www.thalesgroup.com

My system runs perfectly without users!

Human Factors in System Engineering

Dr. Michel Varkevisser
Engineering Psychologist
Thales Research & Technology, Delft

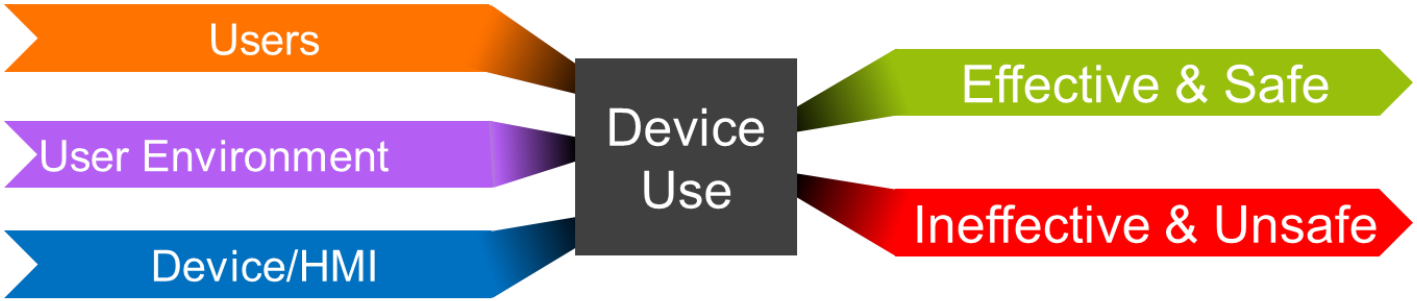
THALES

Thales Group

Defense | Aerospace | Transportation | Security | Space

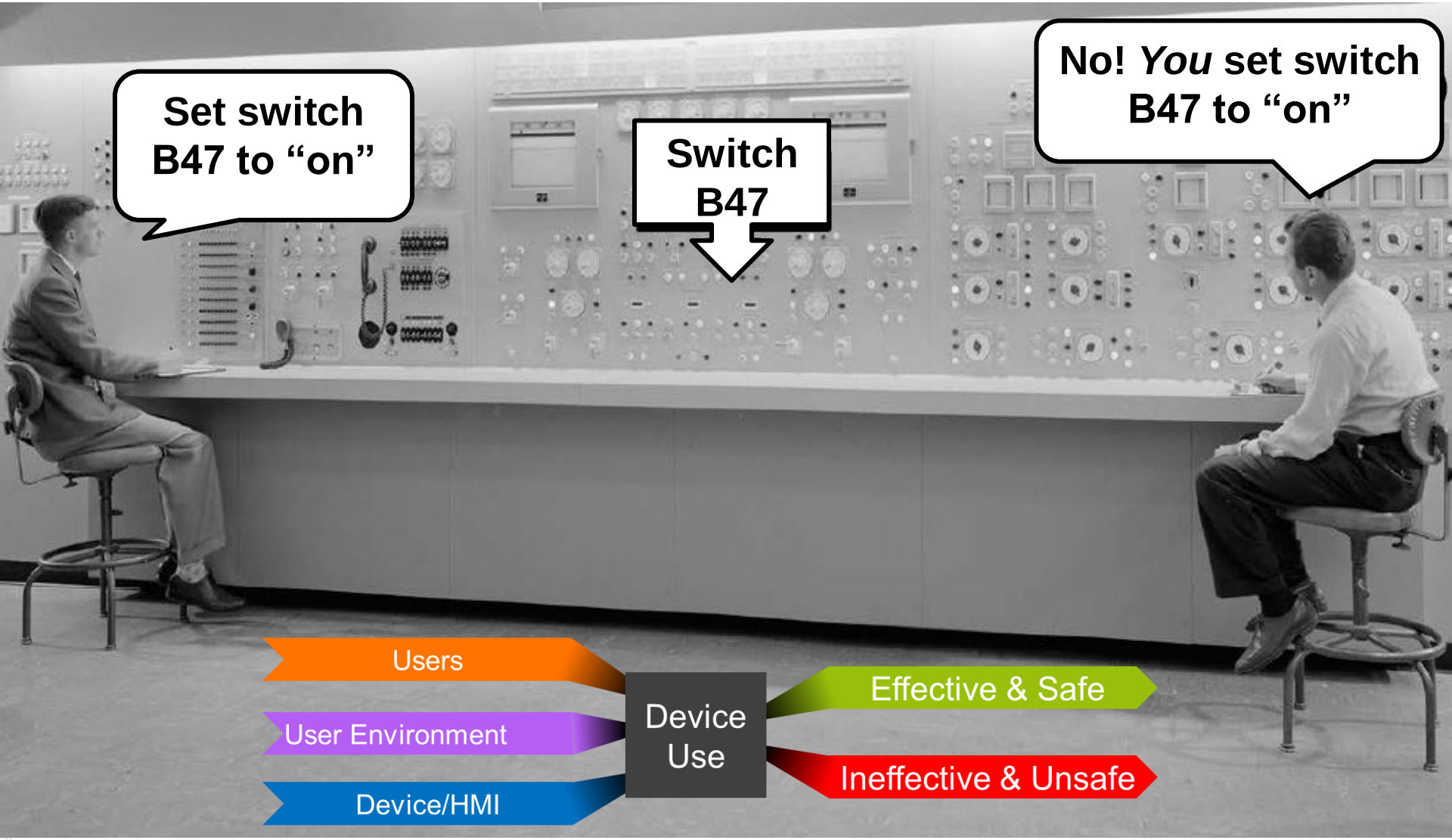
THALES

General Scope HF @ Thales



THALES

Why Human Factors?



Taken from http://joshpelton.com

What is Human Factors?

THALES

What does it bring?

Benefits

- Customer satisfaction
- De-risk internal projects
- Cost reduction
- Tuned to the end-user
- Innovation

THALES

What it is not

Human Factors

1. Is just common sense
2. Can't be measured
3. Is just for making things look nice
4. Costs too much
5. Is unrelated to system engineering
6. Is a magic trick

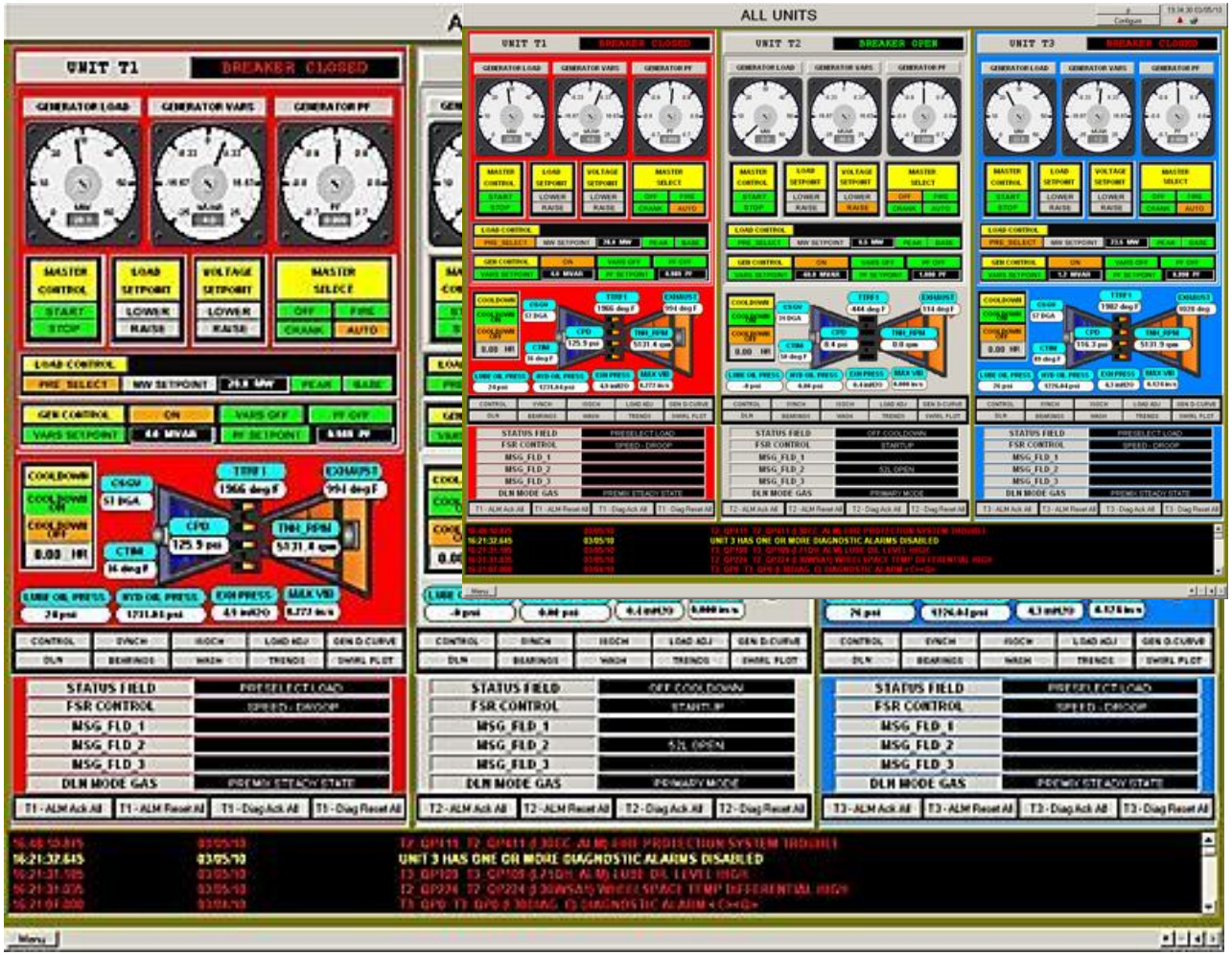
What it is not

Human Factors

1. Is just common sense
2. Can't be measured
3. Is just for making things look nice
4. Costs too much
5. Is unrelated to system engineering
6. Is a magic trick

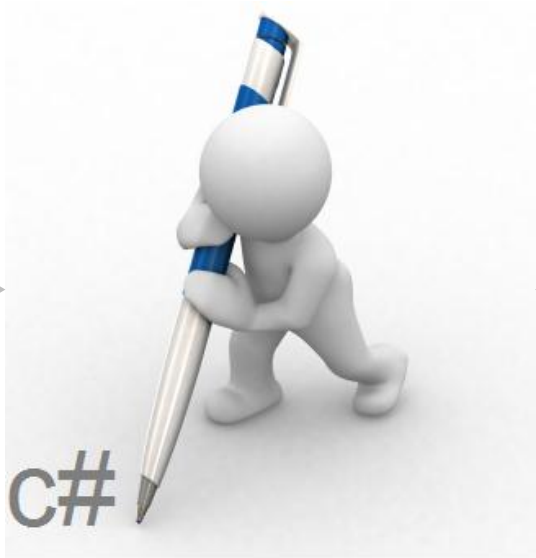
THALES

Know thyself and thy user

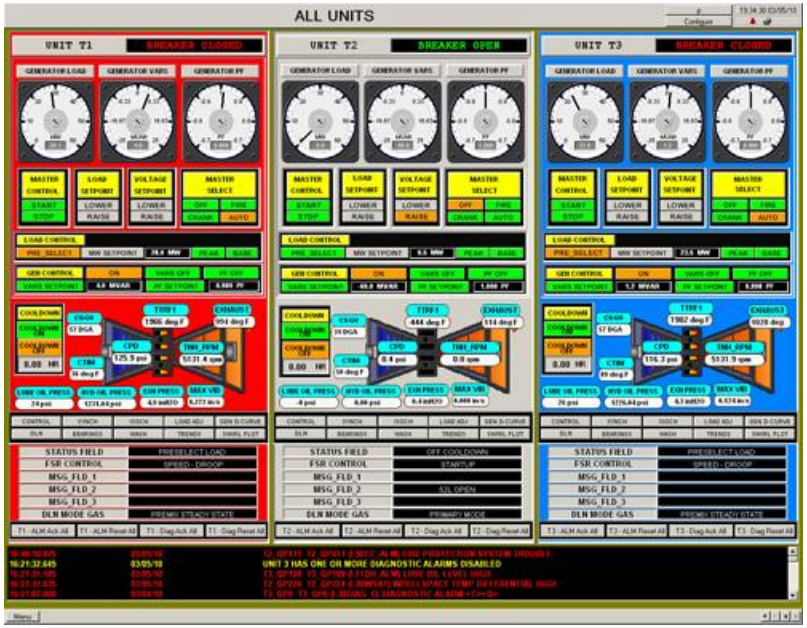


THALES

Know thyself and thy user



≠



≠

≠

THALES

Operators & Systems – not just HMI

Overall goal(s): system alignment

Overall goal(s): operator alignment

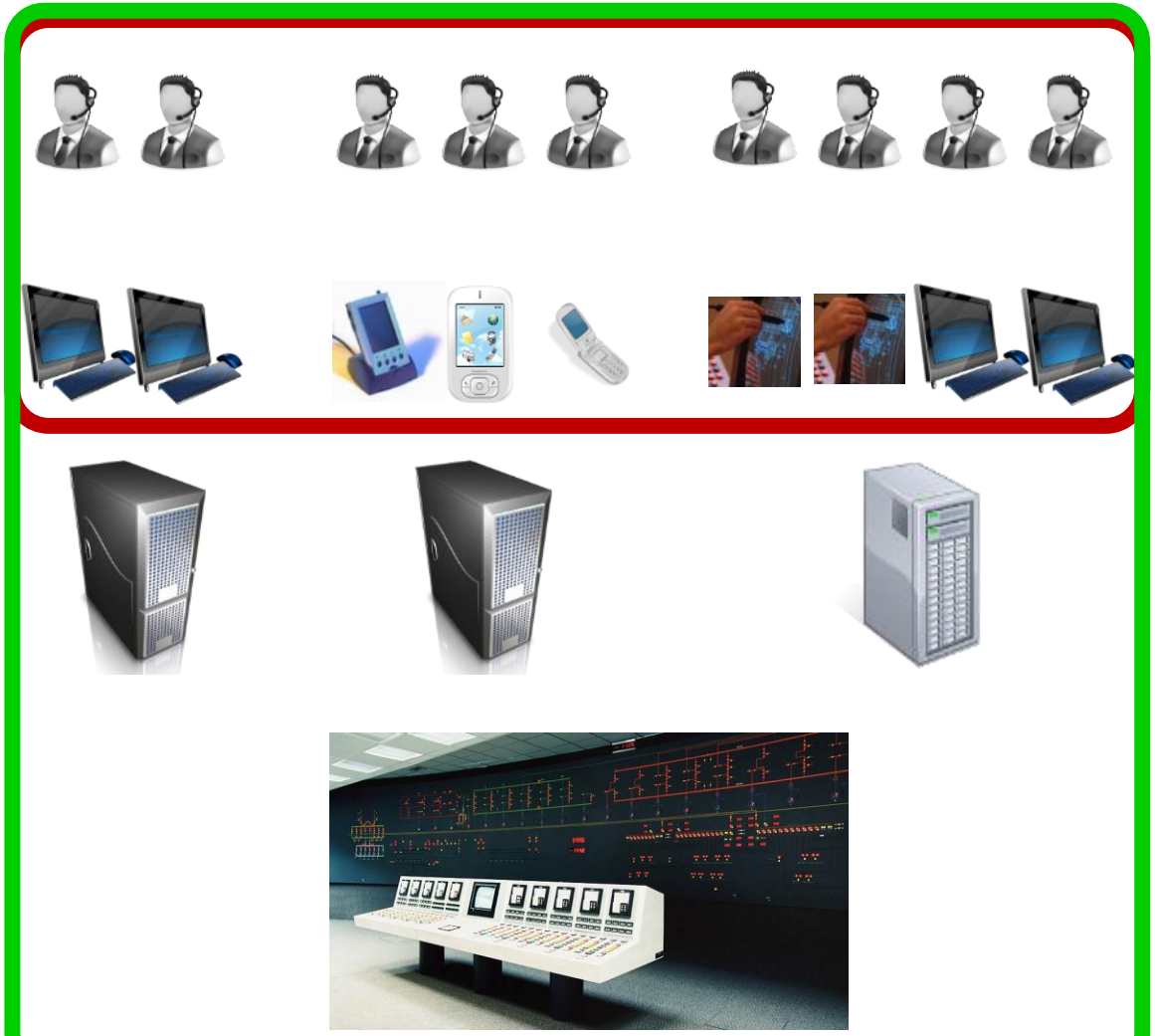
(Operators)

HMI/GUI

System functionalities &components

System of Systems

General Architecture



Information Flow

Perception/ Cognition

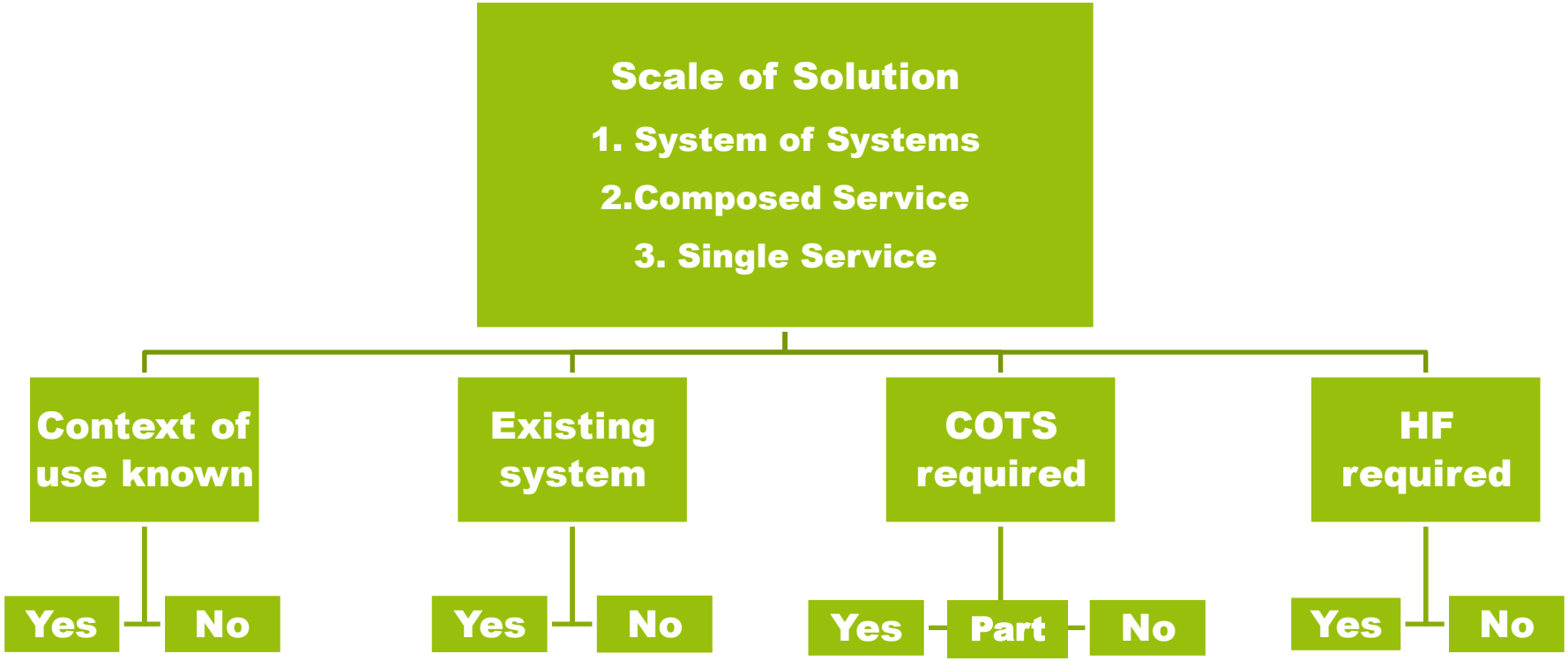
Information representation

Mapping of system-to-operator functionalities

Dataflow + Communication + Distributed locations

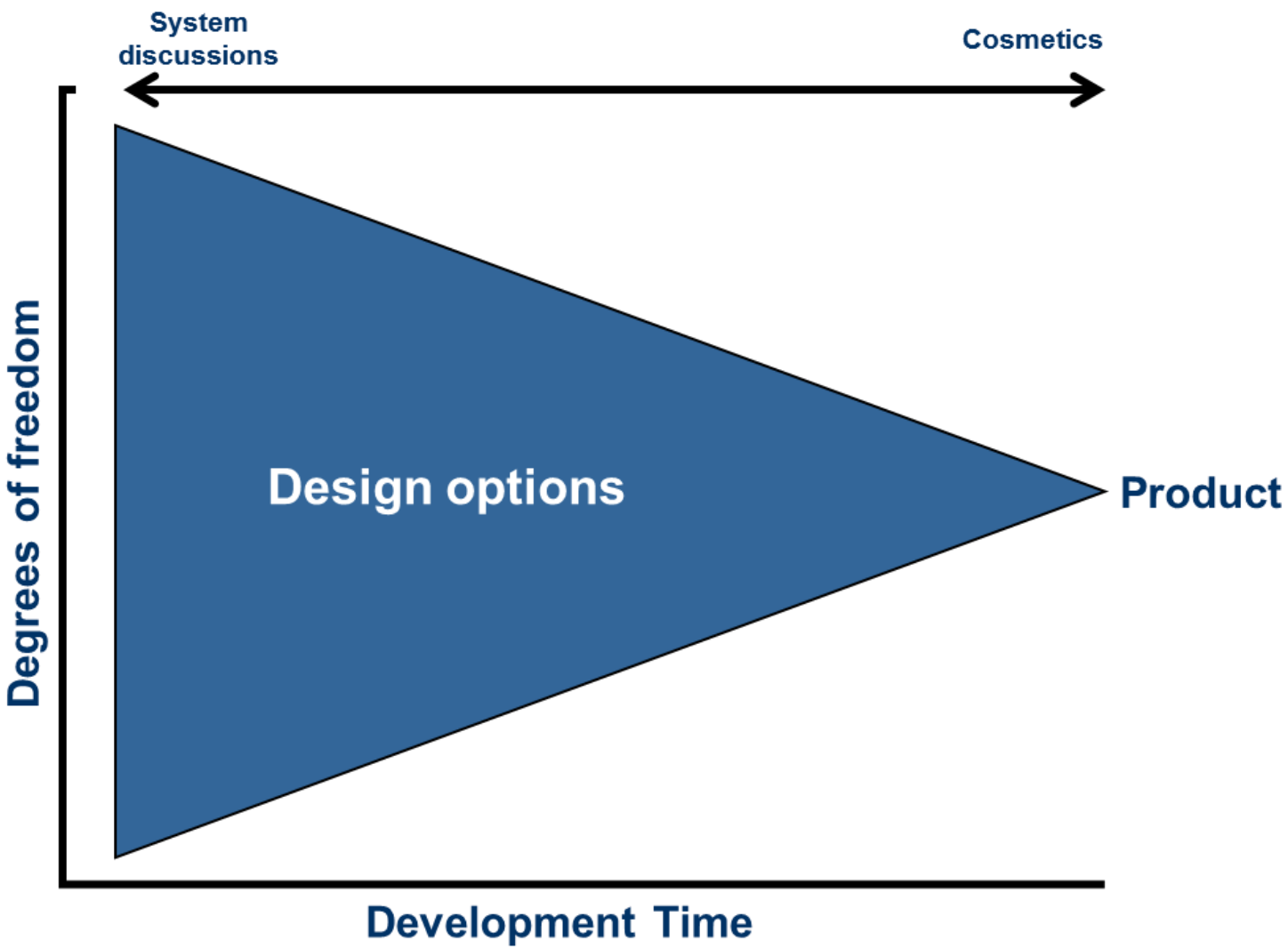
THALES

Scale of problem definition



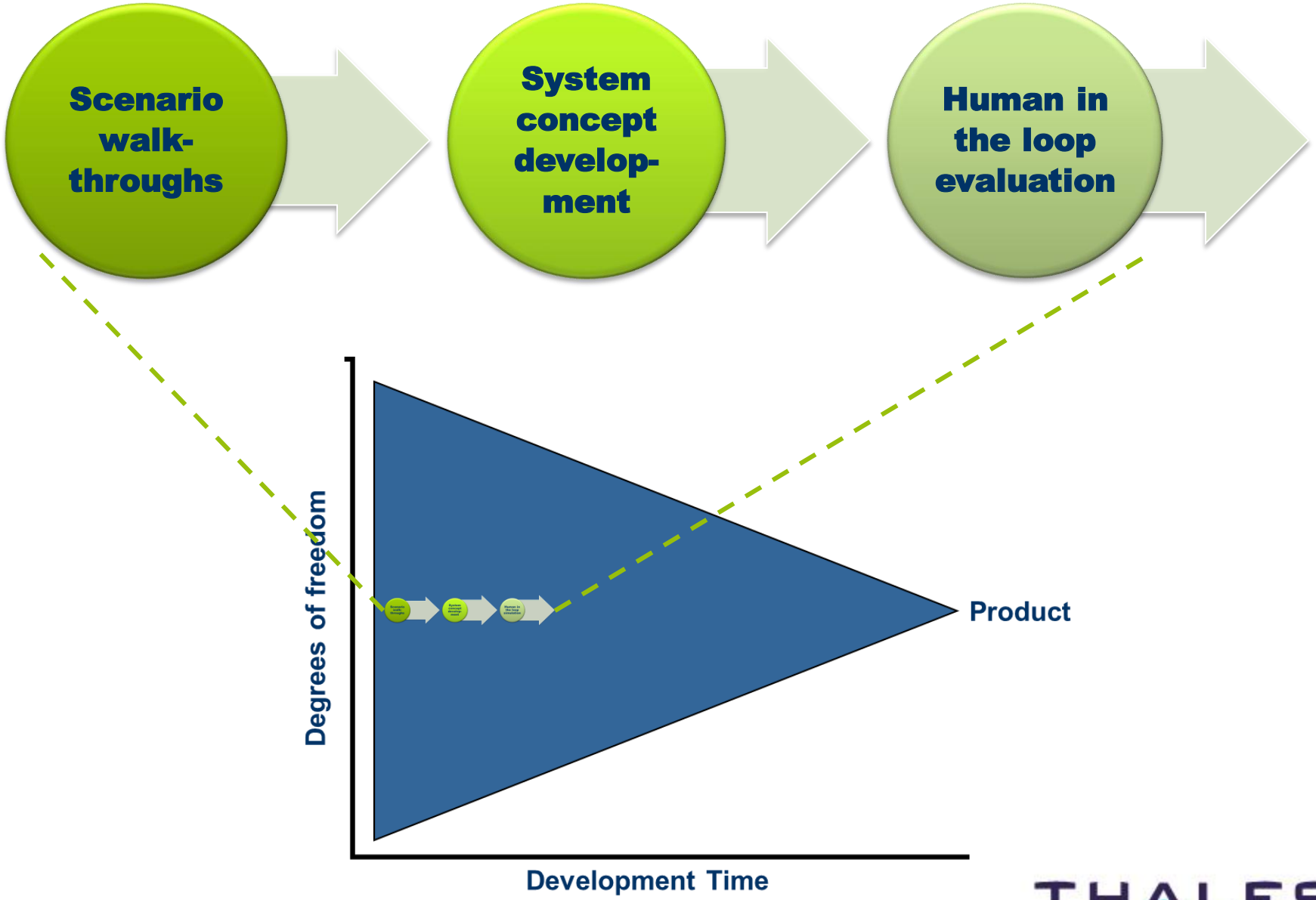
THALES

Freedom to Design



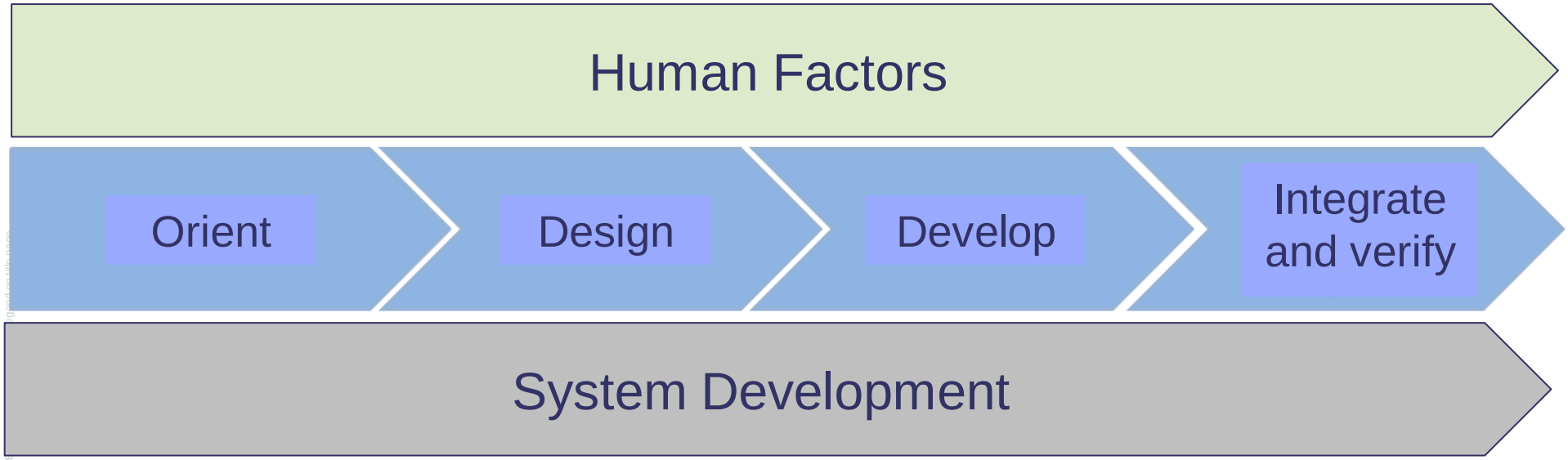
THALES

Freedom to Design



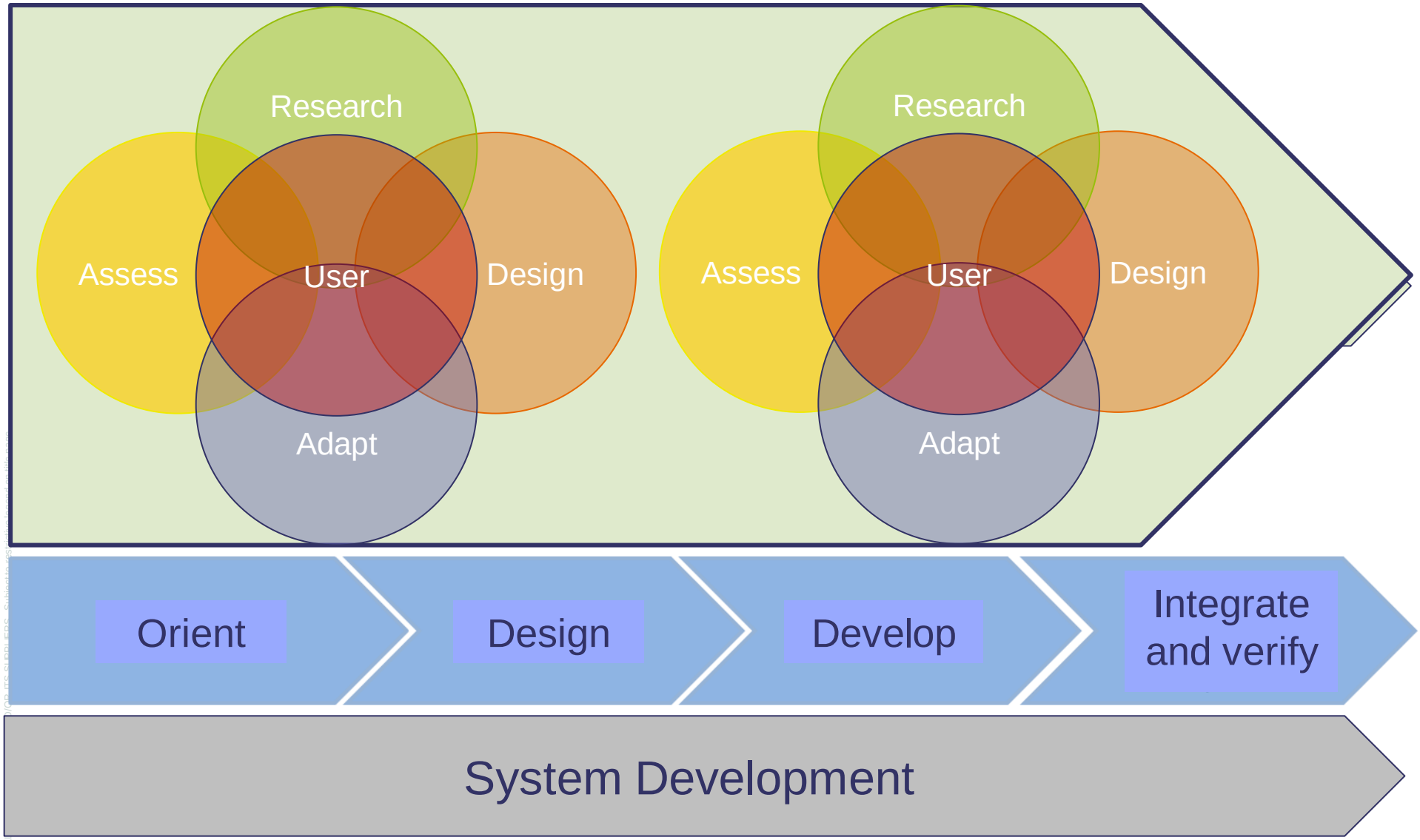
THALES

HSI Process from HF perspective



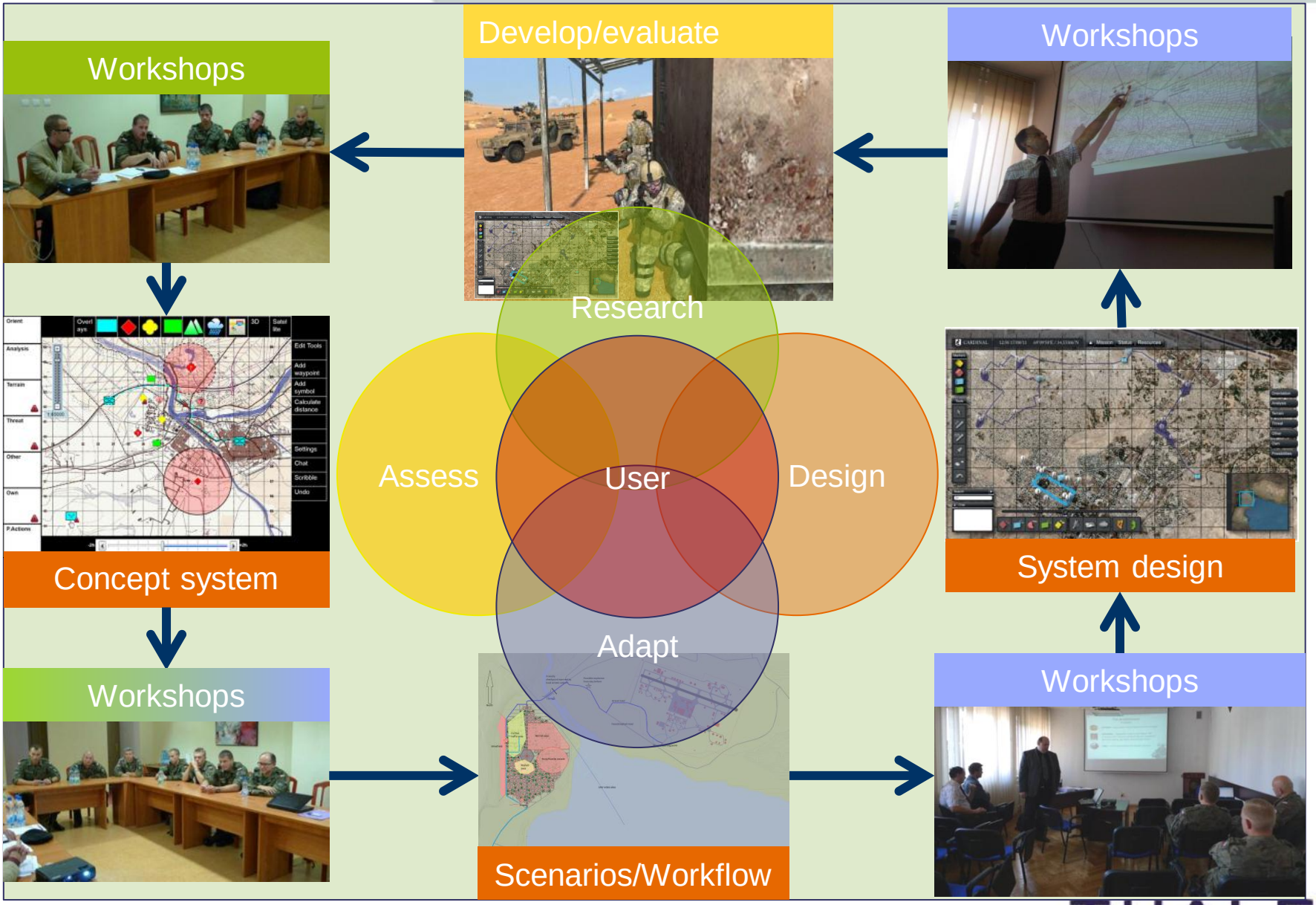
THALES

HSI Process from HF perspective



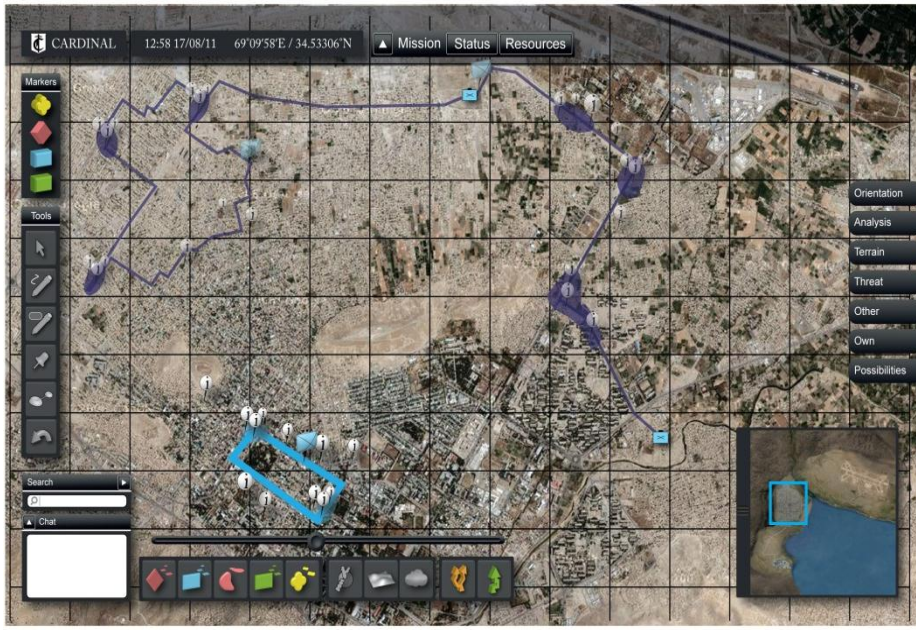
THALES

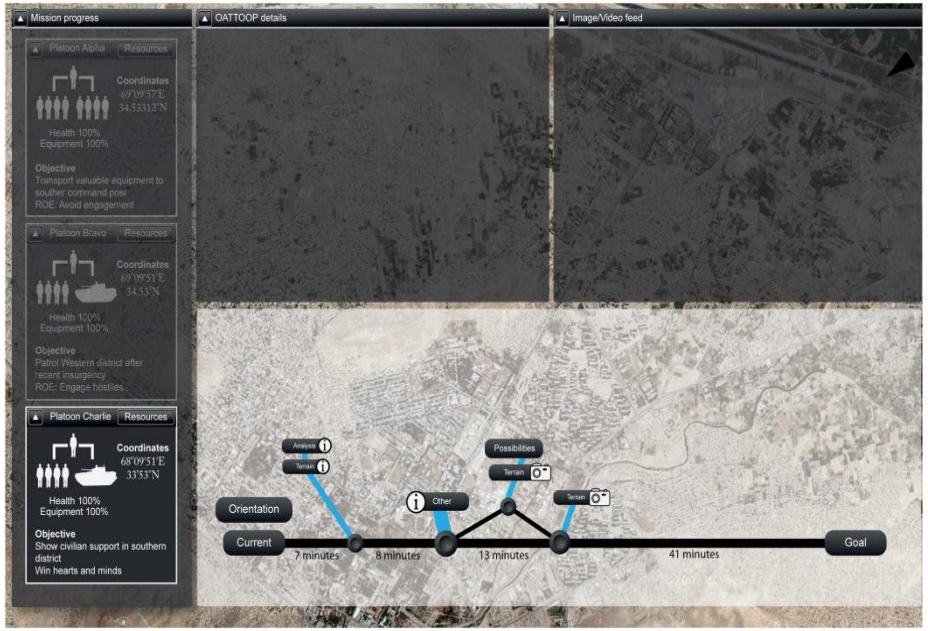
GUI Information Management example



THALES

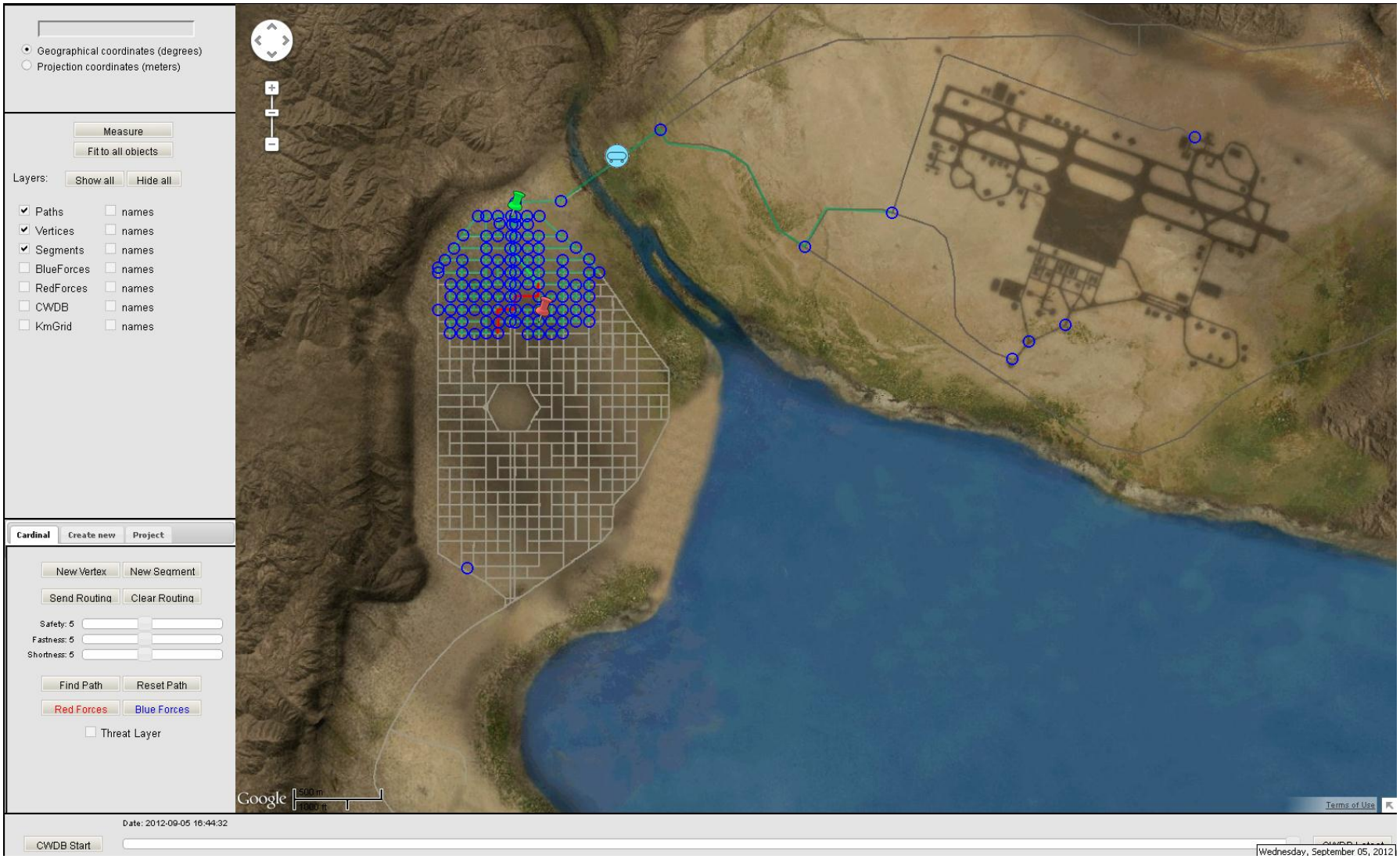
How things can still go wrong





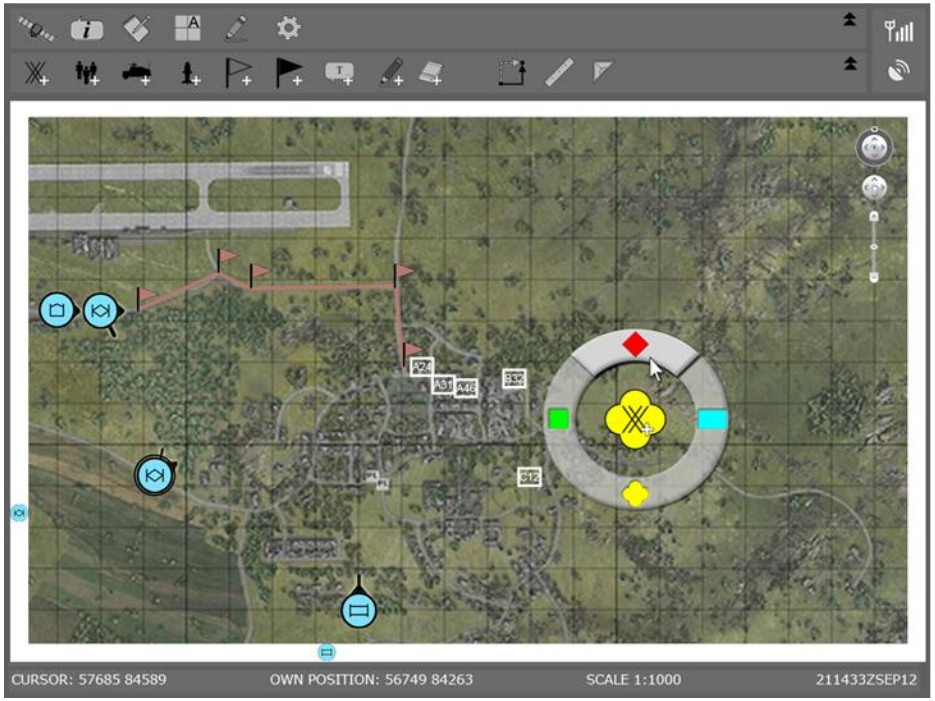
THALES

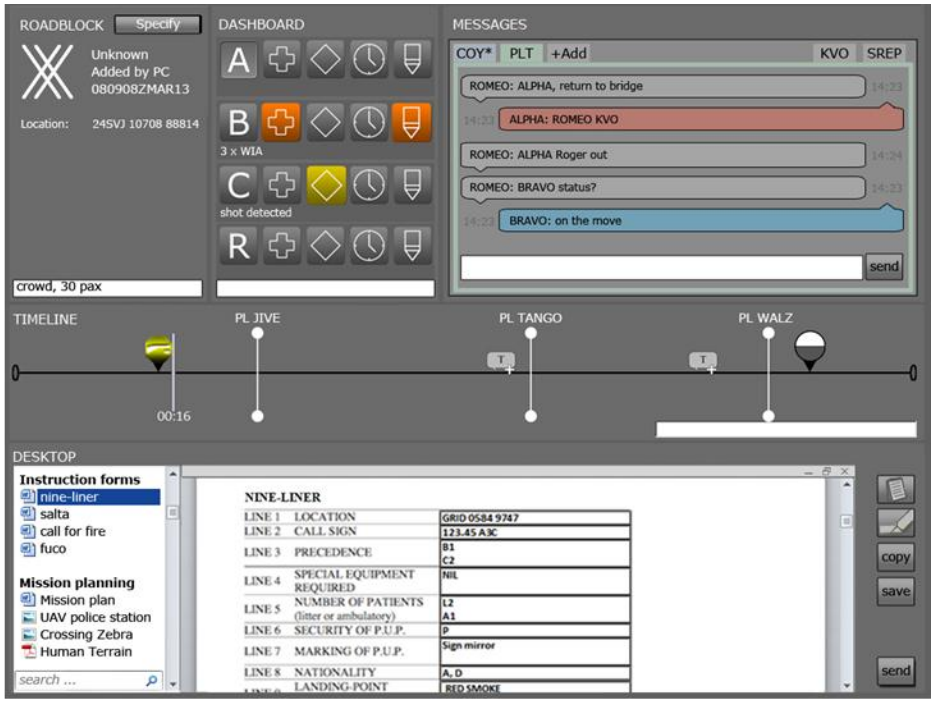
How things can still go wrong



THALES

How things can still go wrong





THALES

To conclude

For good design you pay now, for bad design you pay later (and more)

- Re-design/re-engineering
- Loss of customer(s)

Ask advice R&T/HF department (Large Companies)

Hire HF consultant (Small & Medium-sized Companies)

Perfect world model:

- Team of system engineers, designers & HF experts

Human Factors is a profession not a trick

THALES

Thales Human Factors & Cognition

- De-risking internal projects
- User-centered design
- Customer satisfaction
- Innovation

Michel.Varkevisser@nl.thalesgroup.com