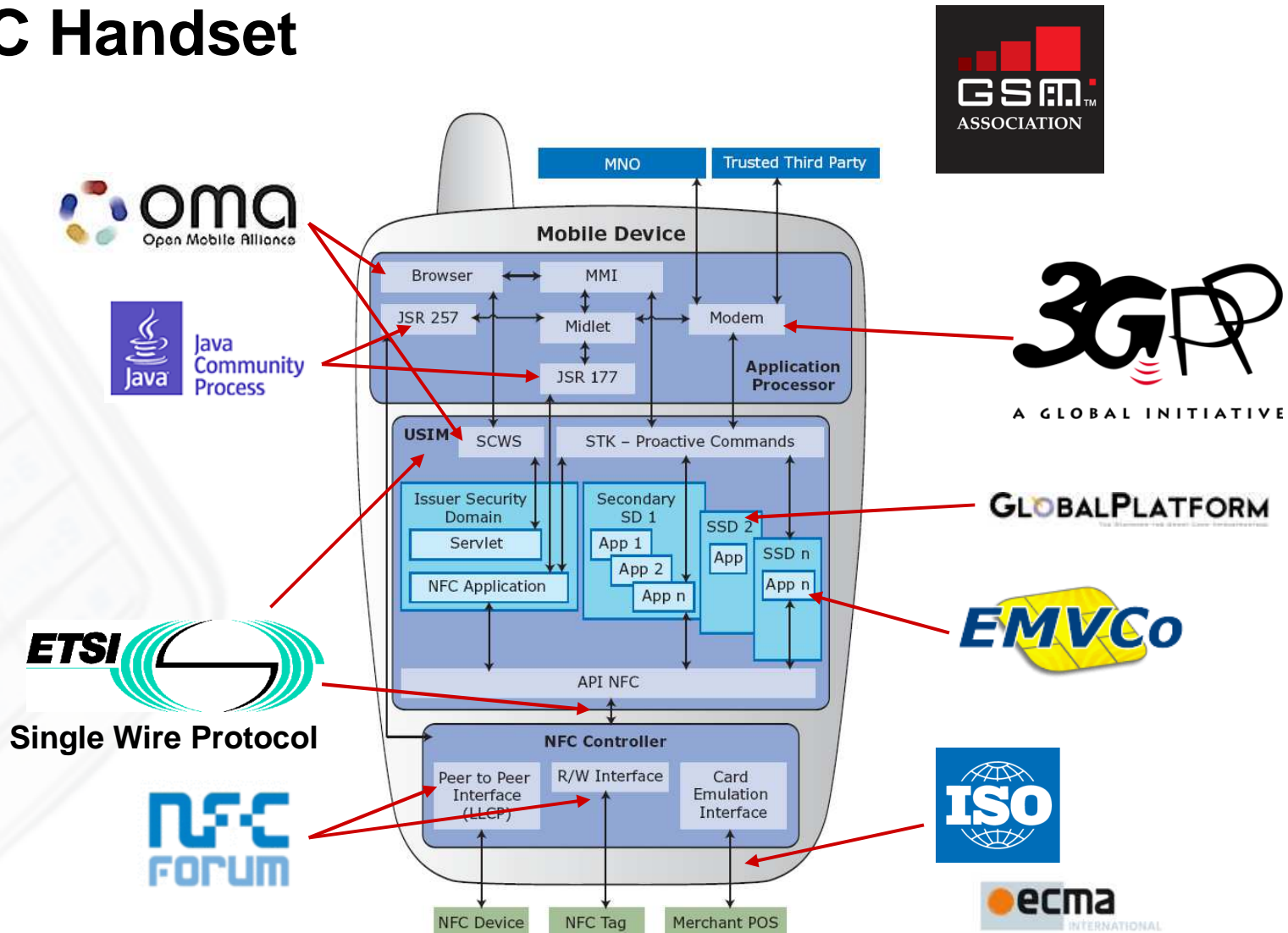


## NFC and cars

- Bluetooth Pairing / hands free profile
- Audio streaming from a mobile device (A2DP)
- Especially useful for
  - Car pools
  - Car rental
- NFC also for “keyless go”



# NFC Handset



Near Field Communication  
Research Lab  
Hagenberg



University of Applied Sciences



22 – 23 February 2011  
Campus Hagenberg  
<http://congress.nfc-research.at>

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