



Every child desired



*Ir. Peter van de Graaf*

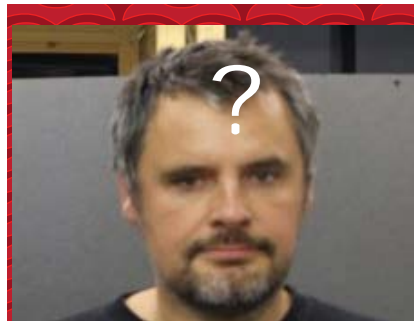
Industrial designer (ir. Delft 1988)

Entrepreneur

Product development *Kiva*

lecturer coach *TU/e*

What is my contribution?



problem x

7000,000,000 =



= total problem

# Data

7 billion now

Growth until 2100: from 7 to at least 10 billion

Growth in Africa: from 1,1 to 3,7 billion

## North:

- 28 million pregnancies a year.
- 49% unplanned.
- 36% aborted.

## South:

- 182 million pregnancies a year
- 36% unplanned.
- 20% aborted.

In Africa alone 90 women die each day through botched abortions..

Carl Djerassi, father of the pill:

50% of all pregnancies are unplanned,  
50% are unwanted.

A bad start in life

Bronnen:

When Pregnancies are Unwanted, By Nancy Felipe Russo, Ph.D., Arizona State University and Henry P. David, Ph.D., Transnational Fami  
<http://www.djerassi.com/icsi2/index.html>  
[http://www.guttmacher.org/pubs/fb\\_IAW.html](http://www.guttmacher.org/pubs/fb_IAW.html)



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Target

“every child desired” - Choice



# Ideal Contraception

- Man & woman can decide for themselves, at every moment, if they are going to have babies, or:
- No brainer – no active control required (sex is an instinctive urge)
- No trouble
- No cost
- No health impact

## Now possible:

- Reversible sterility
- Change with little trouble
- No incision
- No recurring cost
- Mechanical over chemical
- Women over men

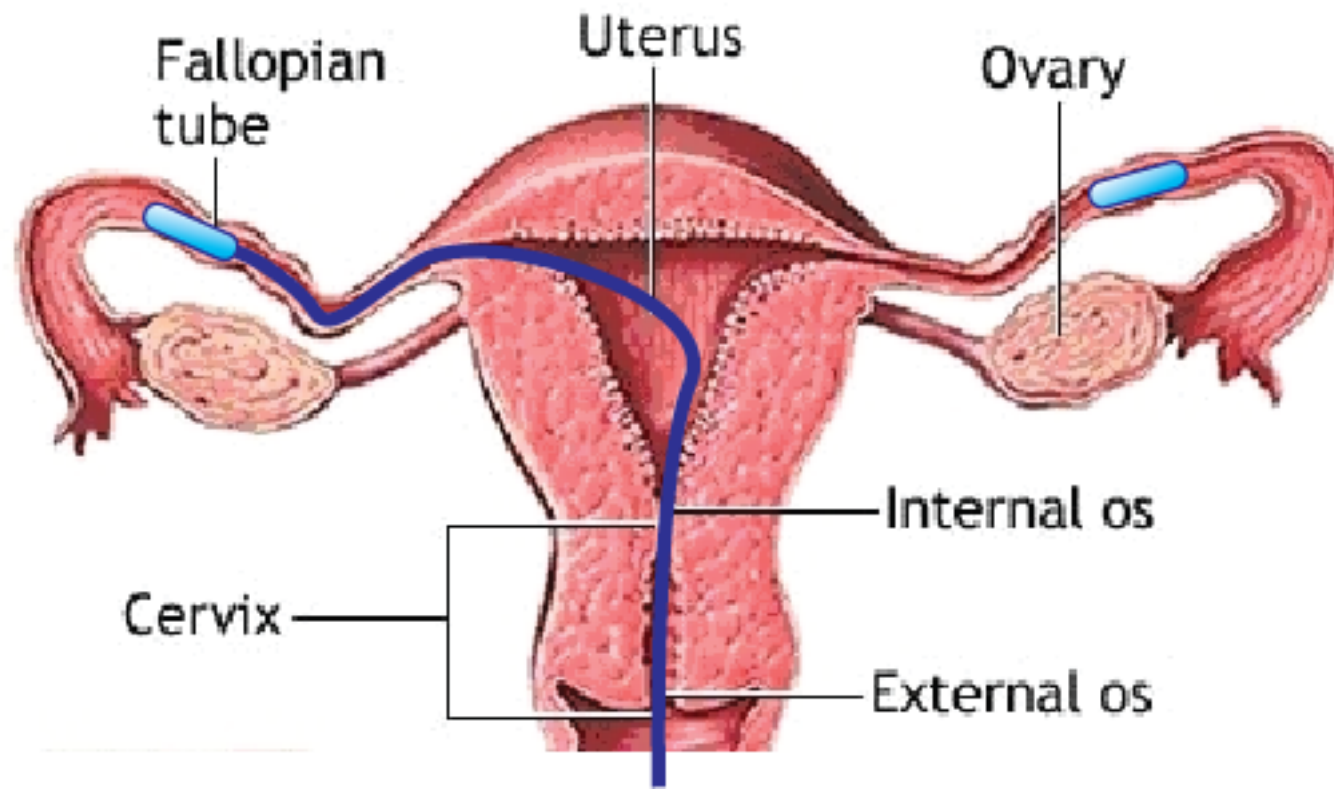






## Concept Choice: Overall

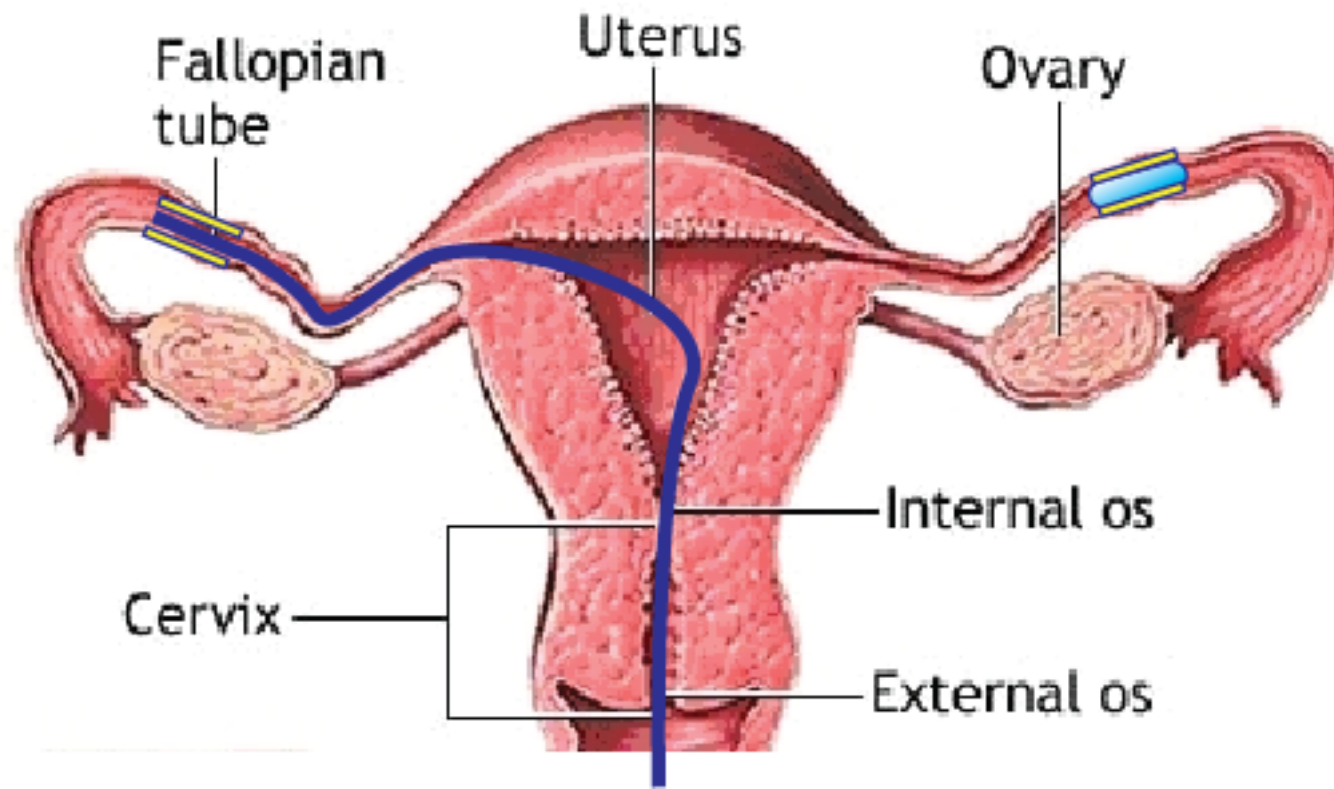
Placing valves in fallopian tubes to control fertility over lifetime





## Concept Choice: Step 1 foundation

Placing stents, for a stable foundation.  
Valves can always be removed, if desired.

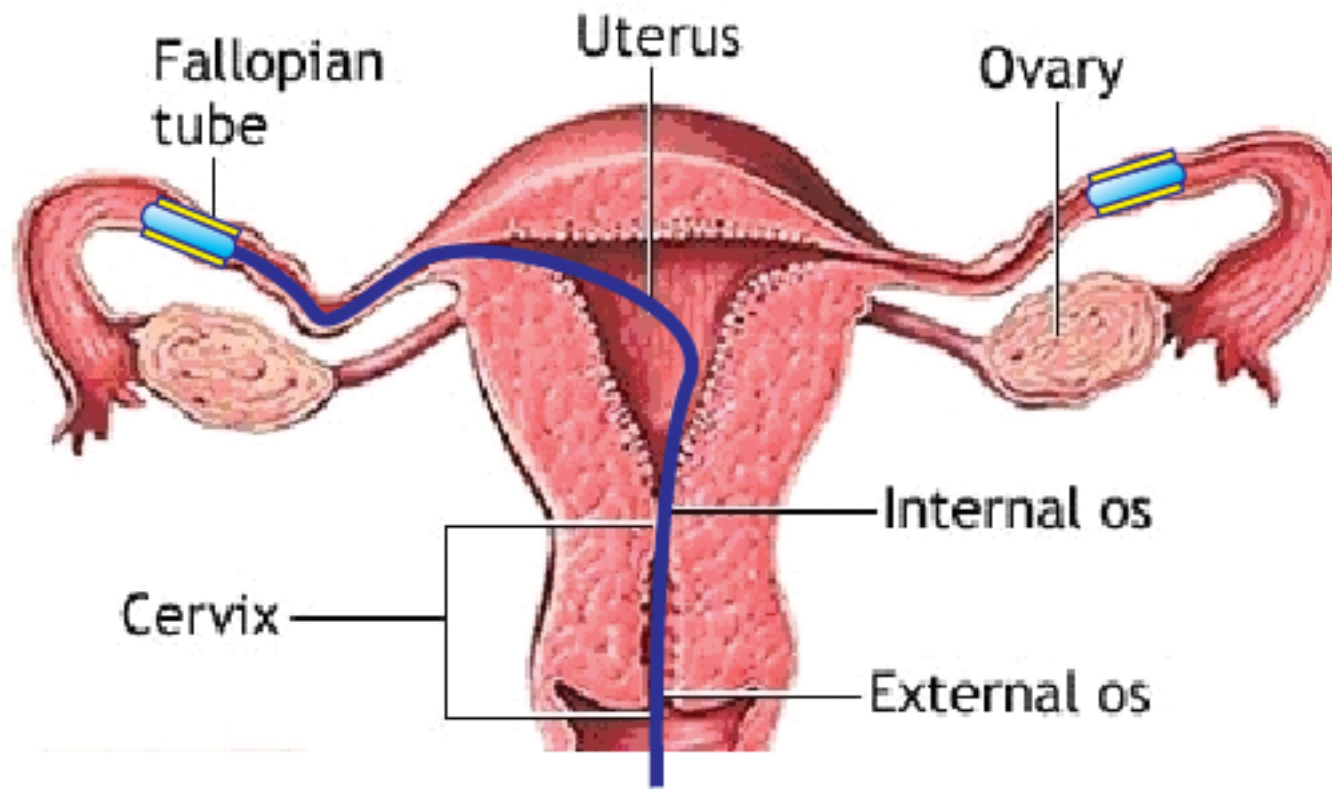






## Concept Choice: Step 2 valves

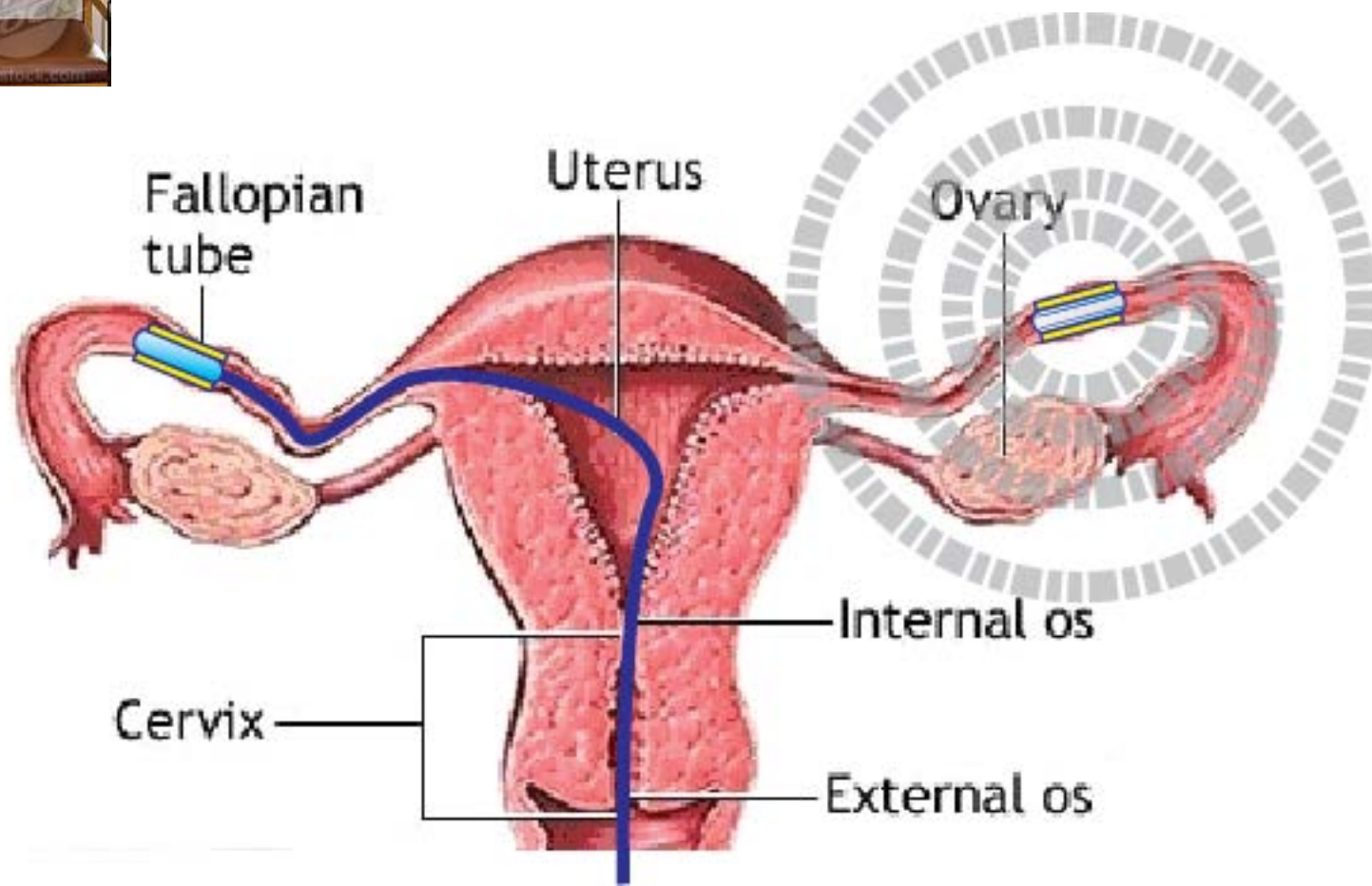
Placing valves. No scar tissue.





## Concept Choice: Step 3 Wireless energy

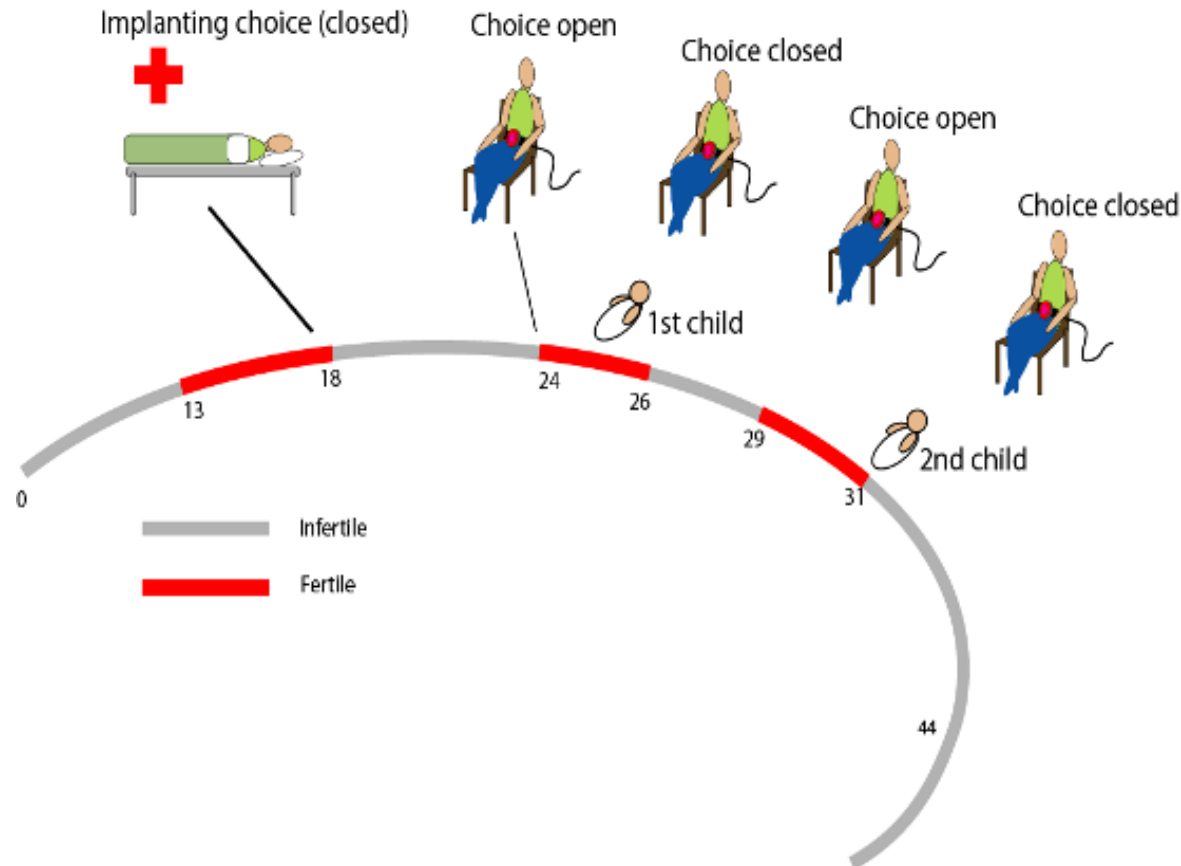
Valves can now be opened and closed from the outside. At rest there is no energy in the system. Energy is transferred through radio waves at times of change.





# Concept Choice: Life with Choice

A woman decides to change her fertile/infertile status only a few times in her life. She goes to a medical post, and an antenna belt will be placed on her abdomen. After 15 minutes her status has changed.



# Challenge:

- Cilindrical
- Size: diameter 2 mm, length minimal
- Valve minimum obstruction
- Closure: sperm cell 5 $\mu$
- No energy in passive state
- Energy storage sufficient for one mode change
- Energy transfer less than 2 hours
- Communication about status in energised state



# Current status:

- Start project September 2012
- Valve solution early 2013
- Satisfying electro-mechanical concept spring 2013
- Not MRI compatible
- New concept September 2013 – to be checked and patented





# Wireless part 1

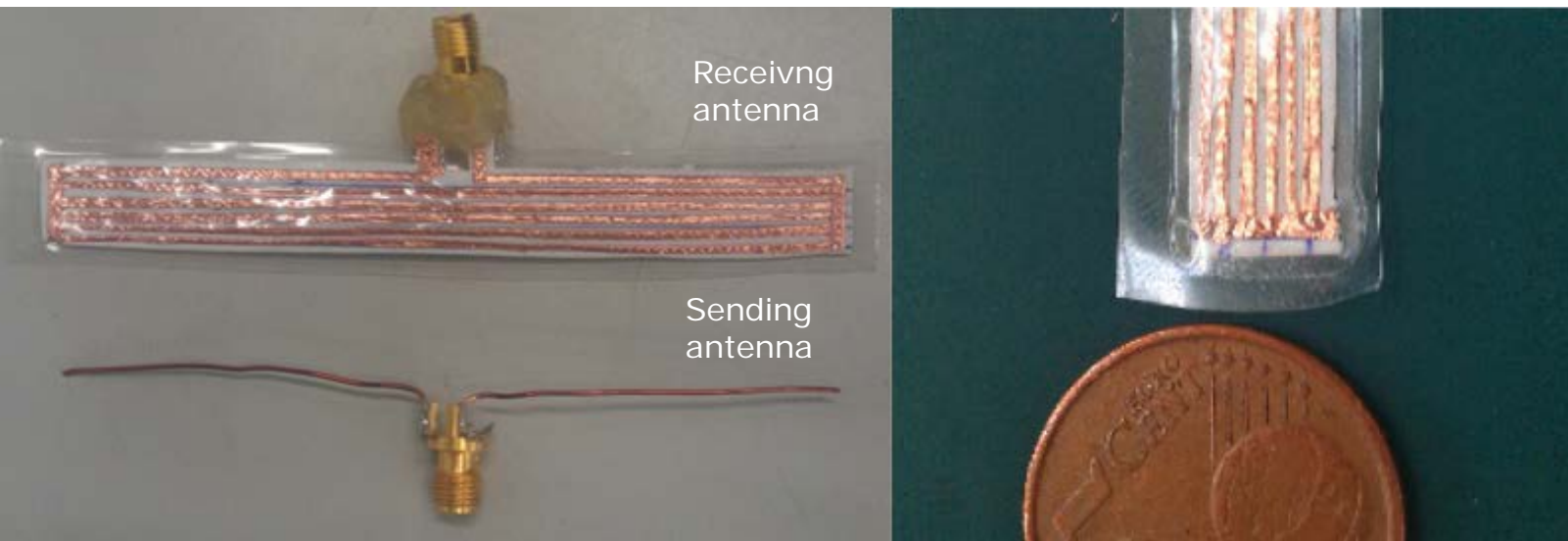
- Under development with Centre for Wireless Technology, Technical University Eindhoven
- Special thanks to the good people of Electrical Engineering and especially to prof. Peter Baltus
- 3 Bachelors final projects: antenna, energy storage, actuation
- Seeking masters student to take up challenge



# Wireless part 2

## Antenna (Teun van de Biggelaar)

- 100 mm  $\lambda/2$ , 170 MHz
- 6 folded dipole antenna
- Magnetic antenna not MRI compatible



## Wireless part 3

- Water simulating human body, antenna's 15 cm apart, then human body
- The presented wireless power link has a loss of -28 dB at 200 MHz
- To supercapacitor 0,5F 38 minutes charging time
- 50 mm antenna  $\lambda/4$ , 200 MHz?
- Find location and polarization



# Next steps

- Building 20:1 model to show actuator/valve/volume package
- Building 1:1 dummy model to show dimensions
- Check current concept with gynaecologists/stent makers/implant experts
- Patent!
- Market acceptance study
- Dummy testing on rabbits
- Build optimized wireless system



# Partners & Endorsement:

- Prof. Dr. Fauser - gynaecologist Utrecht Medisch Centrum
- Prof. Dr. Laven - gynaecologist Erasmus Medisch Centrum
- Prof. Dr. Ir. Baltus - head Centre for Wireless Technology TU/e
- Prof. Dr. Bouten - head Smart Interventions Health TU/e
- Prof. Dr. Ir. De Wit - head Smart Diagnostics Health TU/e
- Prof. Dr. Ir. v/d Vosse - cardiovascular Biomechanics TU/e
- EPC TU/e (joint engineering)
- Animal Medicine Utrecht University (animal testing)
- Hemolab (tissue modelling)
- Helmond Blue Medical (stents)



# Value Proposition

## From the North (1st model)

- Safety
- Comfort
- Freedom

Early adopters: young tech-savvy women

## To the South (3-4 rd model)

- Safety
- Affordability

“Every Child desired”





# Earnings Model

Value derived from 5 times exchange of IUD (spiraaltje) \$ 500/time = \$ 2500 total for a life with two kids, \$ 500 for M.D. Dependant on health system in the country.

## Choice Value Chain

- \$ 100 costprice/set
- \$ 750 sales price to distributor
- \$ 1500 distributor to location (e.g. hospital)
- \$ 2000 to final customer (woman)

## Choice earnings model:

1. R&D & outside research & licence income
2. Choice incorporated in larger company



# Growth Expectation

- 1000 women 1st year
- 10000 women 3rd year
- 100000 women 5th year
- Access through gynaecologists (Essure)



# Timeline/Finance

- |                     |                                 |      |
|---------------------|---------------------------------|------|
| • 1st year 1st half | 1st iteration                   | 60K  |
| • 1st year 2nd half | 2nd iteration                   | 100K |
| • 2nd year          | team formation                  |      |
| • 2nd year          | fully functional prototype      | 400K |
| • 3rd year          | production version              | 800K |
| • 3rd year          | first placement in woman        |      |
| • 4th year          | full scale clinical trial       | 2 M  |
| • 5th year          | sales (North)                   |      |
| • 7th year          | begin development version South |      |

## Exit strategies:

- Bring product to market after clinical trials (see Essure)
- Sell company before clinical trials



# Challenge

- *“Only an idiot who did not know it could not be done, could find the solution”* (quote glued to Paul Mages desk, the designer of the hydropneumatic suspension of the Citroen DS).
- *“Certainty of death, small chance of success, what are we waiting for?”* (Gimli, Lord of the Rings)





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Thank you for your attention

*Peter van de Graaf*

