

# Lost in Ambient Intelligence

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**TNO** | Knowledge for business



# Introduction

- **Who am I?**
- **What is CACTUS?**
  - **Joint TU-Delft (EWI&IO) & TNO project**
  - **Context Aware Communication, Terminal and User**
  - **Ad-Hoc Networks**
  - **Intelligent Terminals & Environments**

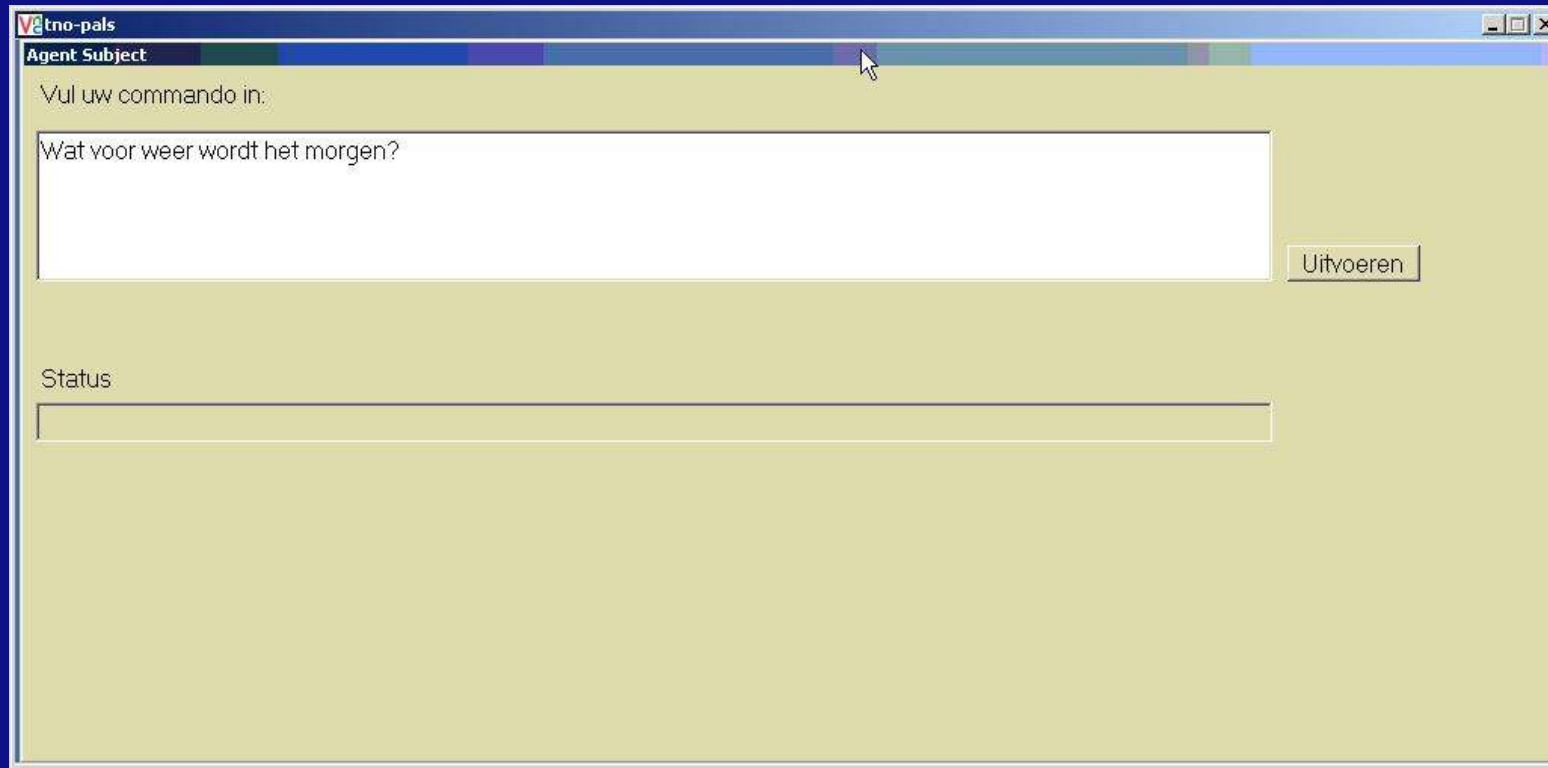


# Experiment - Service Identification and Selection

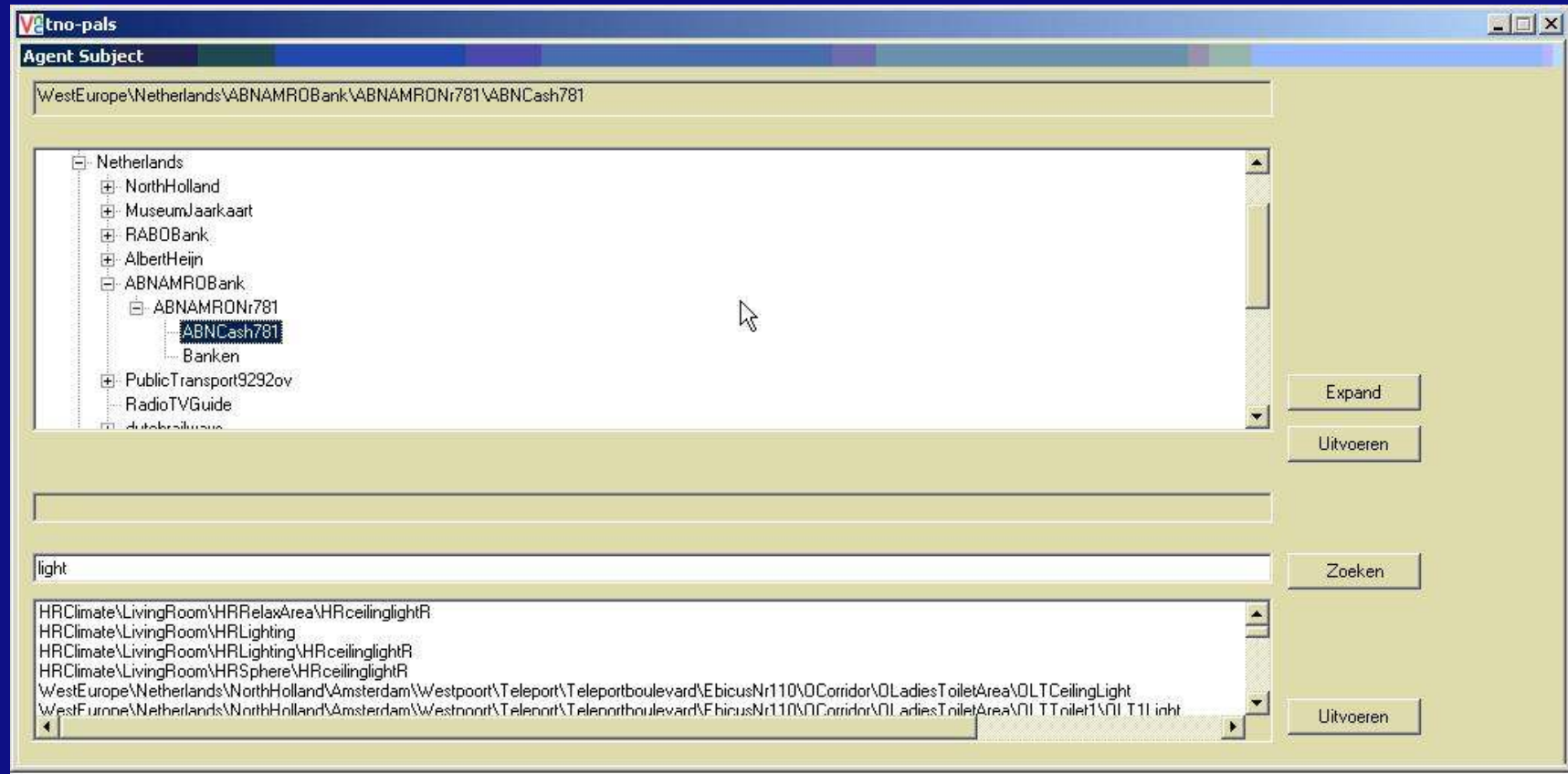
- Problem: identifying and addressing services in large-scale ad-hoc environments.
- Compare two solutions: Ask Interface vs. Select Interface
  - which solution is:
    - more effective
    - more efficient
    - more trustworthy
    - has a better user experience
    - creates better overall service awareness
- Outline:
  - Technical Environment
  - Experimental set-up
  - Results
  - Conclusion.



# Client - Ask Interface



# Client - Select Interface



# Technical Environment

# Services

# Home

## Control-room



## Office



## Gallery

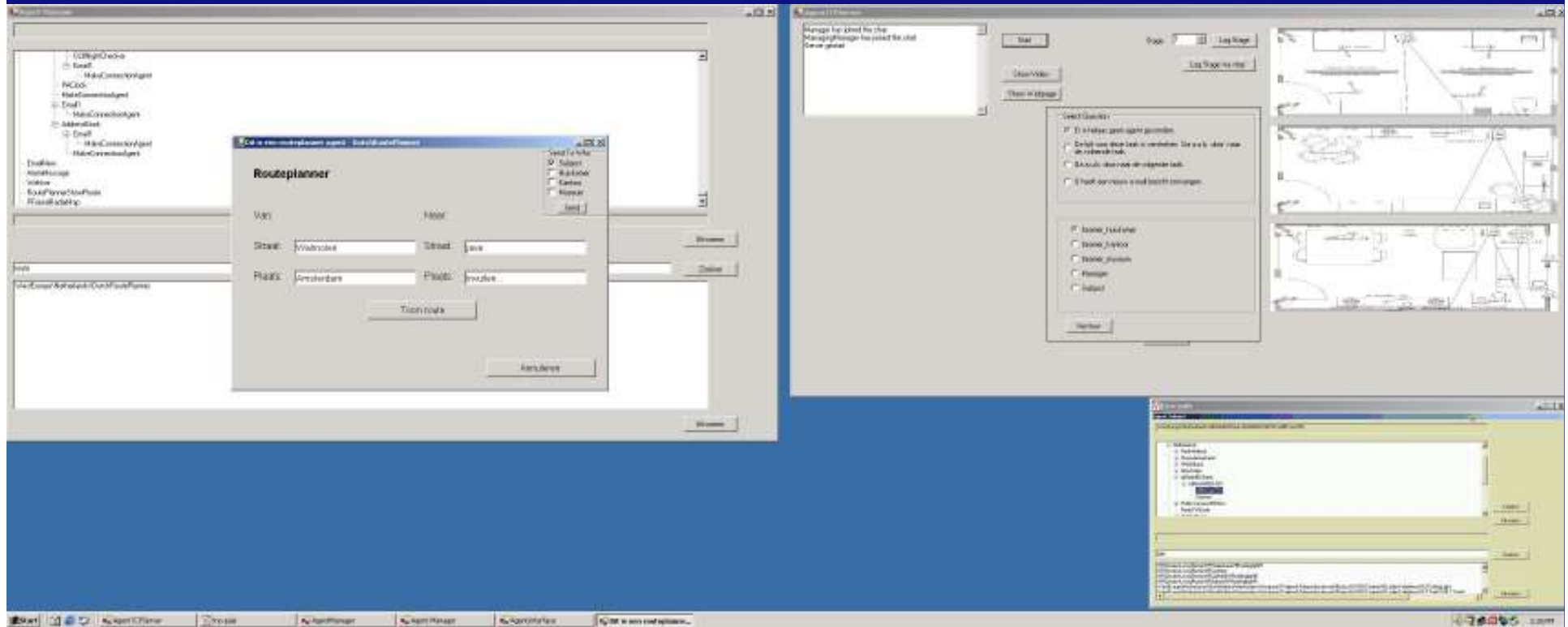


# Available Services

- Lighting
- Video
- Audio
- Washing machine
- Coffee machine
- Email
- Calendar
- Route planner
- Weather information
- News
- Information about paintings
- Alarm handling
- Information about Painters
- Heating
- Curtains
- Restaurant information
- Shops
- Painting Seller
- Delivery service
- Pizza ordering service
- Squash/Fitness center
- Timer
- Movie recommender
- etc.



# Test Leader - Main Console



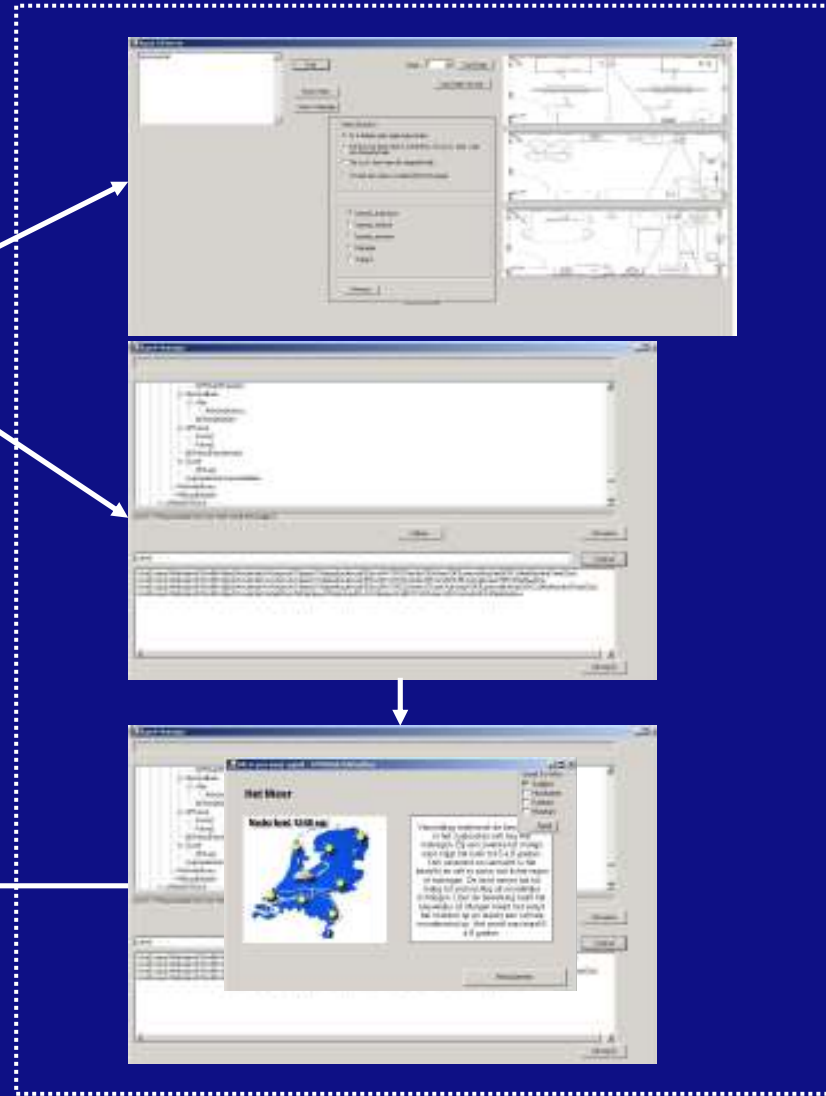


# Ask-interface walkthrough

User



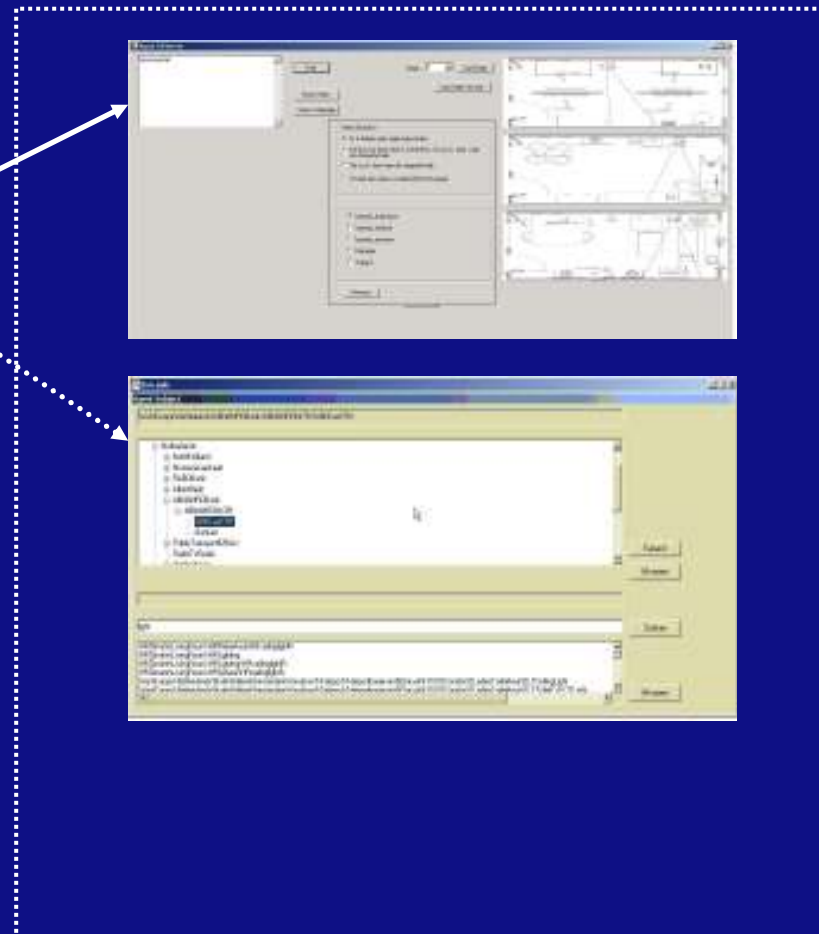
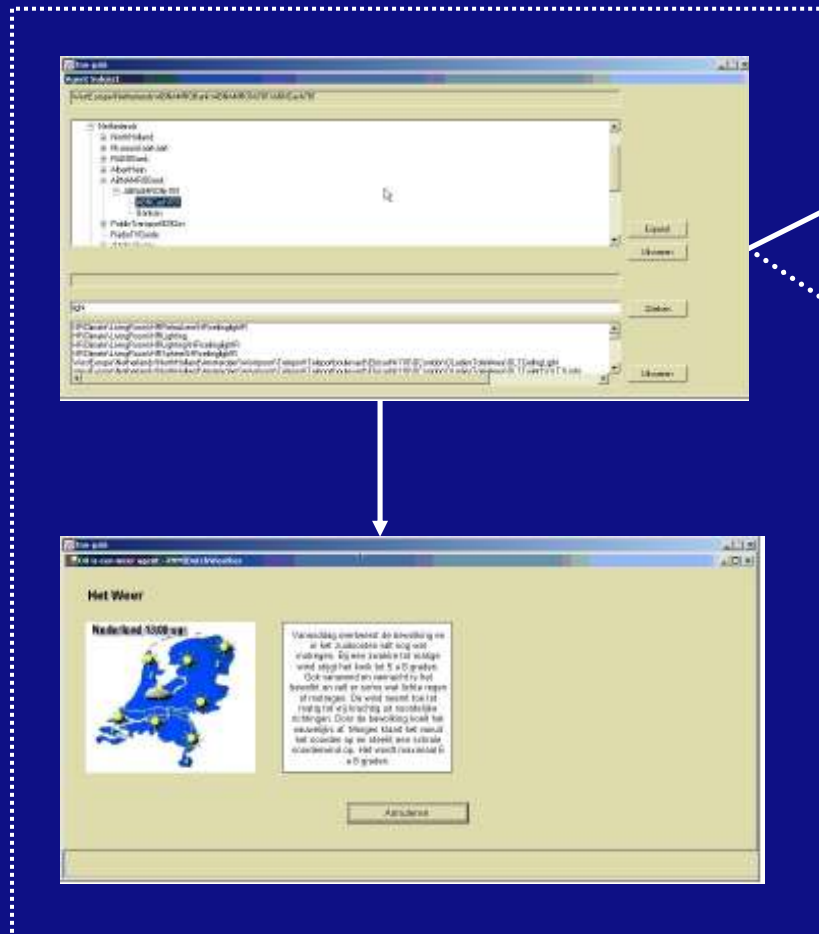
Control



# Select-interface walkthrough

User

Control



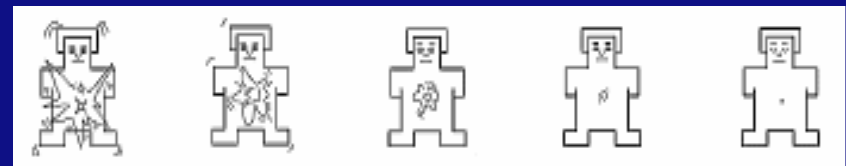
# Experiment - outline & measurements

- Between subjects design (Female & Male balanced)
- Introduction
- Generic Questionnaire
- Locus of Control
- Scenario/Tasks
- Valence/Arousal (6 x during tasks)
- Trust Questionnaire
- Service Awareness Assessment
- Usability Questionnaire

SAM - Valence



SAM - Arousal



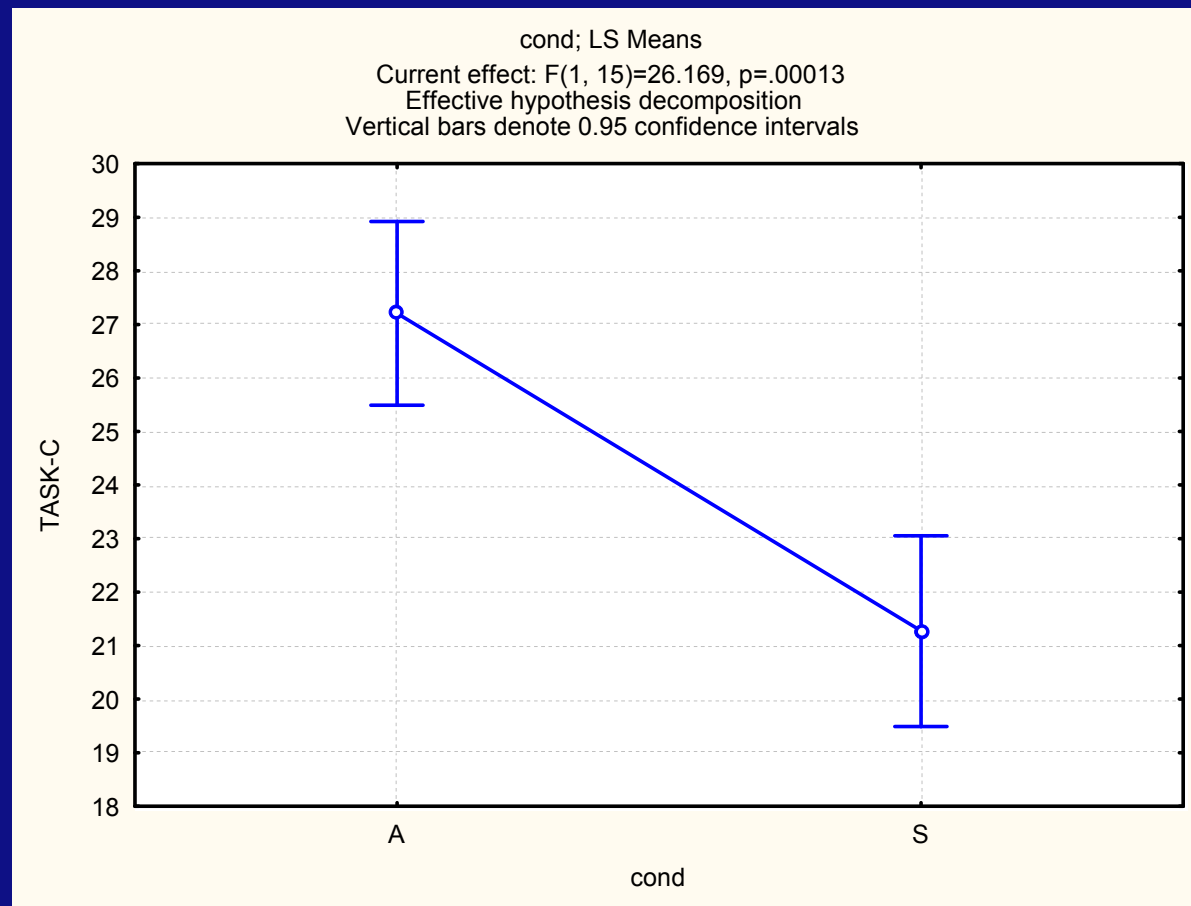
# Experiment - participants

- N = 19 (8 Female, 11 Male)
- Education = HBO+
- Age = average 23 (min = 18 ; max = 28)
- Internet experience: high
- Computer experience: average
- Mobile device experience: average



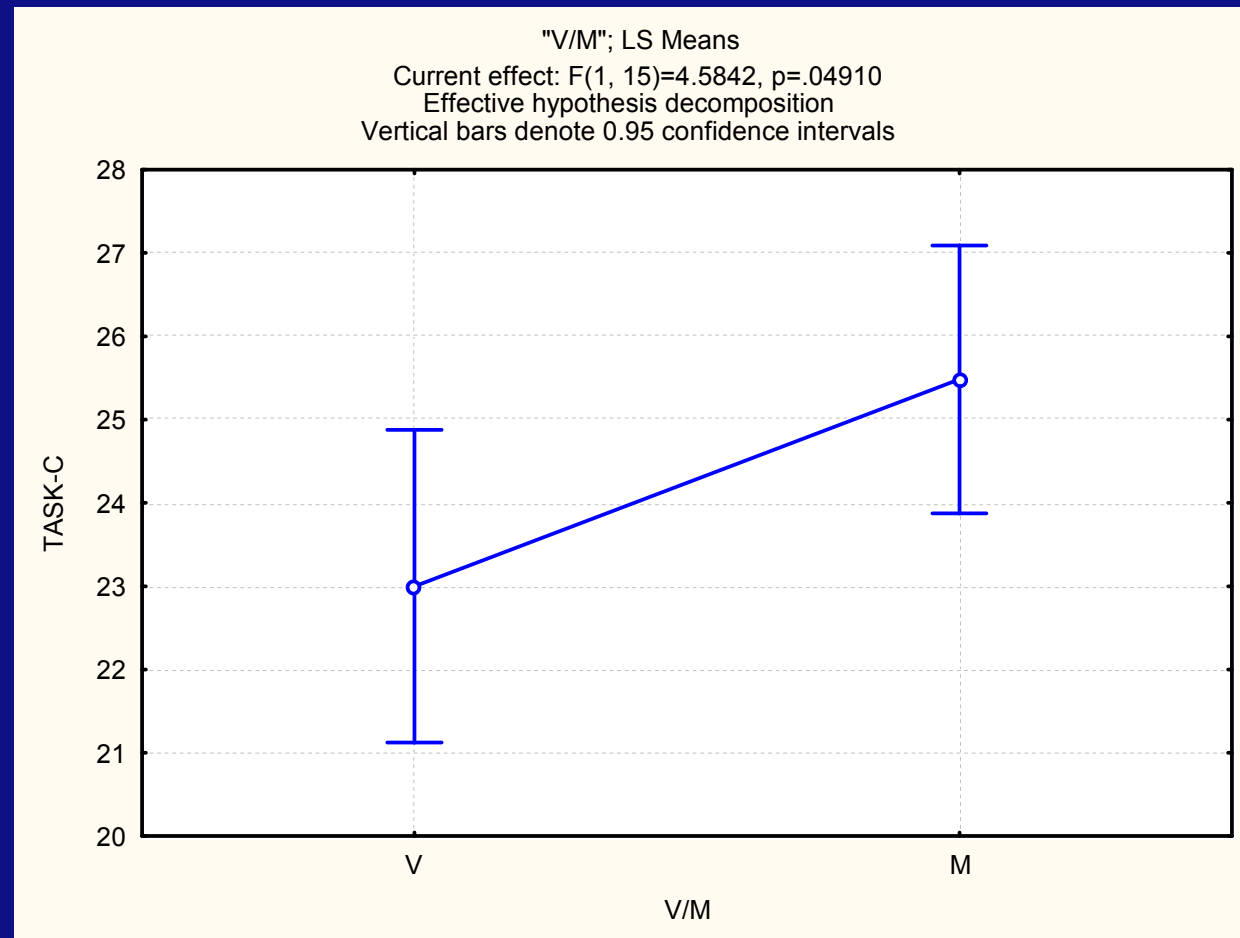
# Results (1) - Number of correct tasks

- Ask Interface (A) vs. Direct Control Interface (S)



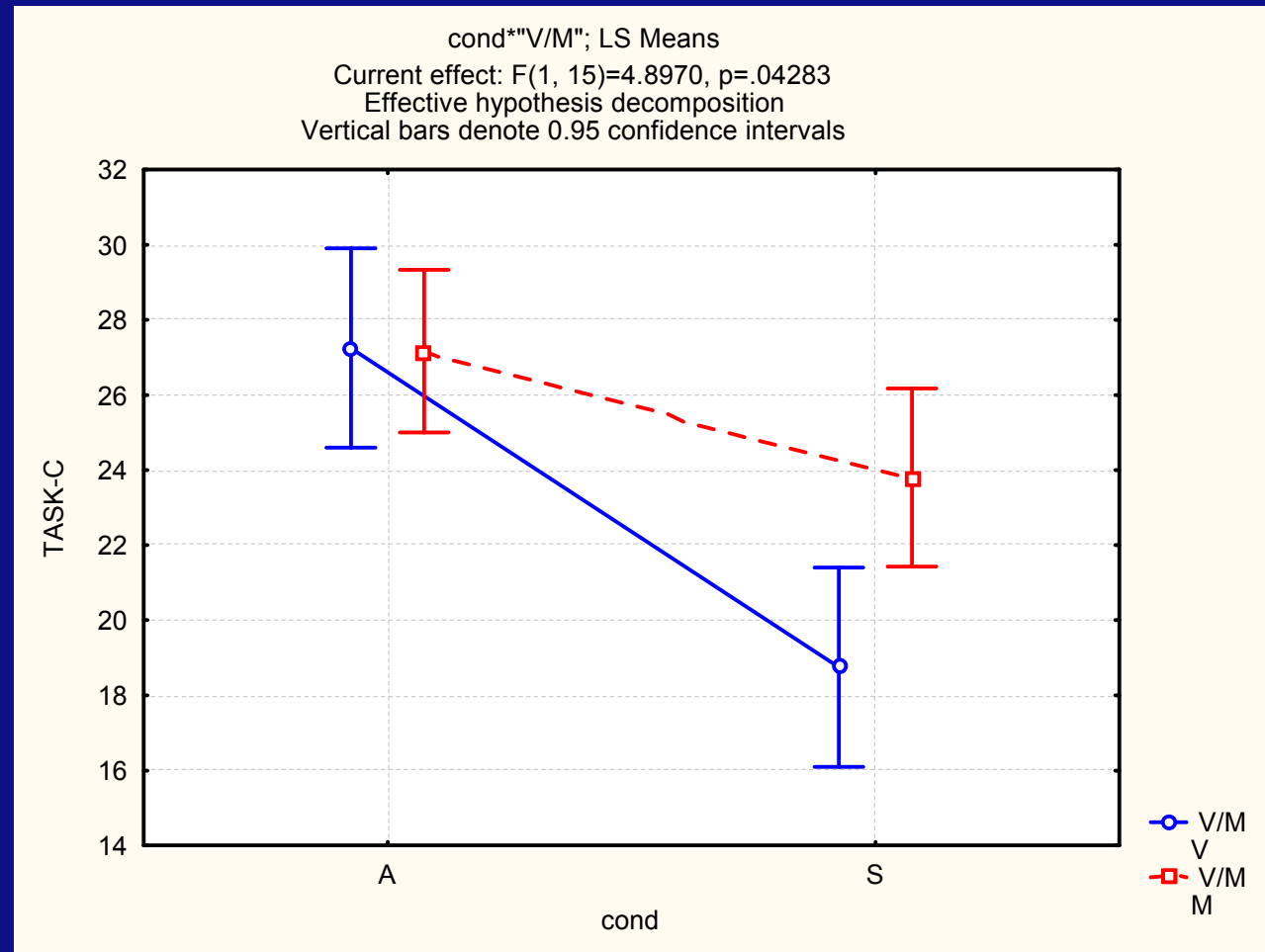
## Results (2) - Number of correct tasks

- Female vs. Male



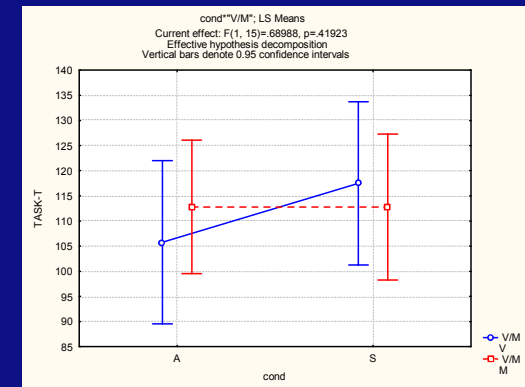
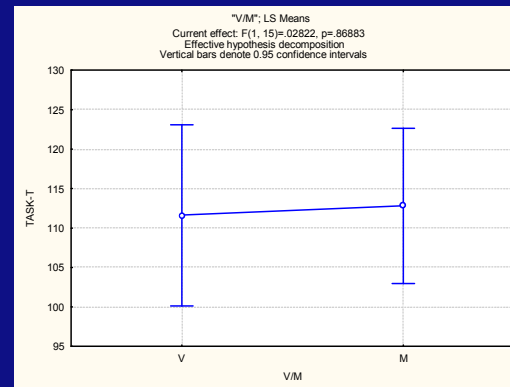
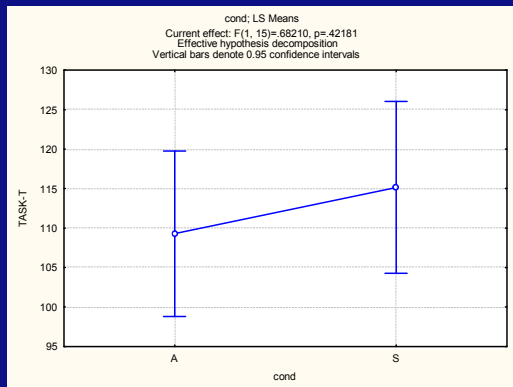
# Results (3) - Number of correct tasks

- A/DC \* M/F



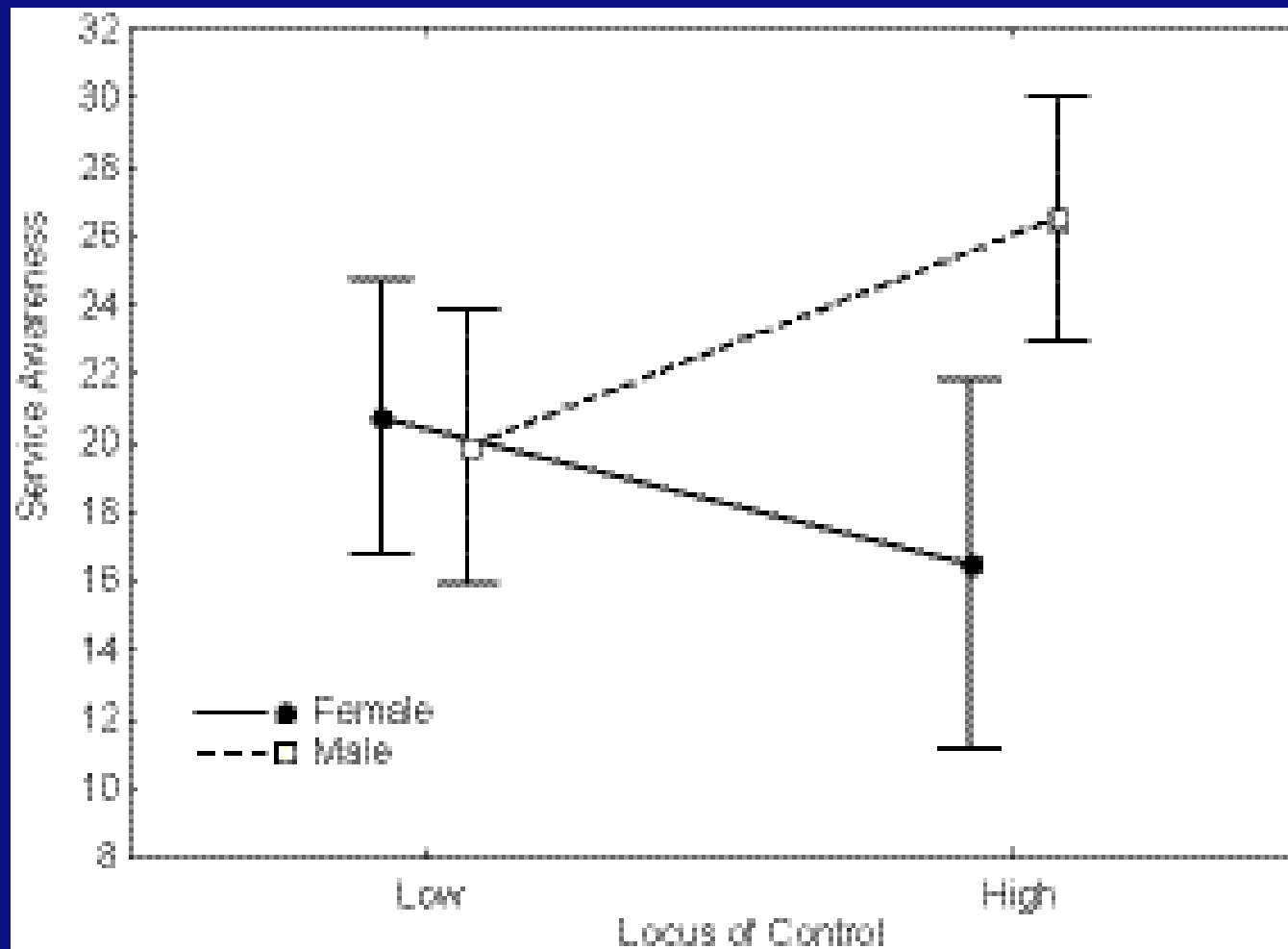
# Results (4) - total time

Same trend, but no significant results.





## Results (5) - LOC & gender



## Results (6) - User Remarks

- You become dependent of the device
- A good system for lazy people (+/-)
- Lost in the structure (Select Interface)
- Ordinary language use is nice, but current understanding is too limited
- No alternative solution (Ask Interface)
- Device is not small enough
- Quick (solution), slow (hard- & software)
- Overkill for switching on the light
- Not enough overall services (turn of all the appliances)



# Conclusion

- Ask interface in combination with context information (history, location, gaze) seems a valid solution.
- Select interface prevents a dead-lock situation.
- A combination should contain an ask-interface for general use and a select interface component for dead-lock situations.
- Context-Awareness proves to be a difficult concept in practice.
- Service Awareness remains limited to the used services.



# The End

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