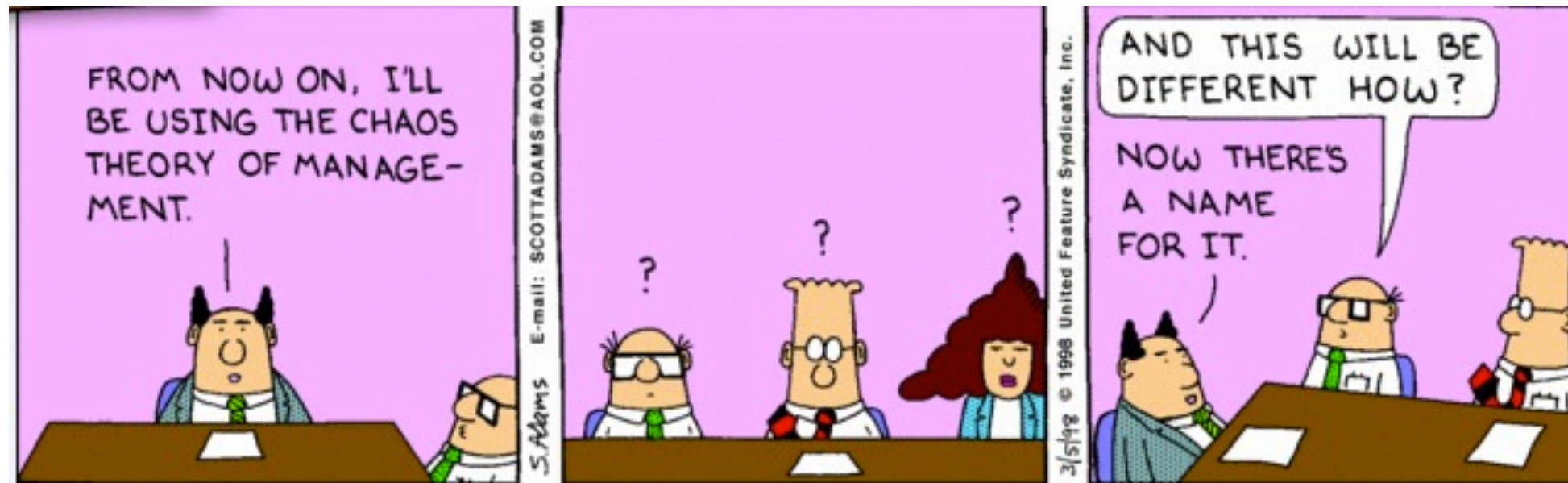


# Navigating Chaos

a holistic approach to product development

Olve Maudal, Cisco Systems Norway



<http://dilbert.com/strips/comic/1998-03-05/>

The key to effective product development is to prepare for the unexpected and be willing to deal with it when it happens. In this presentation I will use examples from developing telepresence products and solutions to show why it is better to respond to change over following a plan, why collaboration is better than contract negotiations, and why following principles is better than implementing procedures. Effective and successful product development is all about being exceptionally good at navigating the unknown.

A 45 minute presentation for Comperio  
Kampen Bistro, 1. September 2011



## About me

1992-1995 BEng, Software Engineering, UMIST, Manchester

1995-1996 MSc, Intelligent Robotics, Dept of Artificial Intelligence, Edinburgh

1996-1996 Postgrad, Data Mining and Knowledge Discovery, NTNU, Trondheim

1996-2000 Schlumberger, developing systems for finding oil

2000-2004 BBS, developing systems for electronically moving money

2004-2010 TANDBERG, developing systems for effective communication between people

2010-now Cisco Systems (TANDBERG was aquired by Cisco in 2010)

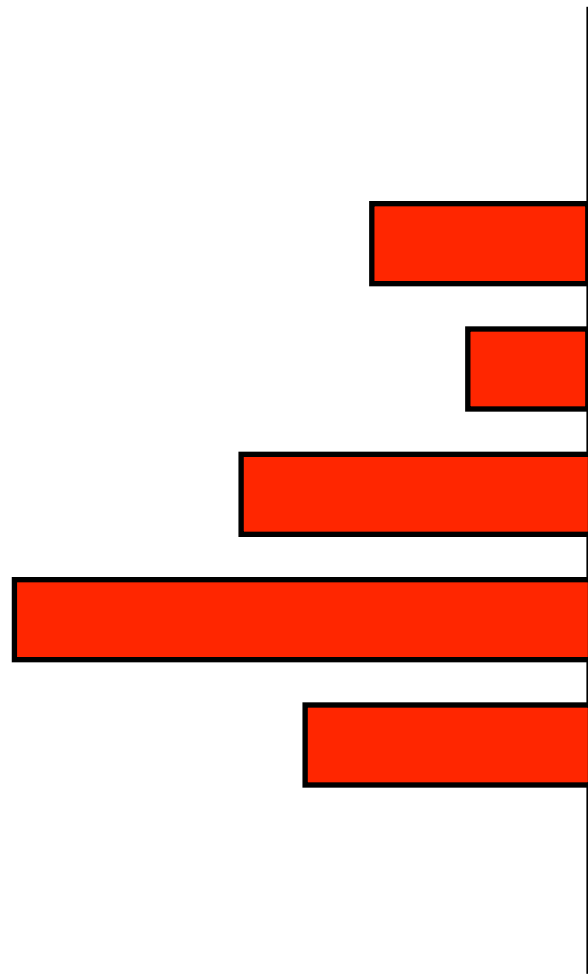
Active member of the vibrant geek community in Oslo. Eg, JavaPils, Smidig, JavaZone, XP Meetup, Cantara, Lean Meetup, and Oslo C++ Users Group, and a lot of other things. Also an active member of ACCU.

Blog: <http://olvemaudal.wordpress.com/>

Twitter: @olvemaudal

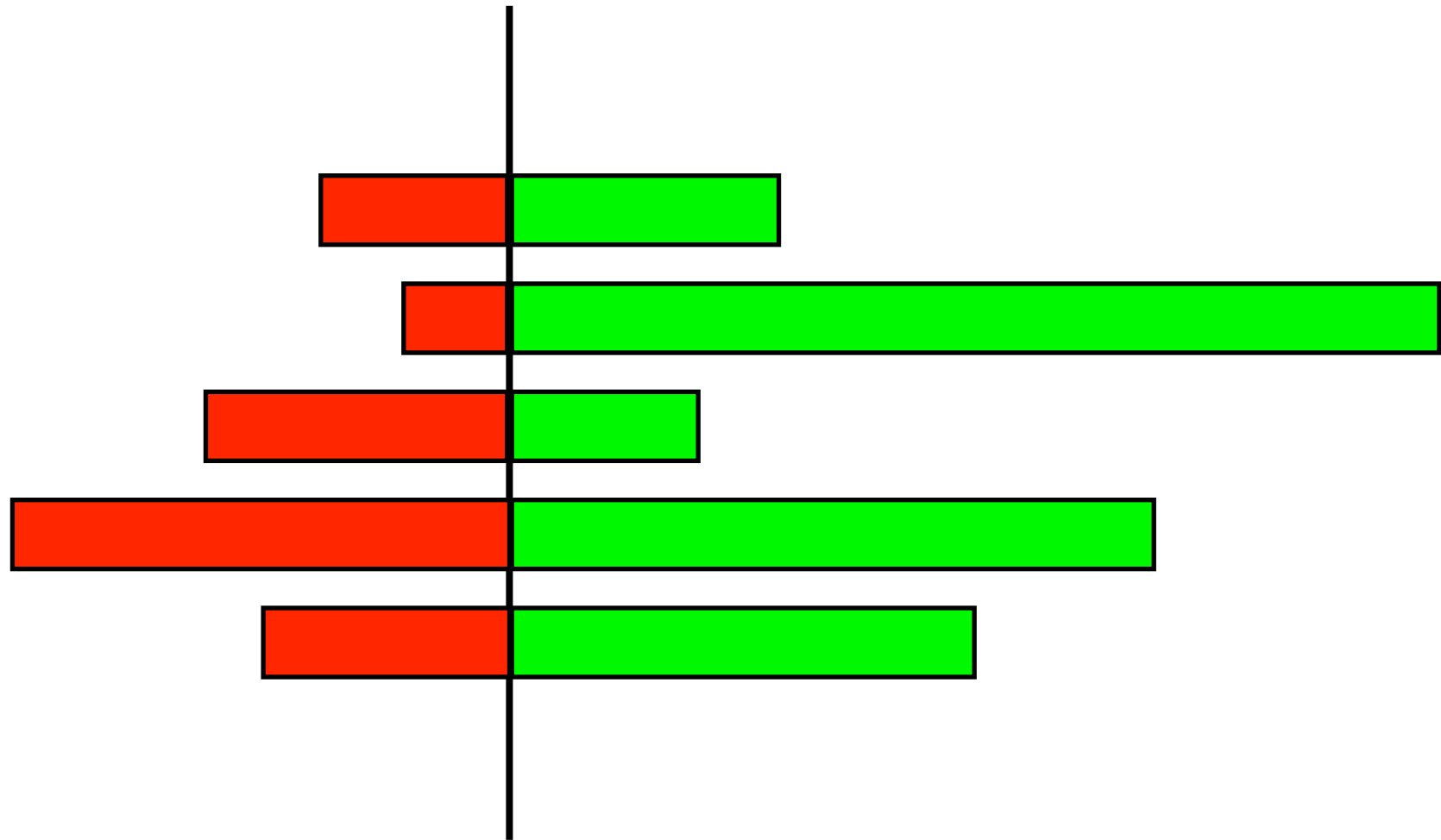
Some thoughts about systems thinking

everything has a negative component ...

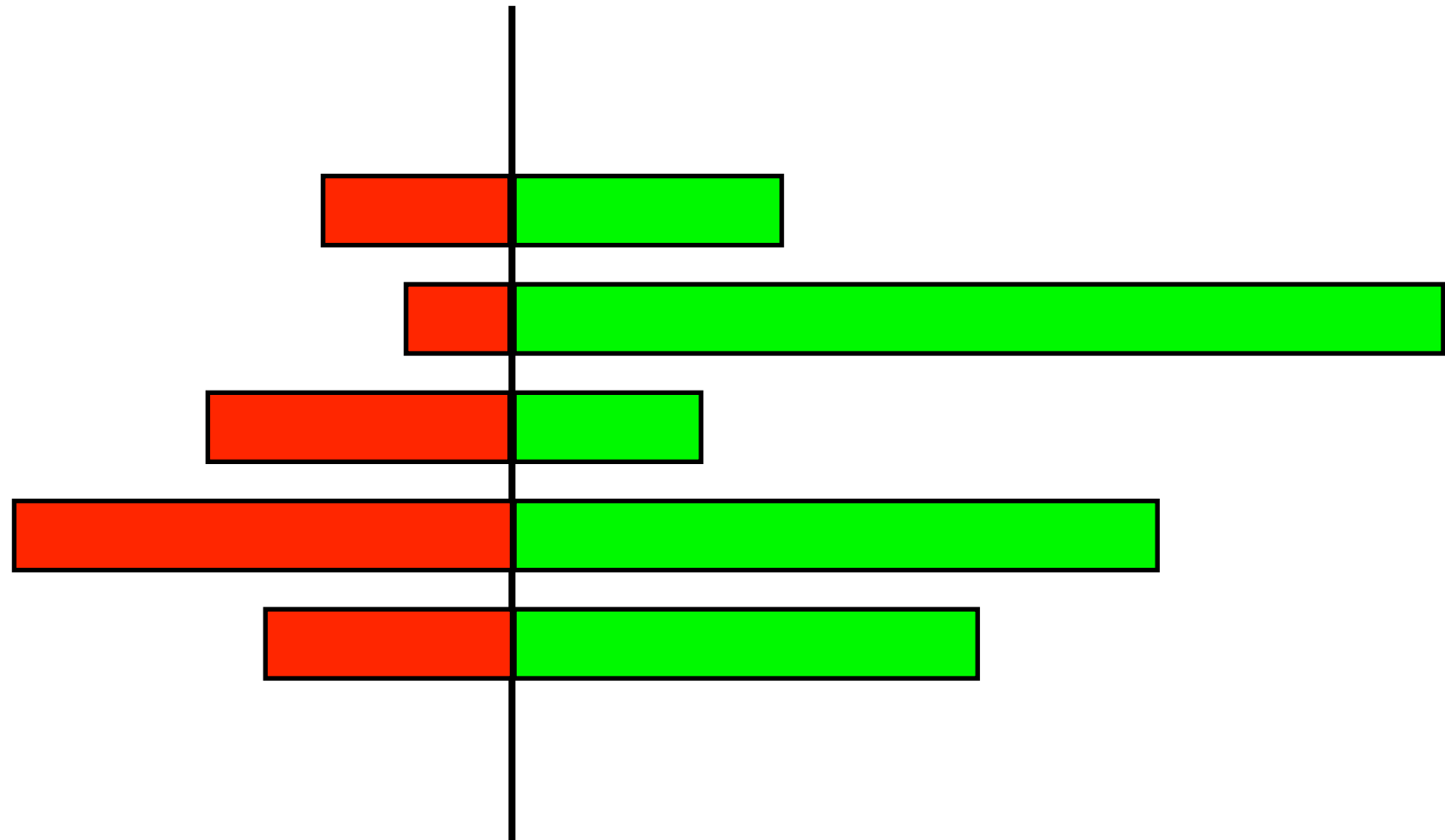




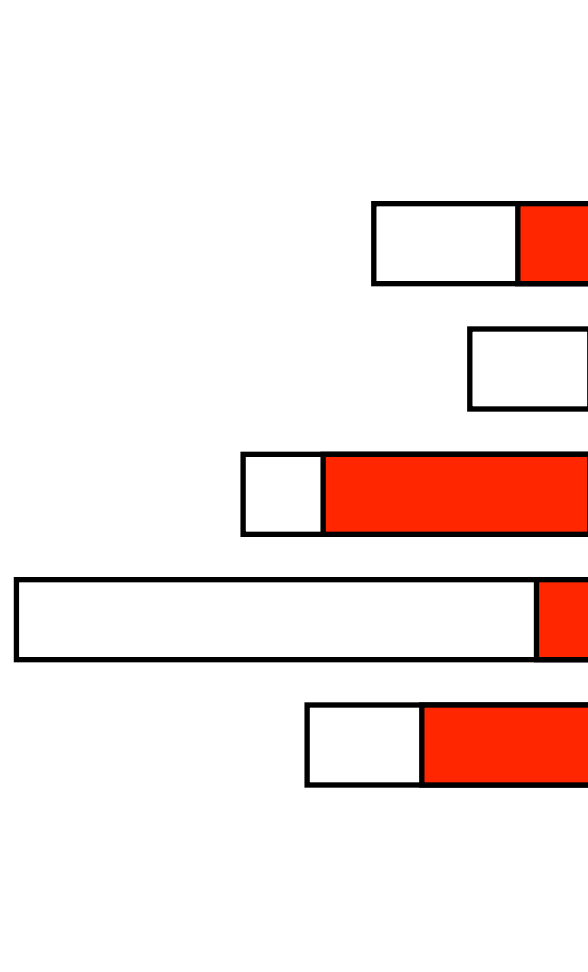
... as well as a positive component



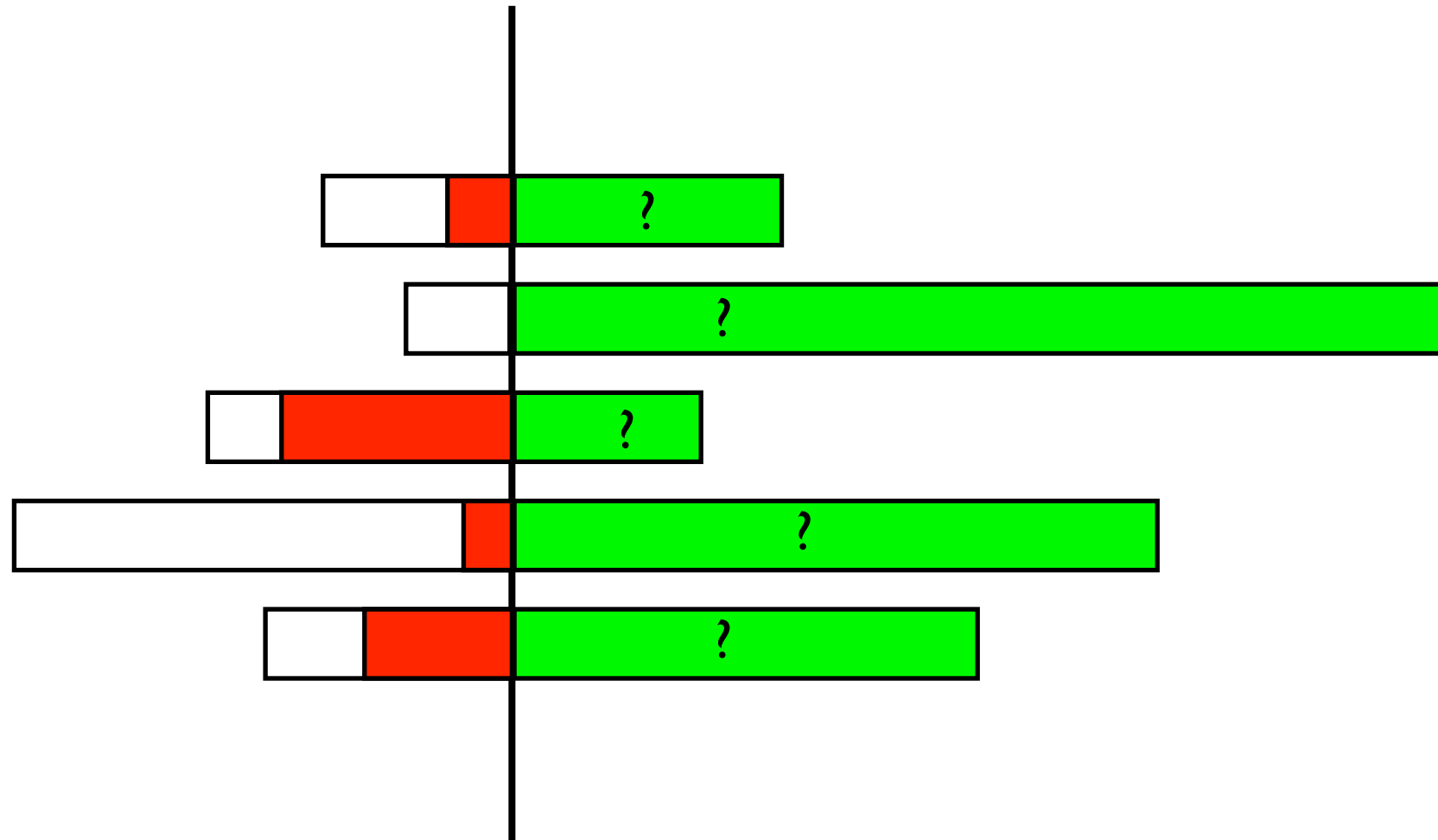
so if you want to improve something...



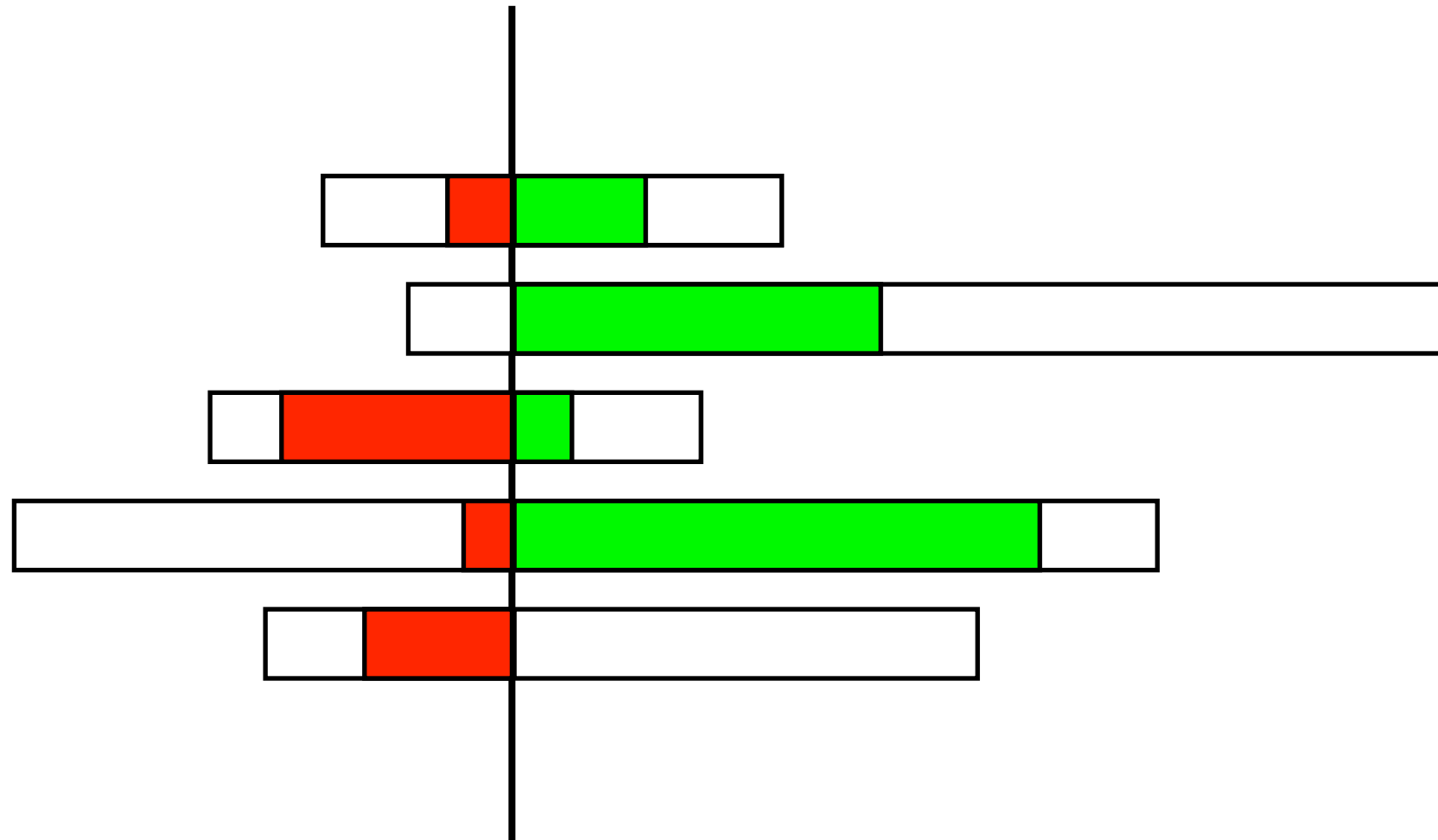
... do **not** try to fix the negative stuff ...



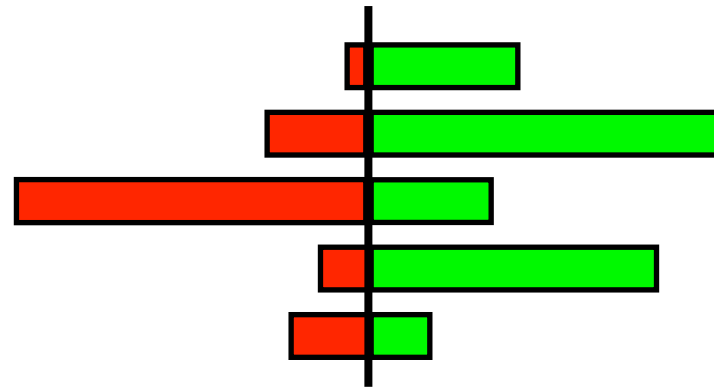
... without considering how it will affect the positive component



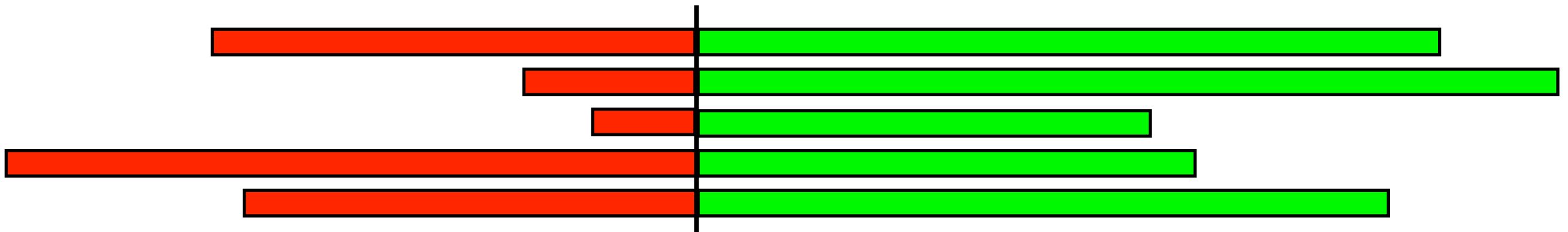
because you might end up by reducing the positive component by even more



**good** organizations often have a profile like this



**great** organizations usually have profiles that look like this



“Managing your problems can only make you good, whereas building your opportunities is the only way to become great.” (Good to Great, Collins, 2001)

# TelePresence Technology Group Cisco Systems Norway



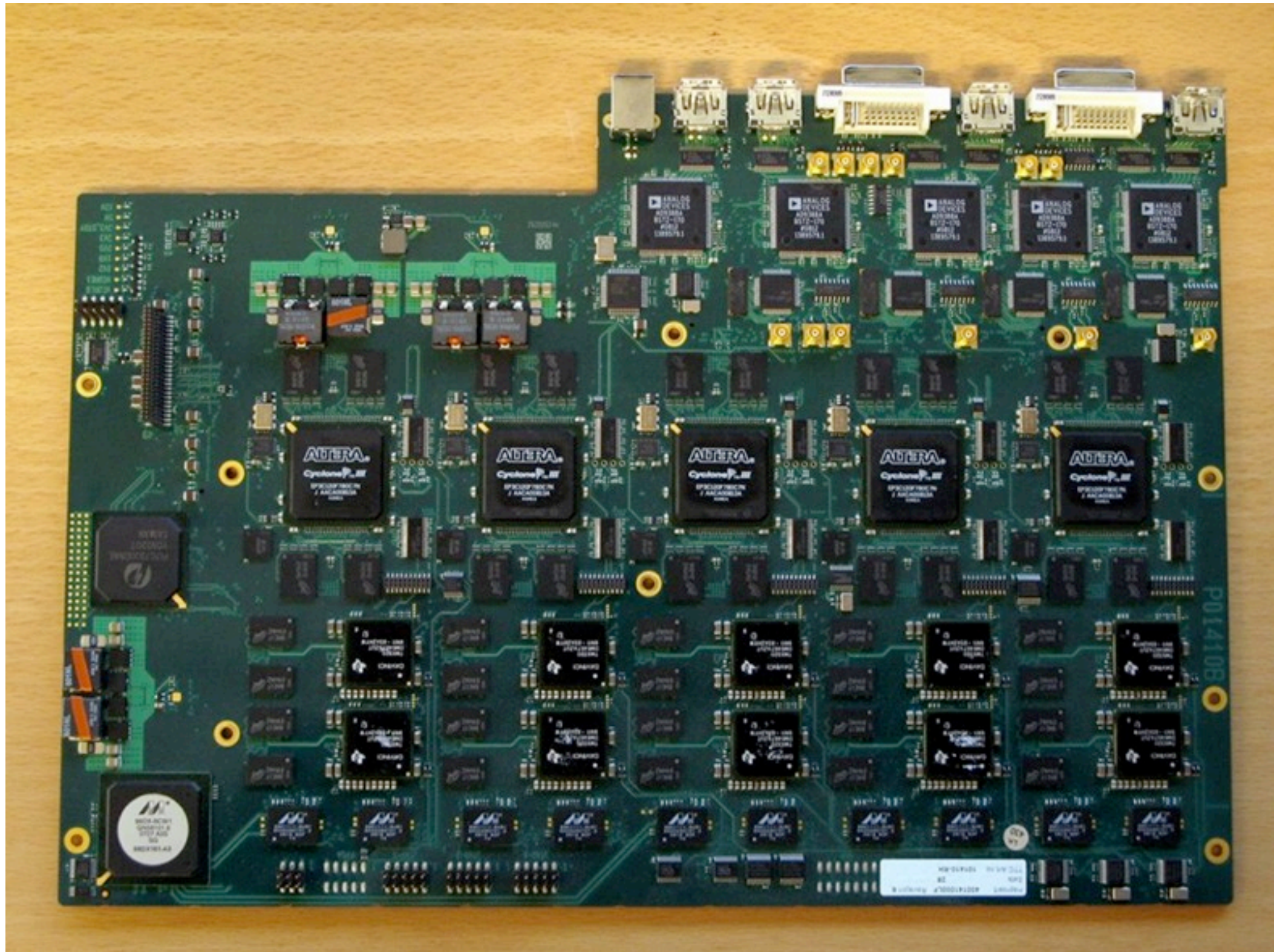


# Telepresence systems and solutions



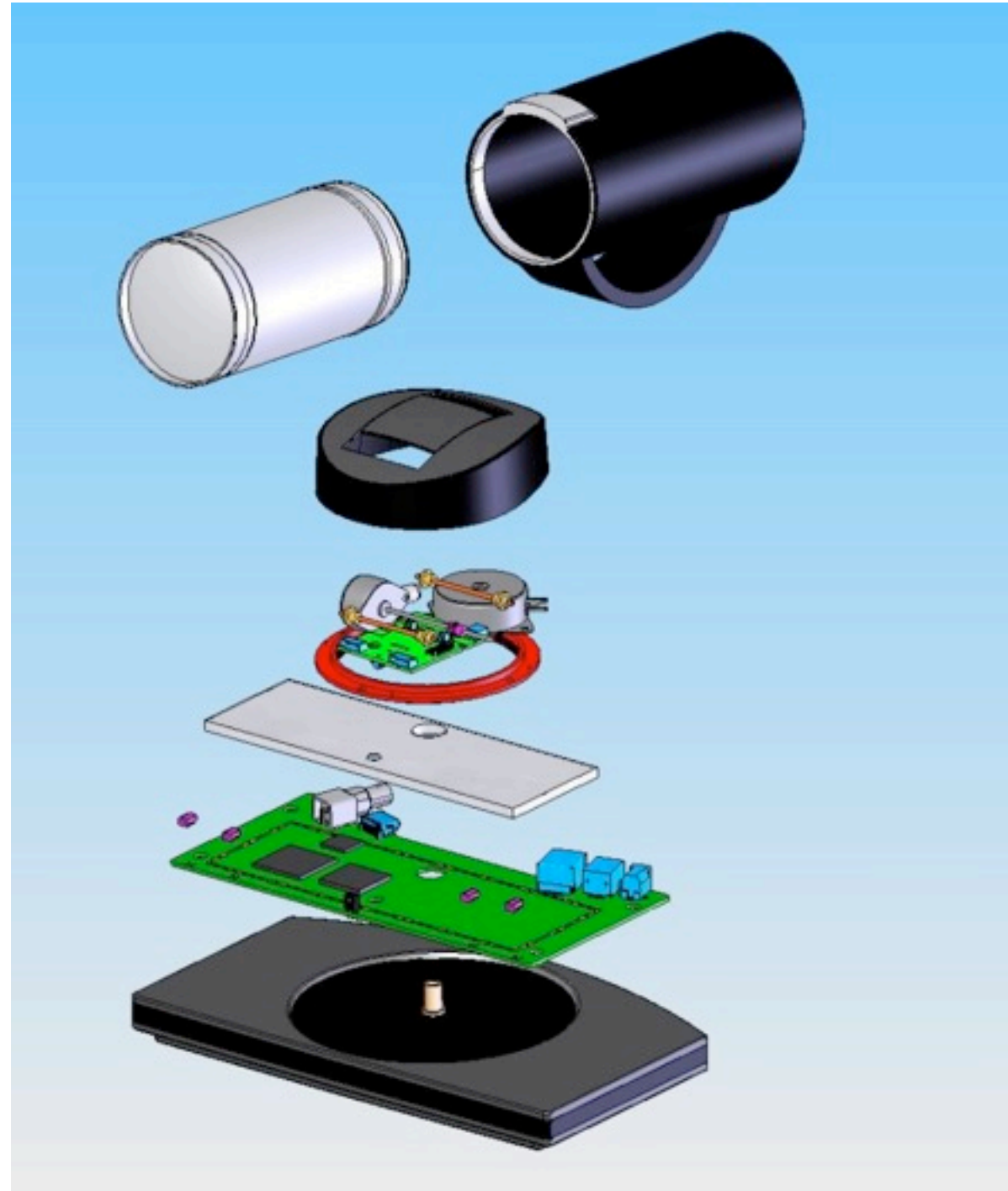


# Electronics / Hardware





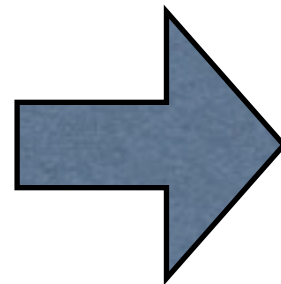
# Mechanics



# Industrial Design



1993



2011



# Software Development



# Example of a Product



# Cisco TelePresence Codec C90







### **C90 Features:**

- realtime H.264 encoding/decoding
- full HD 1080p30, (4+4) concurrent streams
- 12 high definition video sources
- 8 high quality audio sources
- support for many-to-many communication
- Interoperability through H323 and SIP
- API for integration and remote control

# Cisco TelePresence Codec C90



- Developed at Lysaker
- Started spring 2007
- First HW prototype arrived summer 2008
- Released late 2008 (~20 months of development)
- 2-3 people working with mechanics/design
- 4-5 people working with electronics/hardware
- 5-6 people working with FPGA development
- 40-50 people working with software development
- 4-5 test developers
- 1 person working with approvals



# Our Development Process



Development Process?

~~Development Process?~~



# **Development Practices in the Saturn project**

- Continuous planning
- Always attack high risks first
- Heavy focus on effective feedback mechanisms
- Visualization of actual status throughout project
- Teams: GUI, App, Protocol, Video, Audio, FPGA, Platform, QA, Support
- Parallel development
- Iterations and time-boxing
- Daily 15 minute morning assembly of elders
- Weekly rendezvous meetings
- Early and many prototypes

# Observations from TTG, Cisco Systems Norway

as a software engineer joining the organization...

at first you might get this impression...

at first you might get this impression...

- No documentation

at first you might get this impression...

- No documentation
- No routines

at first you might get this impression...

- No documentation
- No routines
- Fooling around



at first you might get this impression...

- No documentation
- No routines
- Fooling around
- Not following plans

at first you might get this impression...

- No documentation
- No routines
- Fooling around
- Not following plans
- Decision are postponed

at first you might get this impression...

- No documentation
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- Nobody decides

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- Little respect for management

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but then you start to notice...

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  - Decision are postponed
  - Nobody decides
  - Little respect for management
  - Little modularization
  - Lack of precision
  - Sloppiness
  - People are not working hard
- People communicate

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- Nobody decides
- Little respect for management
- Little modularization
- Lack of precision
- Sloppiness
- People are not working hard
- People communicate
- Focus on important stuff

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- Lack of precision
- Sloppiness
- People are not working hard
- People communicate
- Focus on important stuff
- Embedded slack

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- People are not working hard
- People communicate
- Focus on important stuff
- Embedded slack
- Continuous planning

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- Respect for the doers

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- Fast deliveries

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- Respect for the doers
- No integration period
- Spectacular products
- Fast deliveries
- Sustainable pace

... and while you still see the "negative" stuff, you will start to appreciate the "positive" stuff more.

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**Agile?**

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**Agile?**

**Scrum?**

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**Agile?**

**Scrum?**

**Lean?**

# Observations from TTG, Cisco Systems Norway

- People communicate
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- Autonomous organisation
- Respect for the doers
- No integration period
- Spectacular products
- Fast deliveries
- Sustainable pace

**Agile?**

**Scrum?**

**Lean?**

**Deming?**





Copyrighted Material

"Toyota is as much a state of  
mind as it is a car company."  
-USA TODAY

# THE TOYOTA WAY

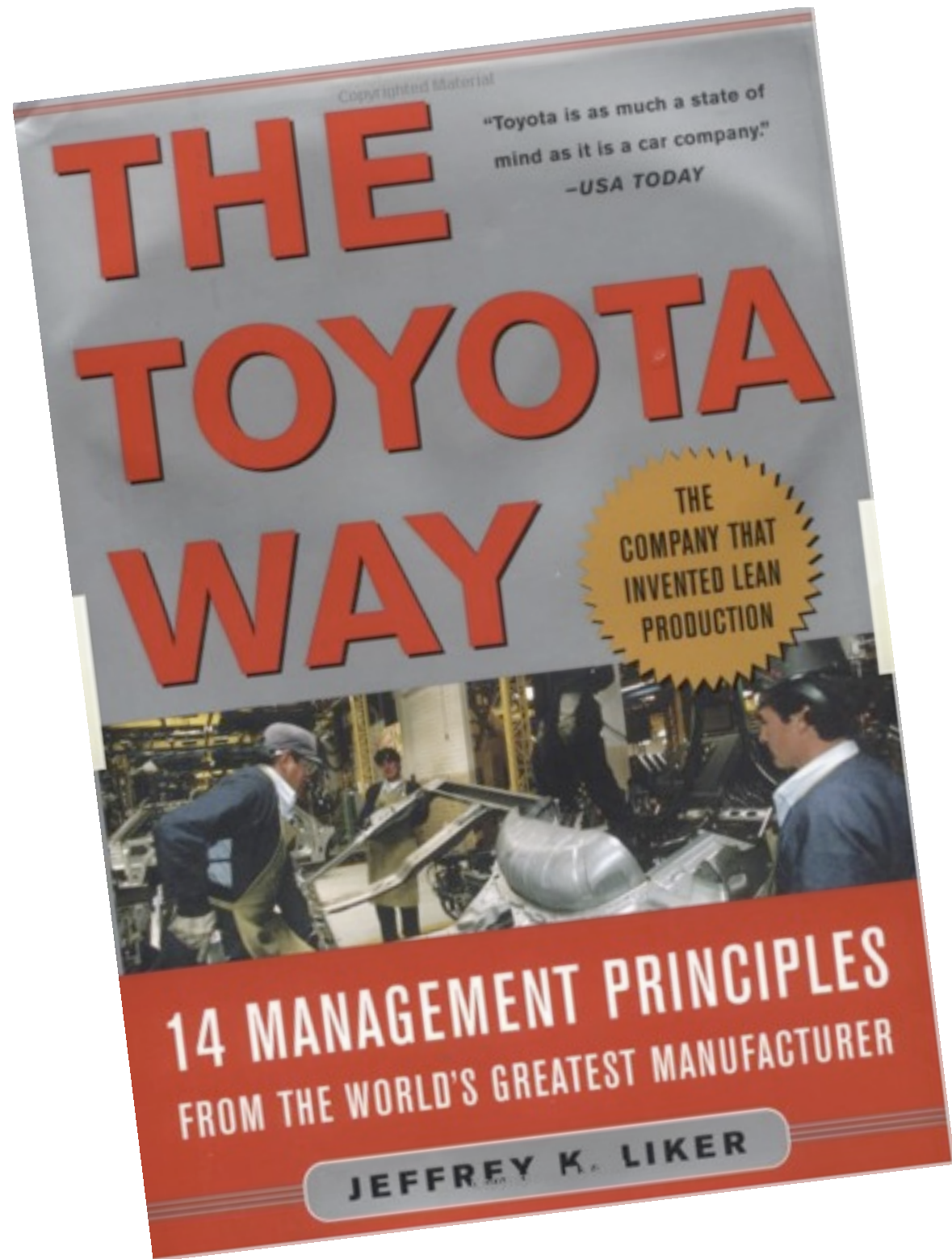
THE  
COMPANY THAT  
INVENTED LEAN  
PRODUCTION



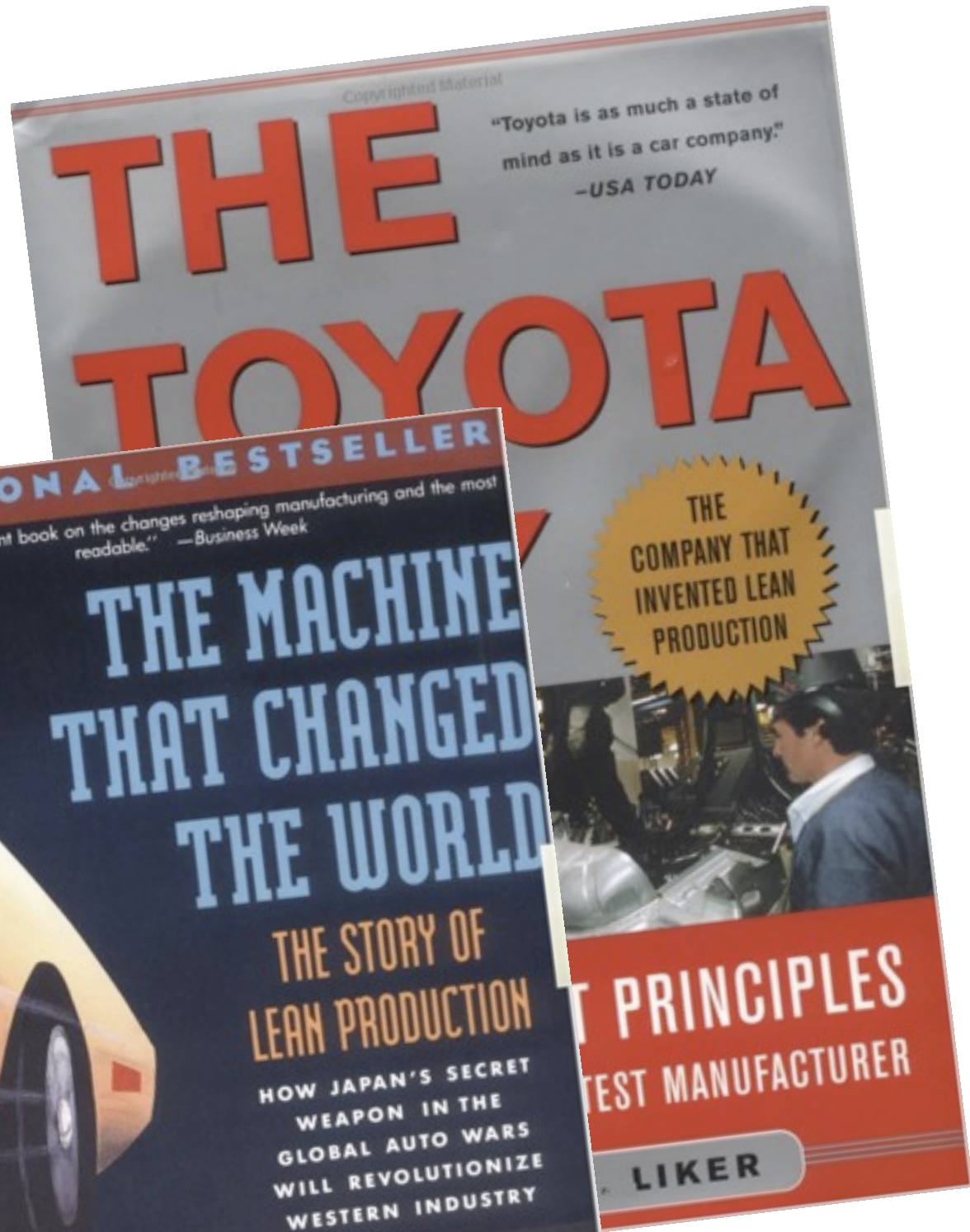
14 MANAGEMENT PRINCIPLES  
FROM THE WORLD'S GREATEST MANUFACTURER

JEFFREY K. LIKER

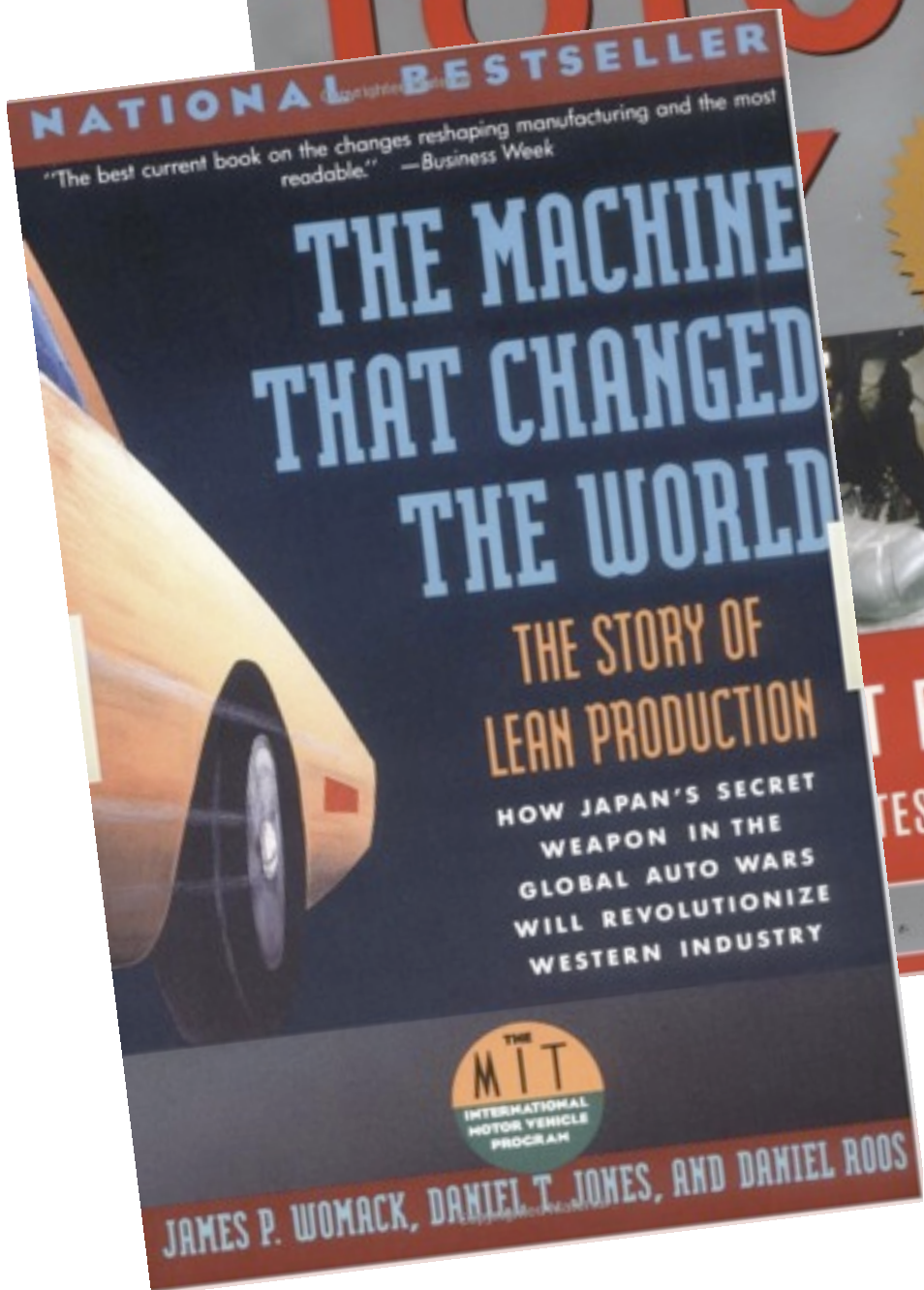
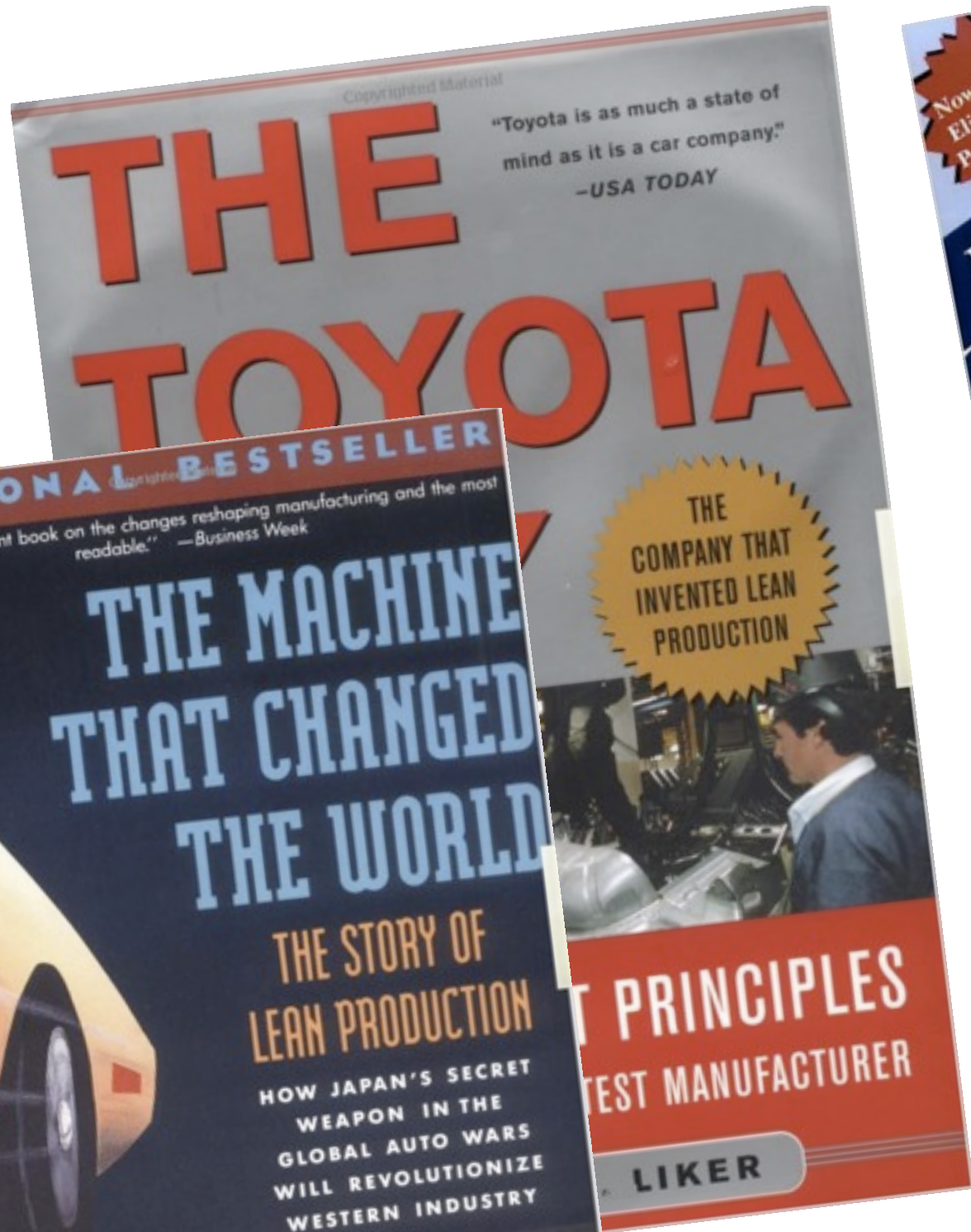




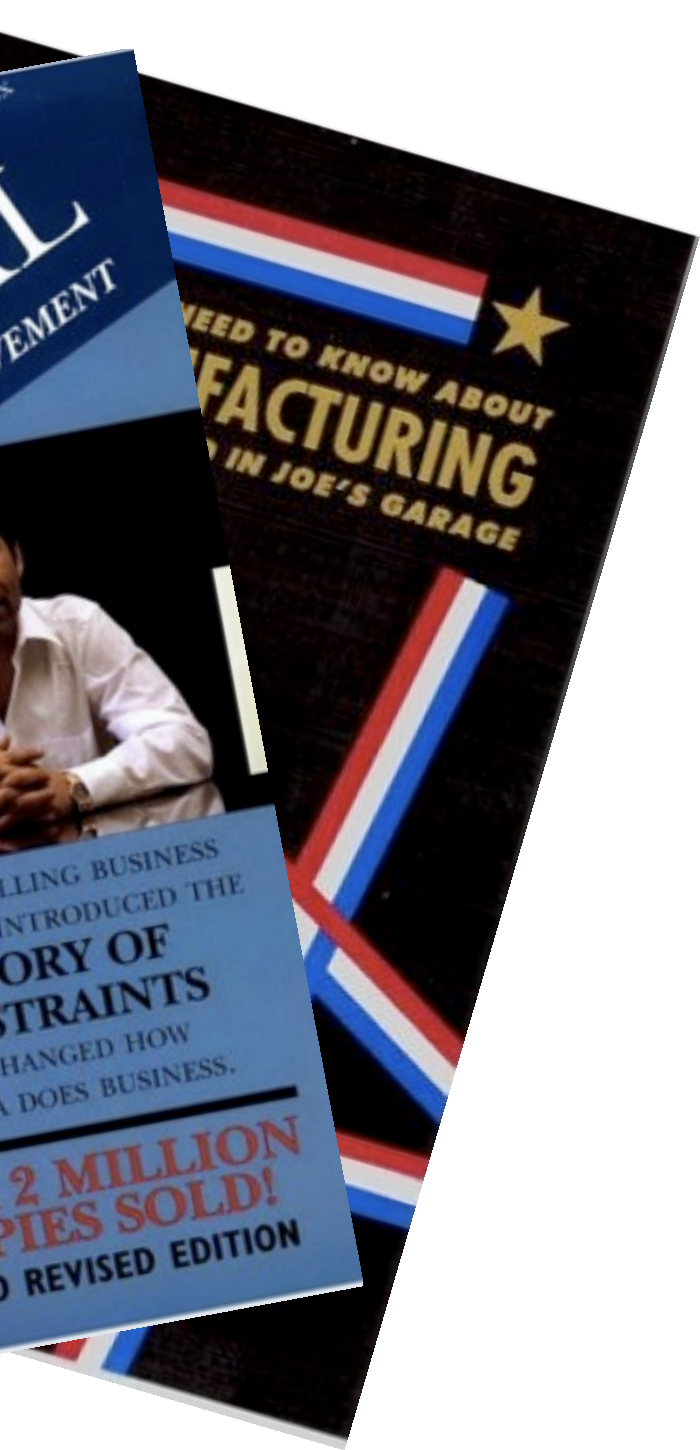
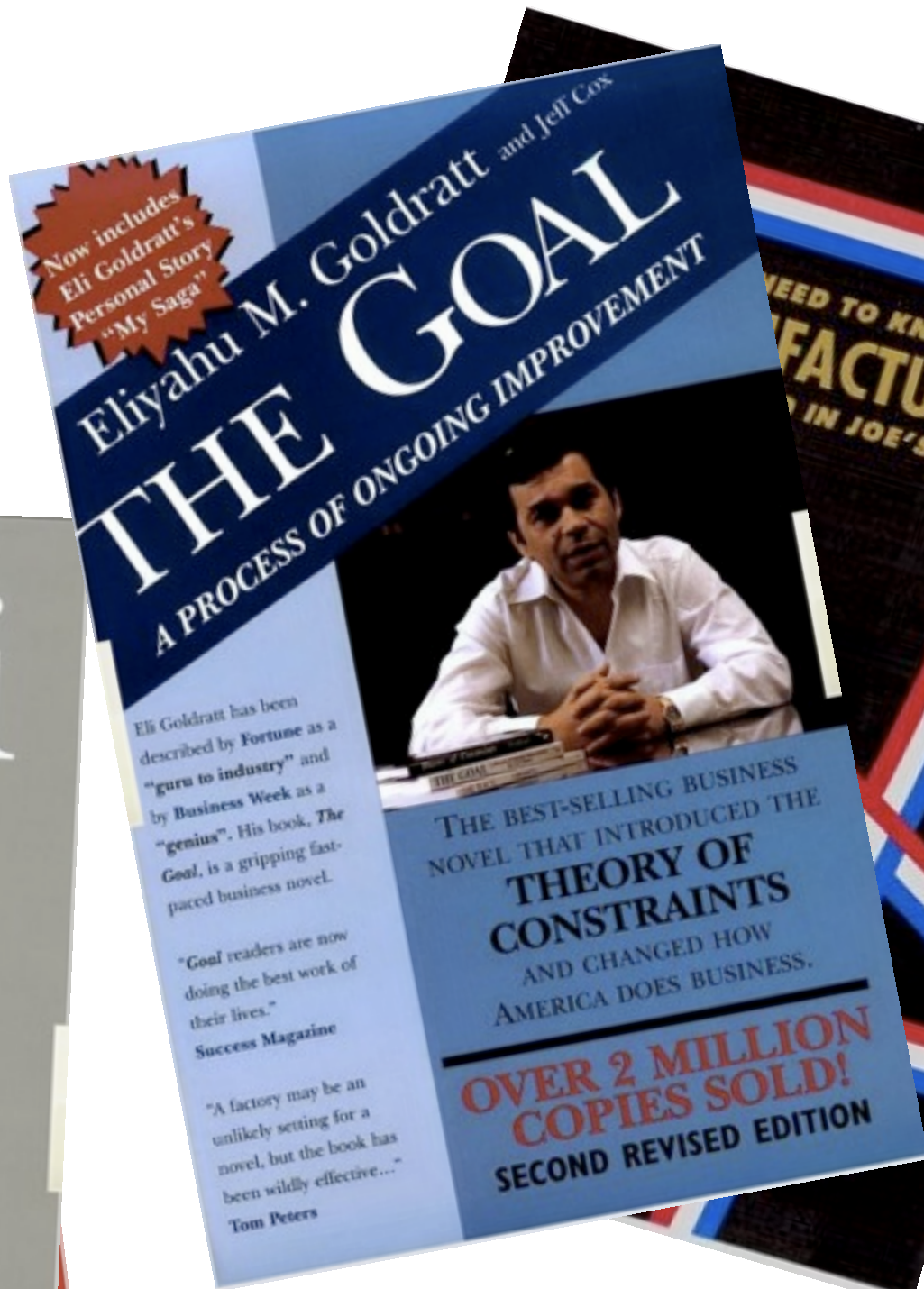
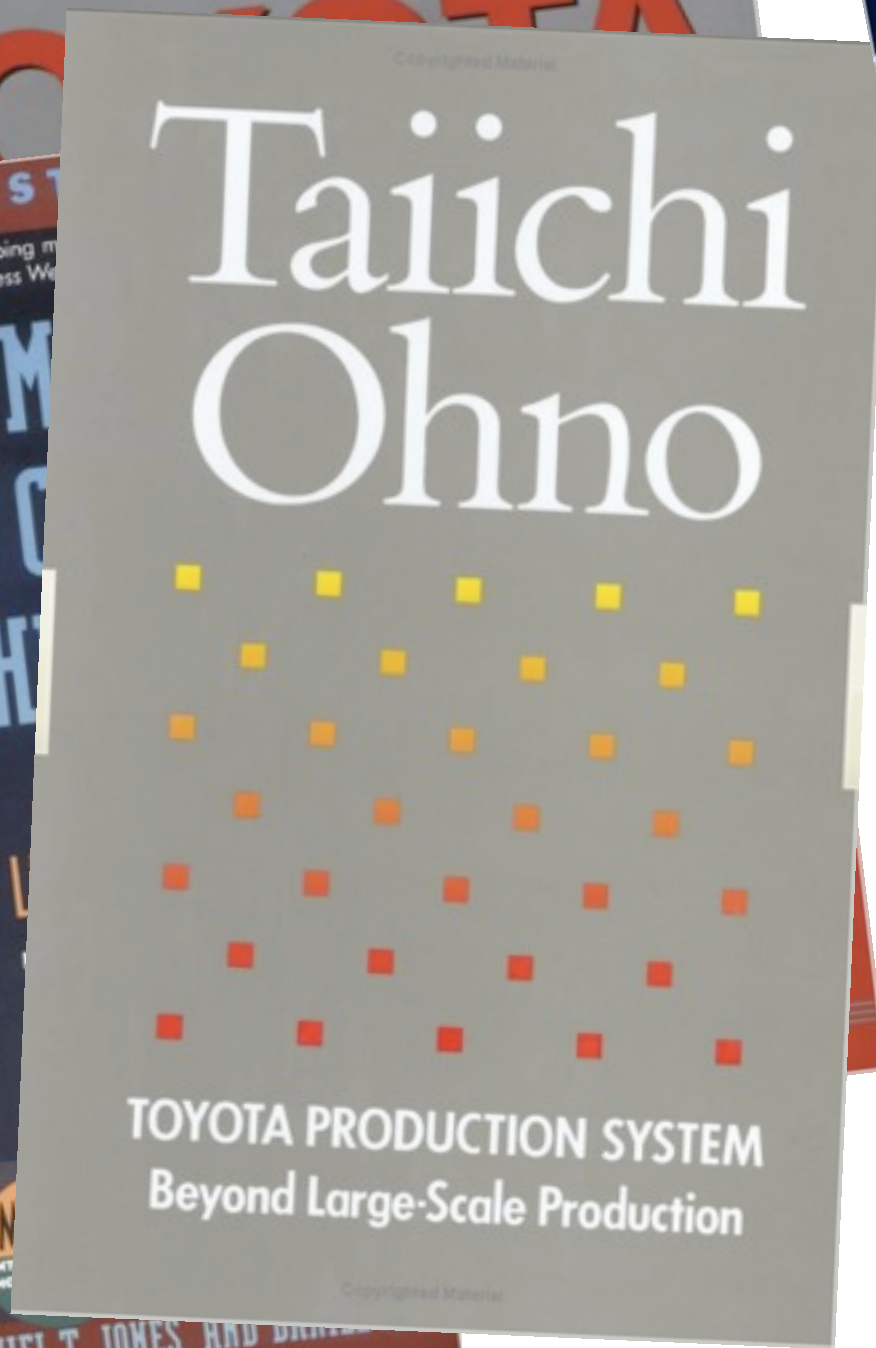
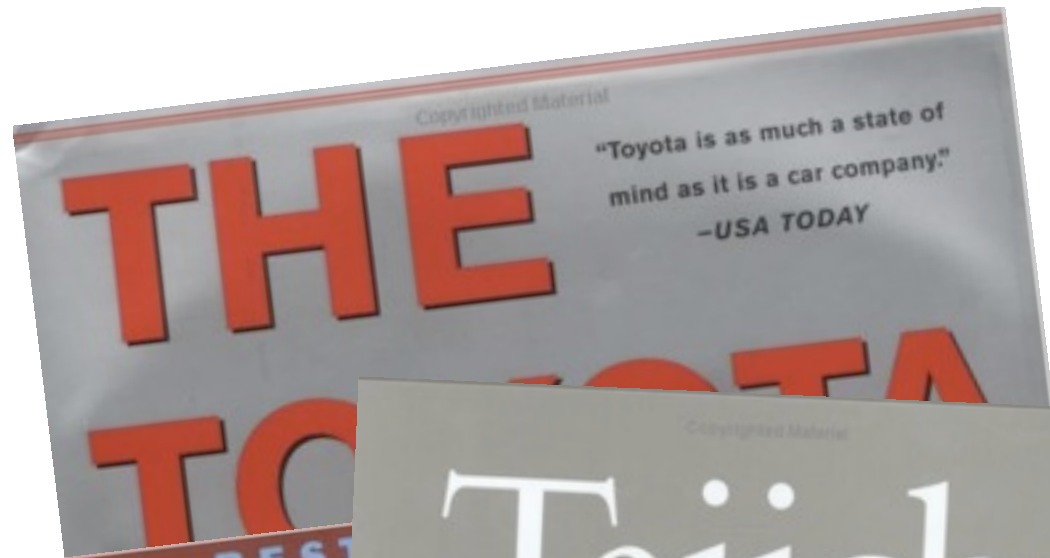




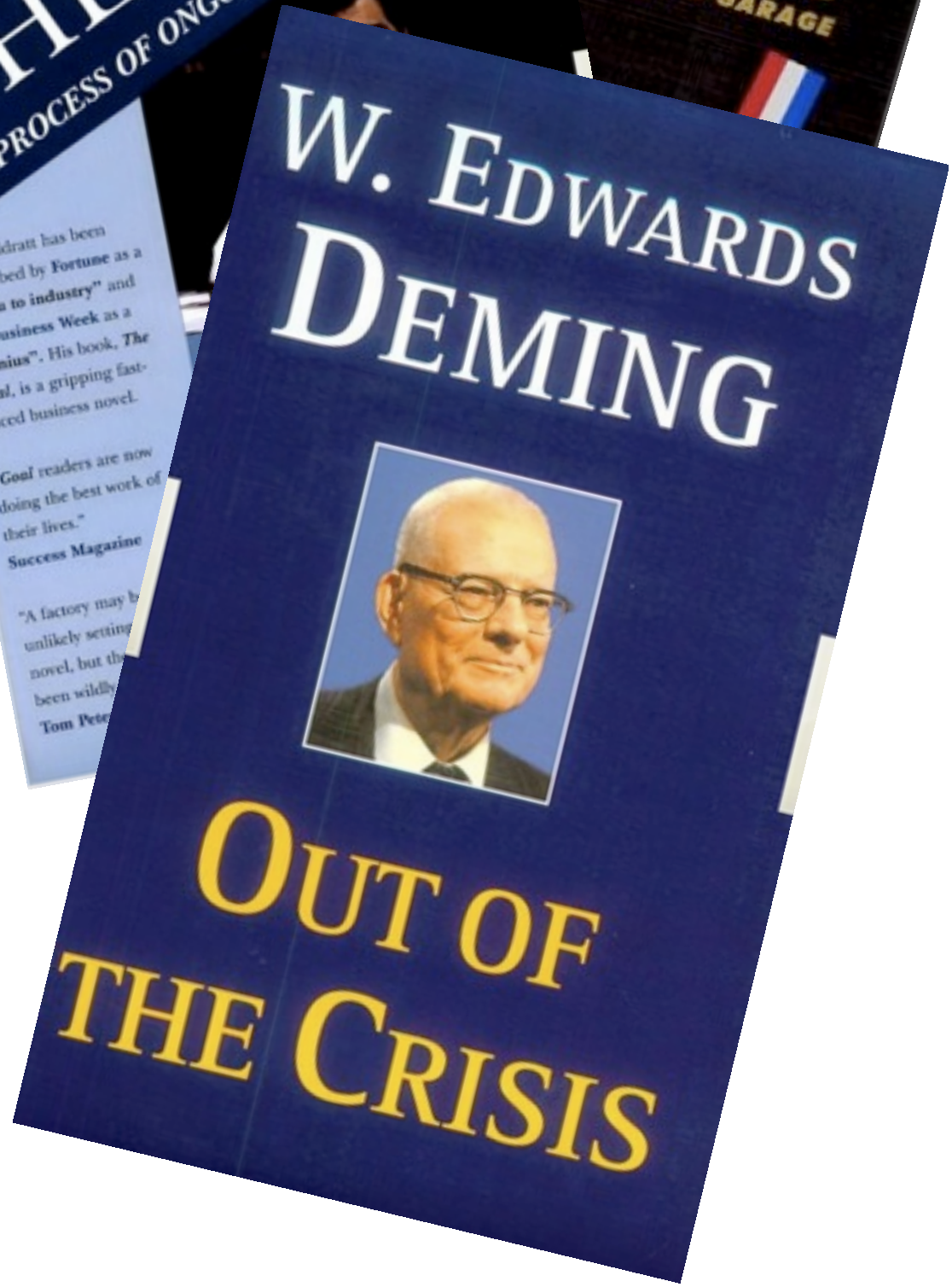
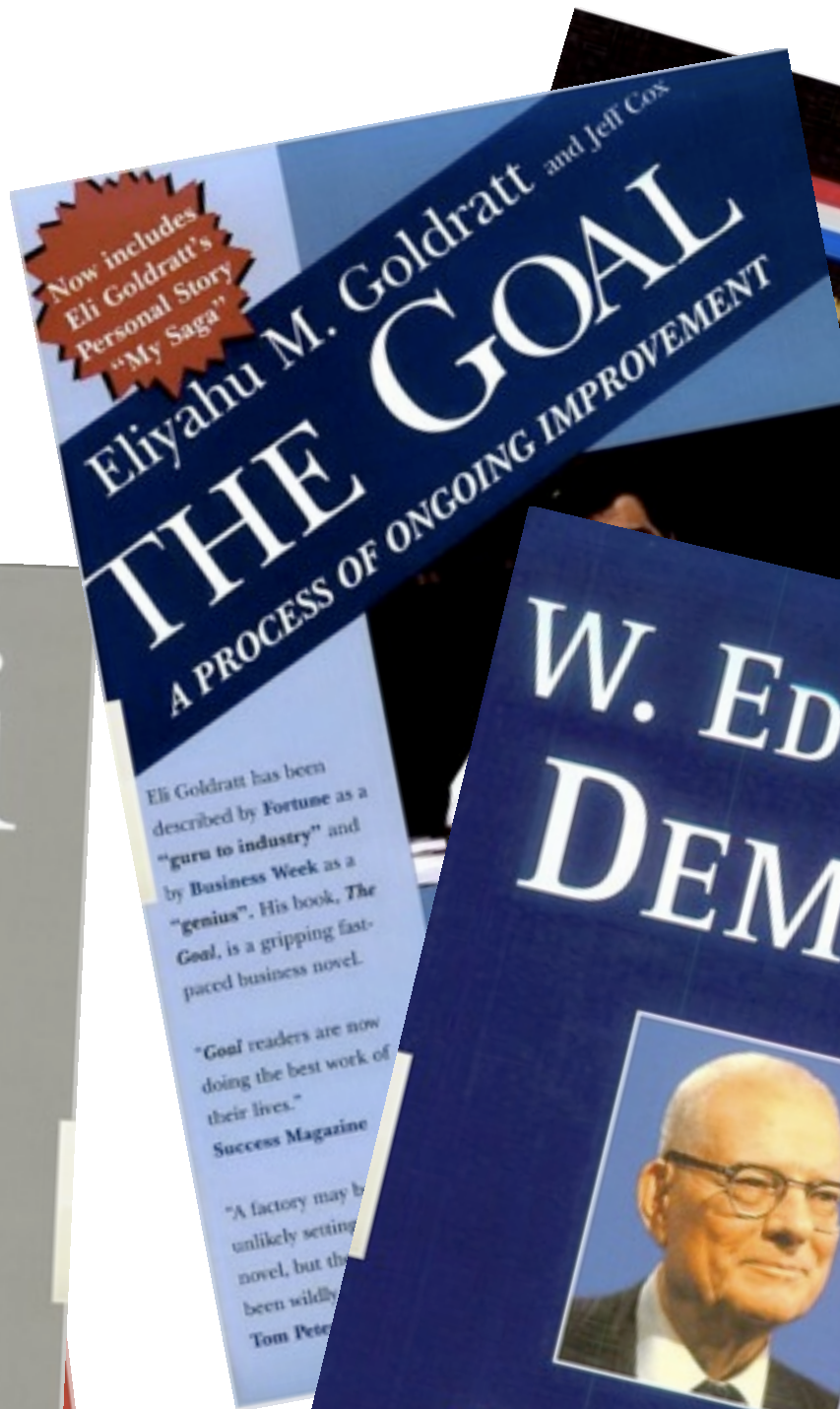
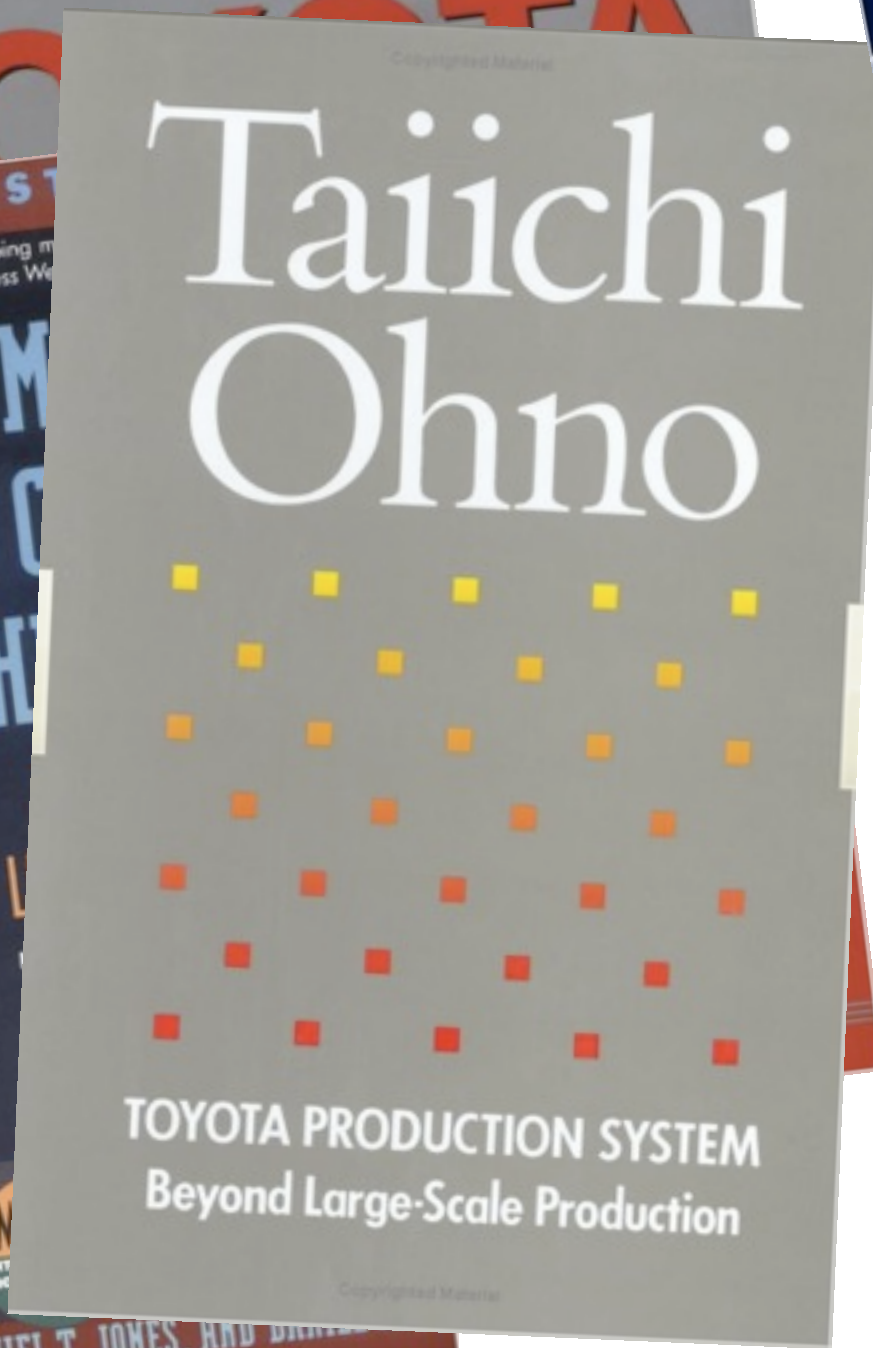
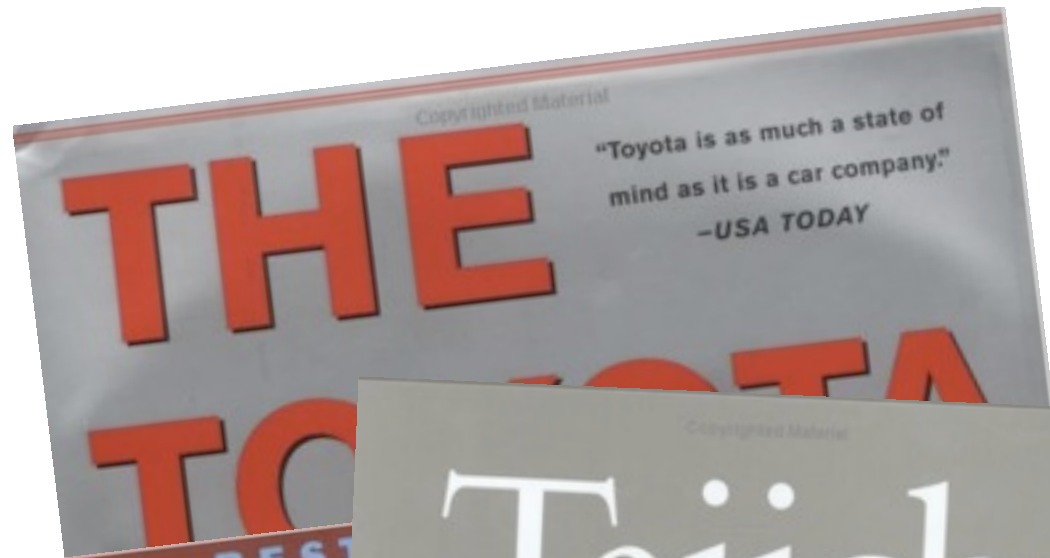




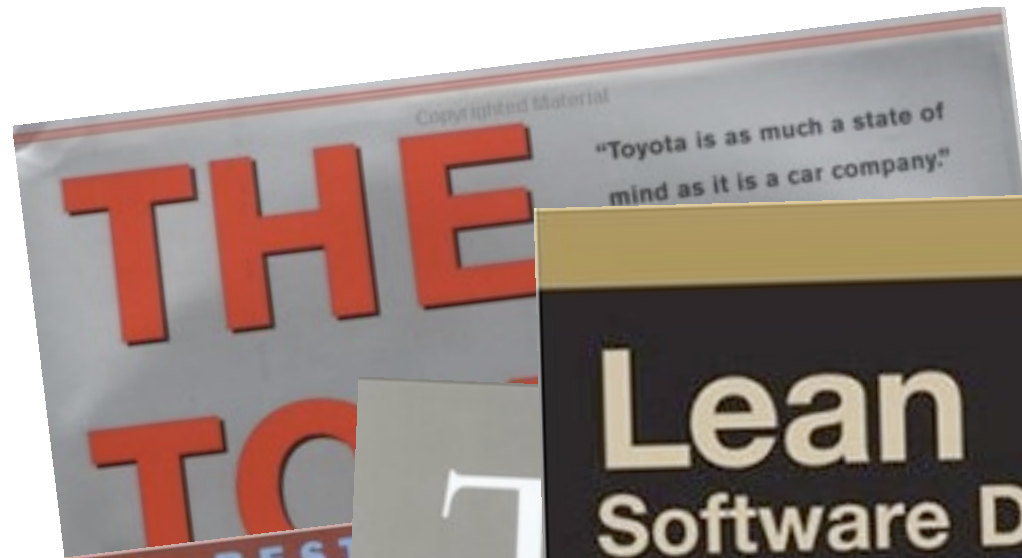












# Lean Software Development

## An Agile Toolkit

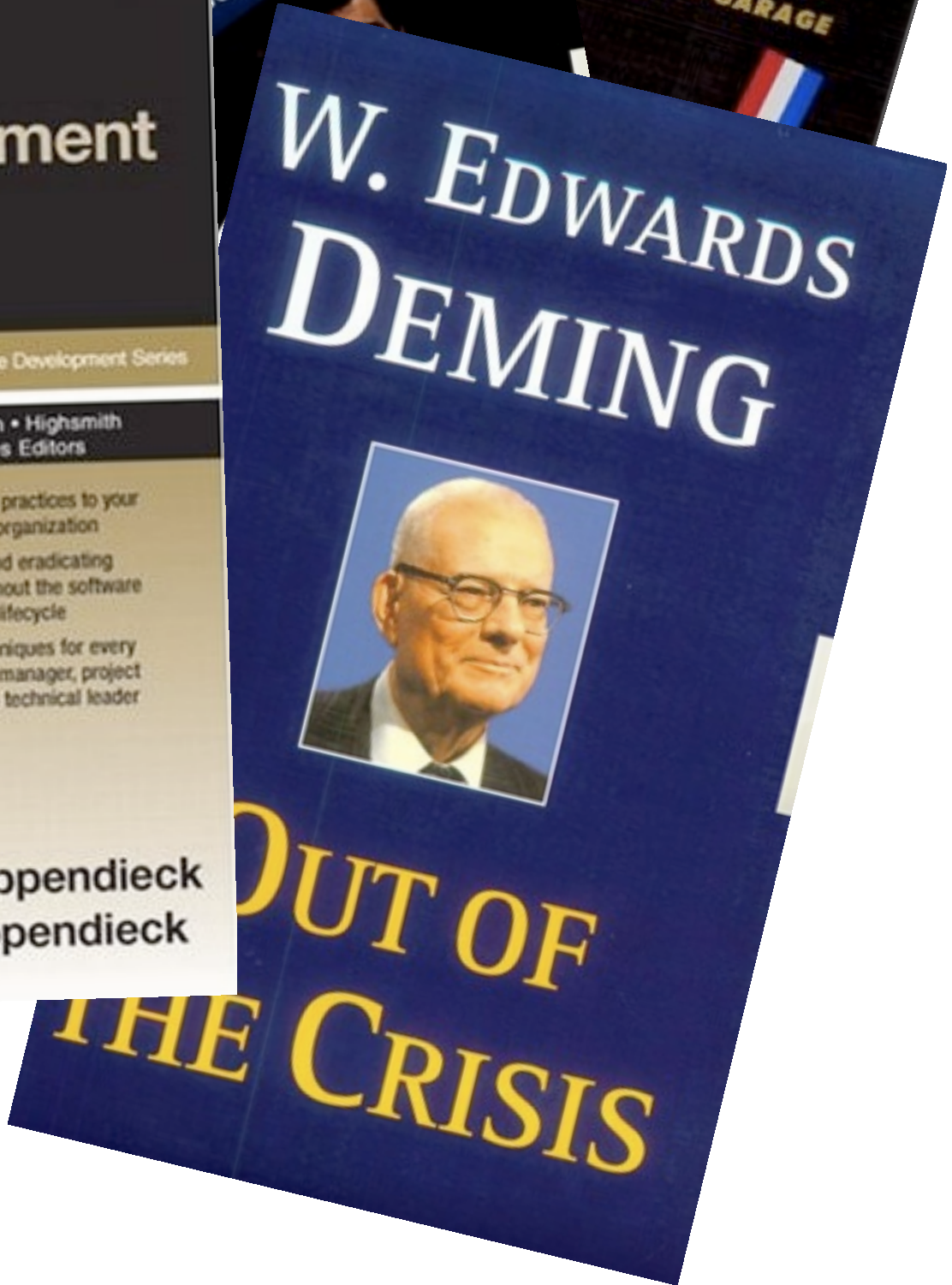
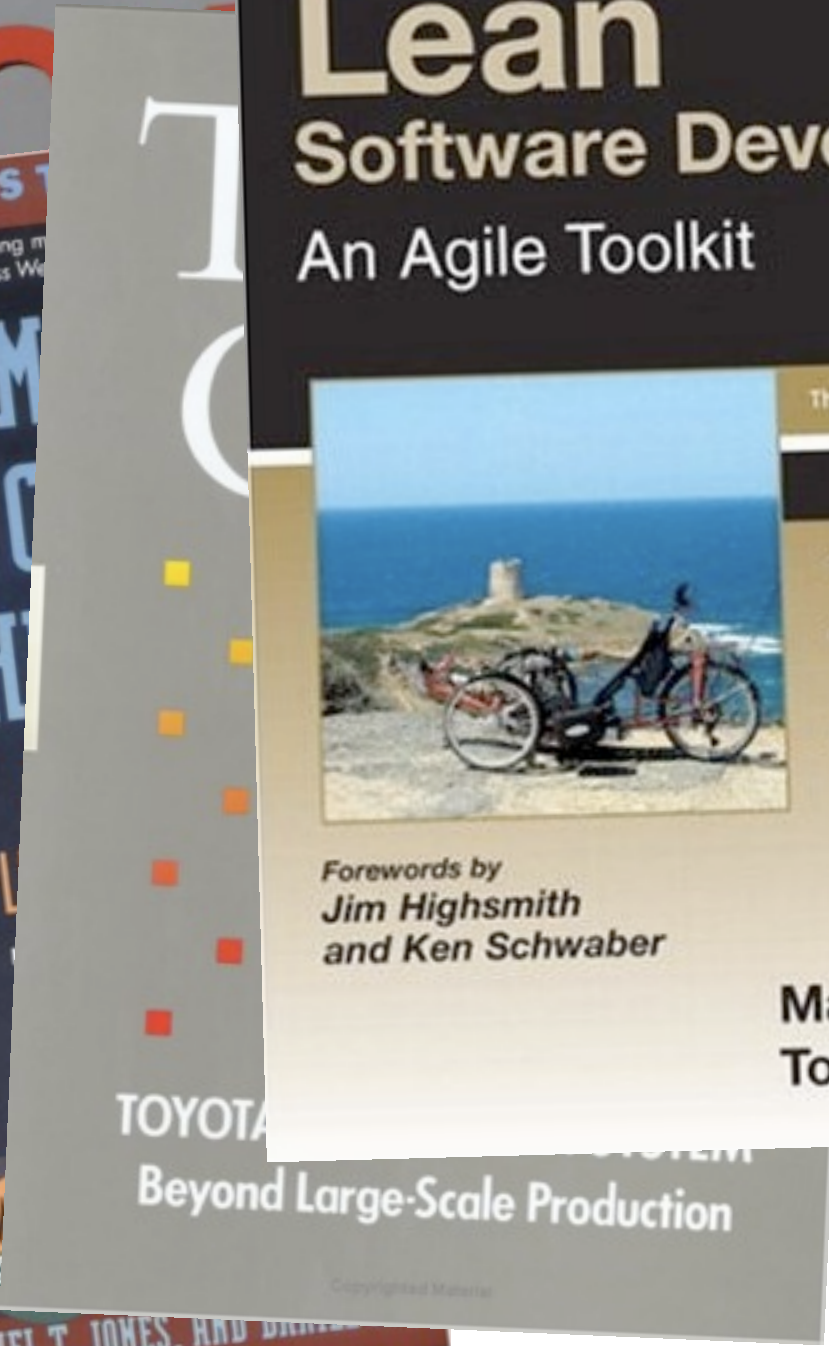
The Agile Software Development Series

Cockburn • Highsmith  
Series Editors

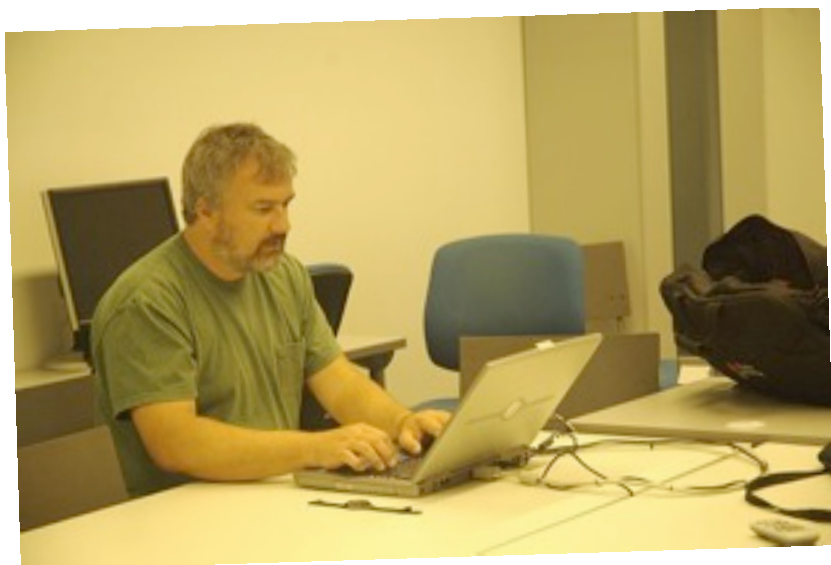
- Adapting agile practices to your development organization
- Uncovering and eradicating waste throughout the software development lifecycle
- Practical techniques for every development manager, project manager, and technical leader

Forewords by  
**Jim Highsmith**  
and **Ken Schwaber**

**Mary Poppendieck**  
**Tom Poppendieck**







“I have been working with software development groups all around the world, and you are way ahead of most.”

(a consultant visiting our R&D department)

# Development Principles





"Plans are nothing, planning is everything"

"Plans are nothing, planning is everything"



"Plans are nothing, planning is everything"



“Everyone has a plan 'till they get punched in the mouth.”



"Plans are nothing, planning is everything"



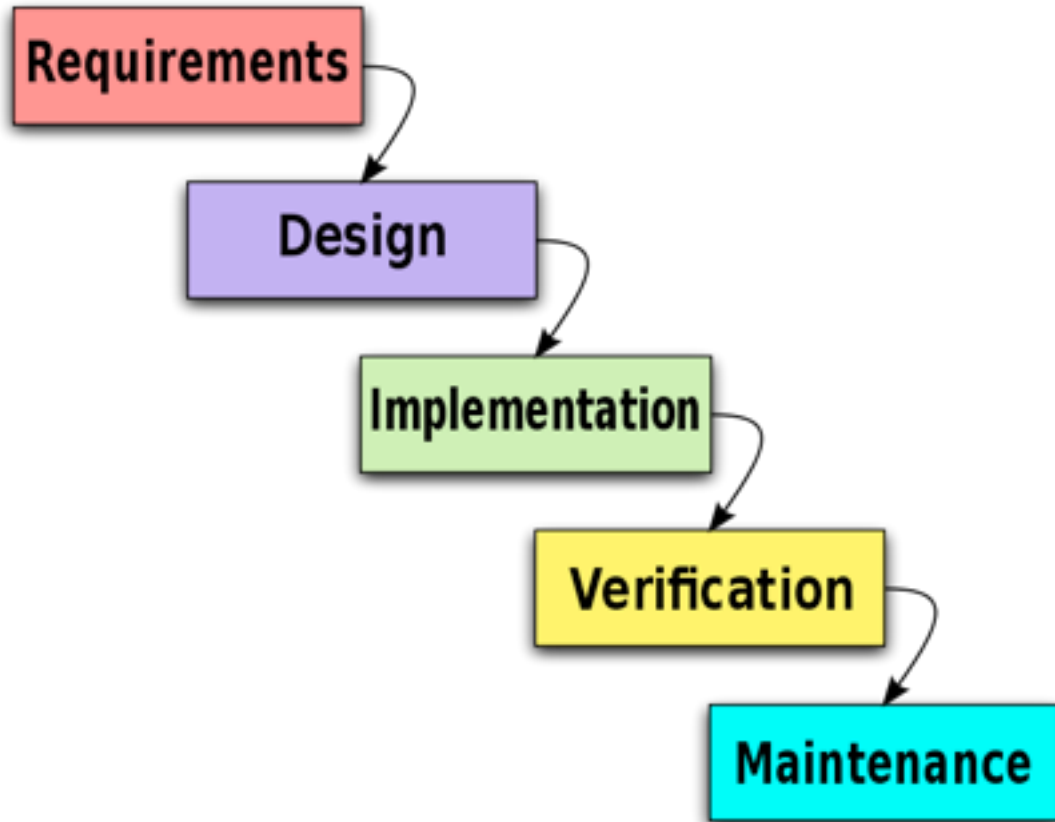
“Everyone has a plan 'till they get punched in the mouth.”

Mike Tyson



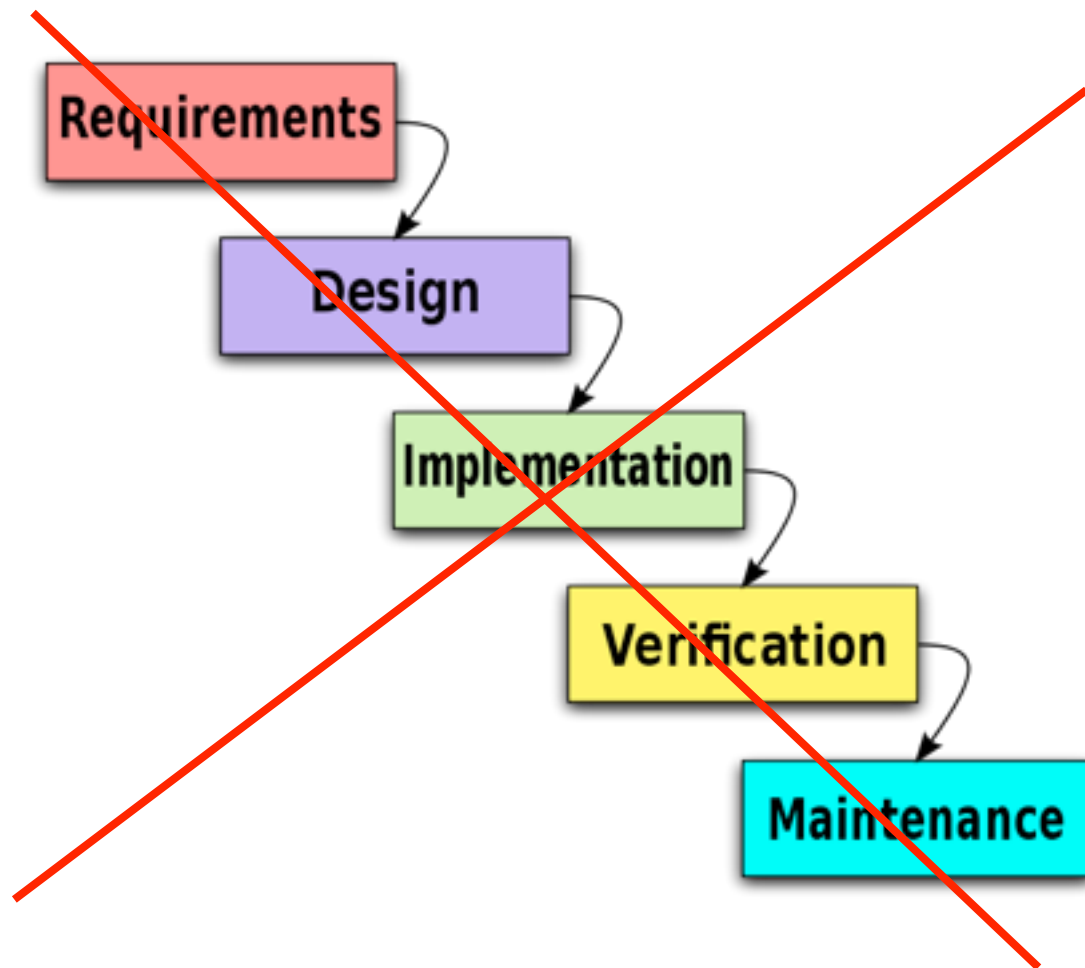
Let the project and teams own their methodology

Let the project and teams own their methodology

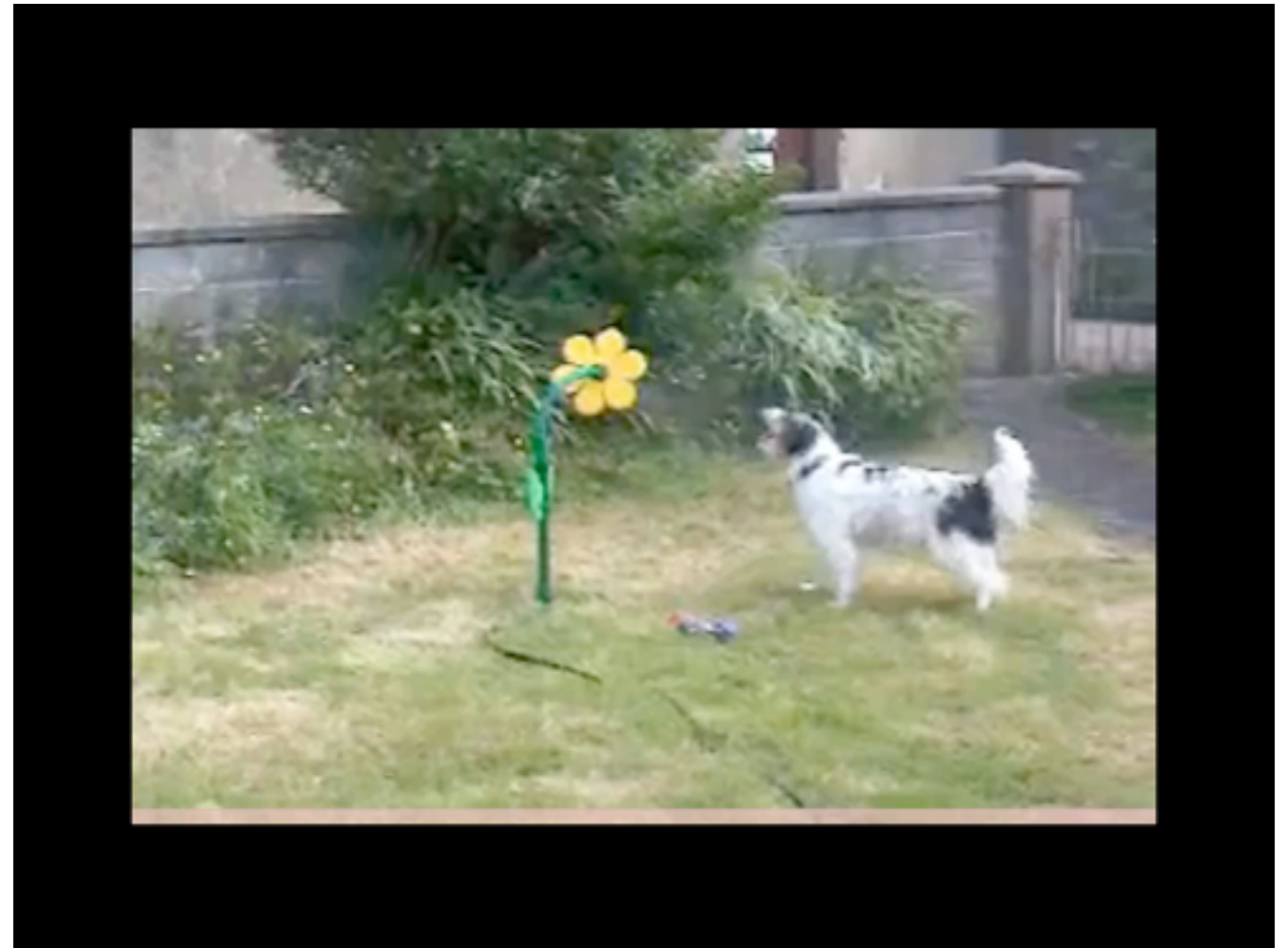
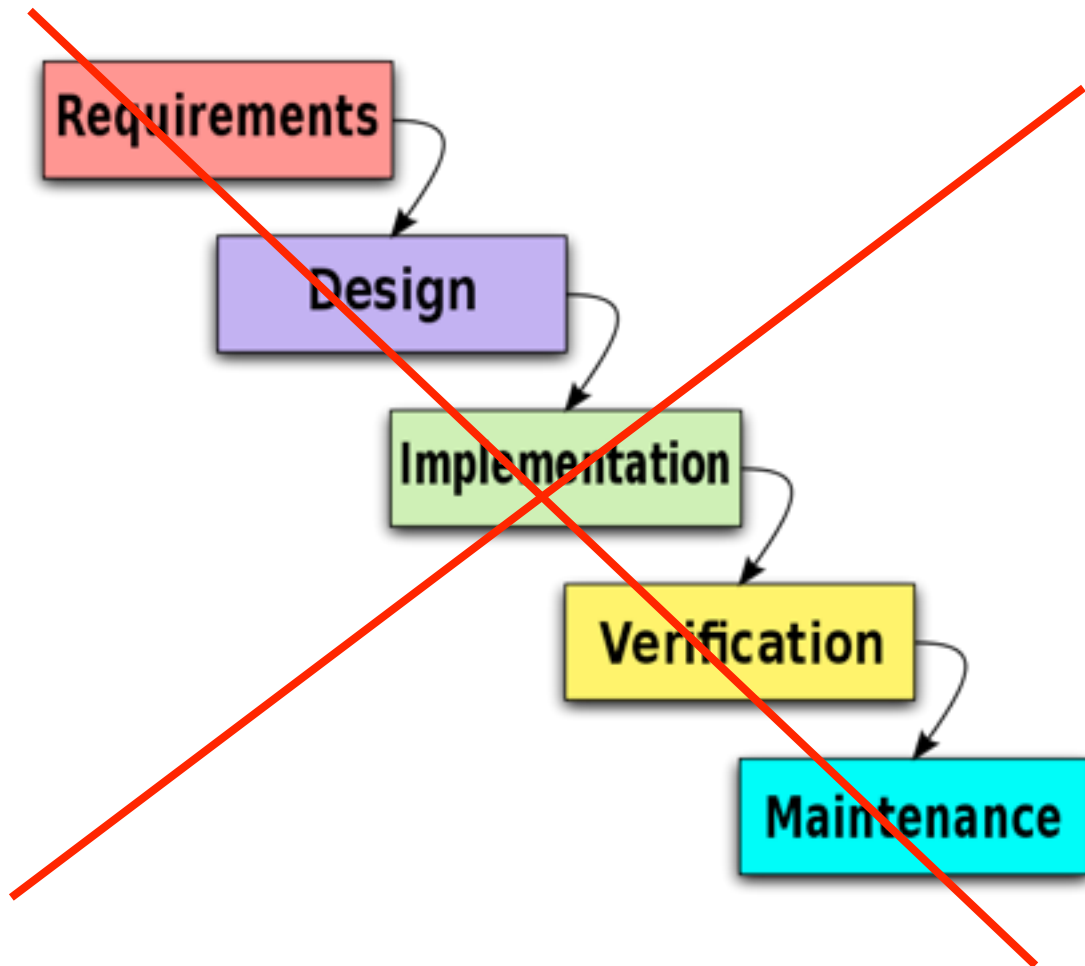




Let the project and teams own their methodology



Let the project and teams own their methodology





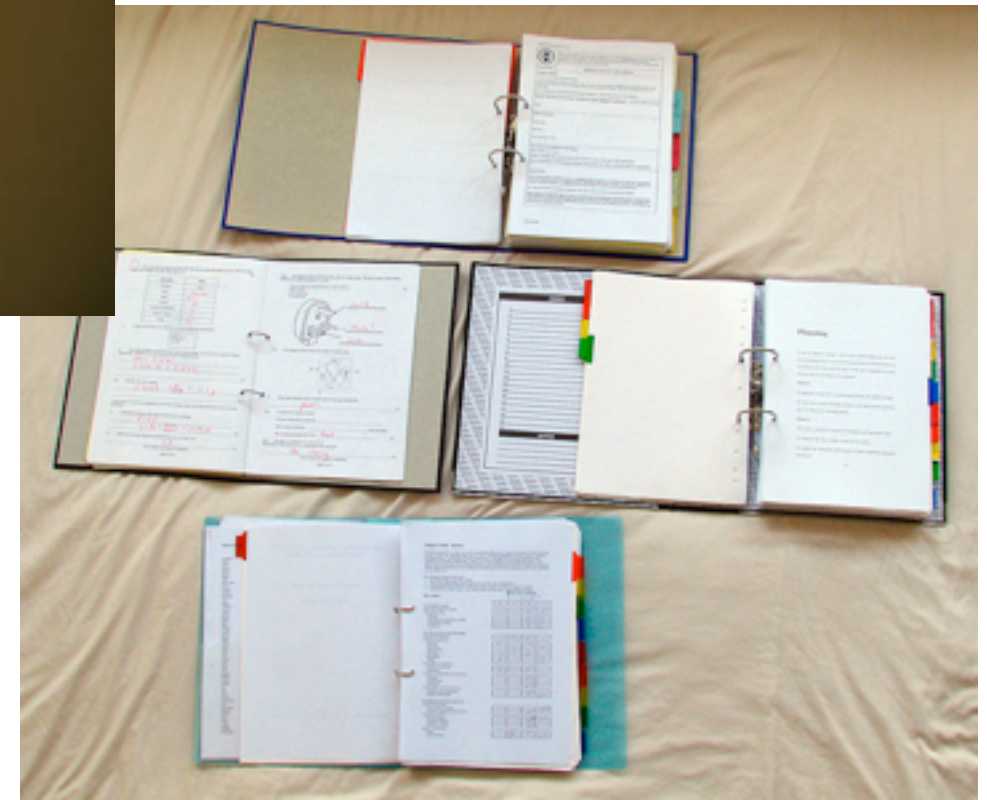
**Focus on communication, don't rely on documentation**

Focus on communication, don't rely on documentation

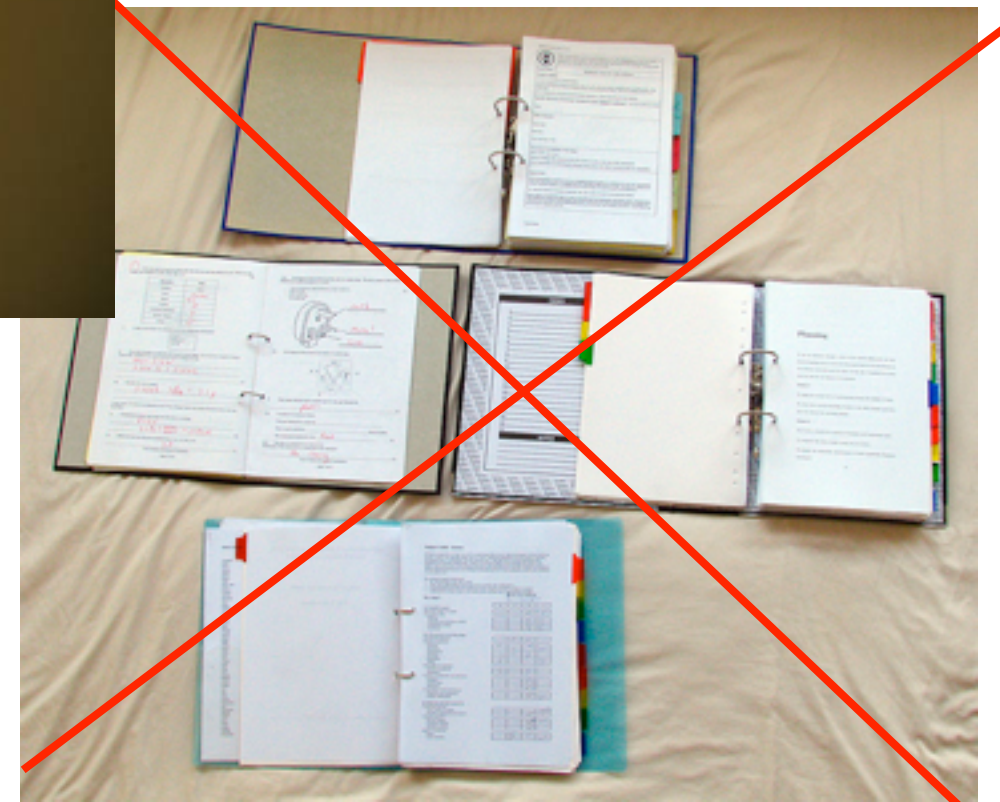




# Focus on communication, don't rely on documentation



# Focus on communication, don't rely on documentation







Treat engineers as professionals, not as resources

Treat engineers as professionals, not as resources



Treat engineers as professionals, not as resources





**Slack is essential!**



**Slack is essential!**





Focus on the whole product



# Focus on the whole product



# Focus on the whole product





Encourage failure



# Encourage failure



# Encourage failure





# Beware of the observer effect

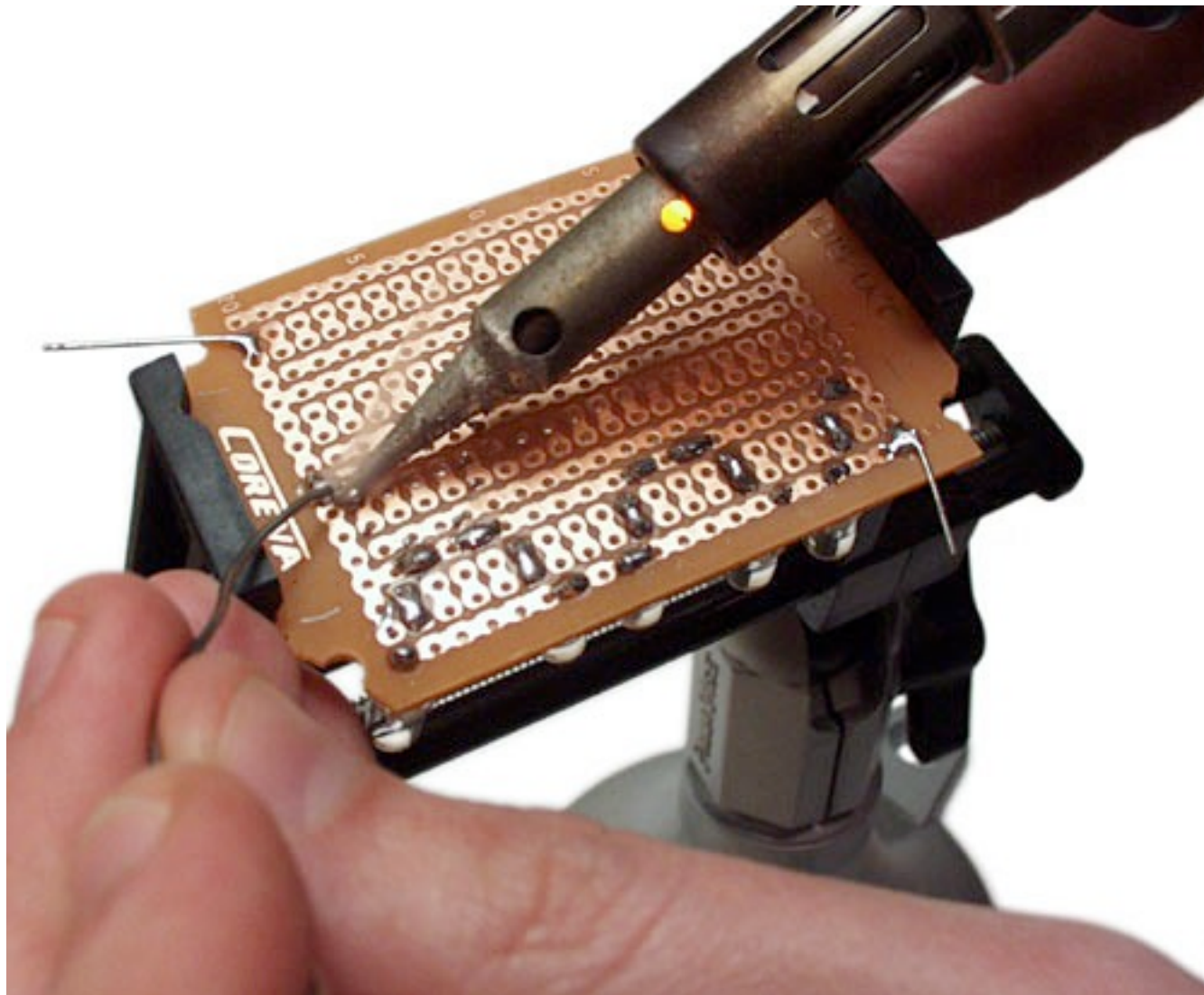




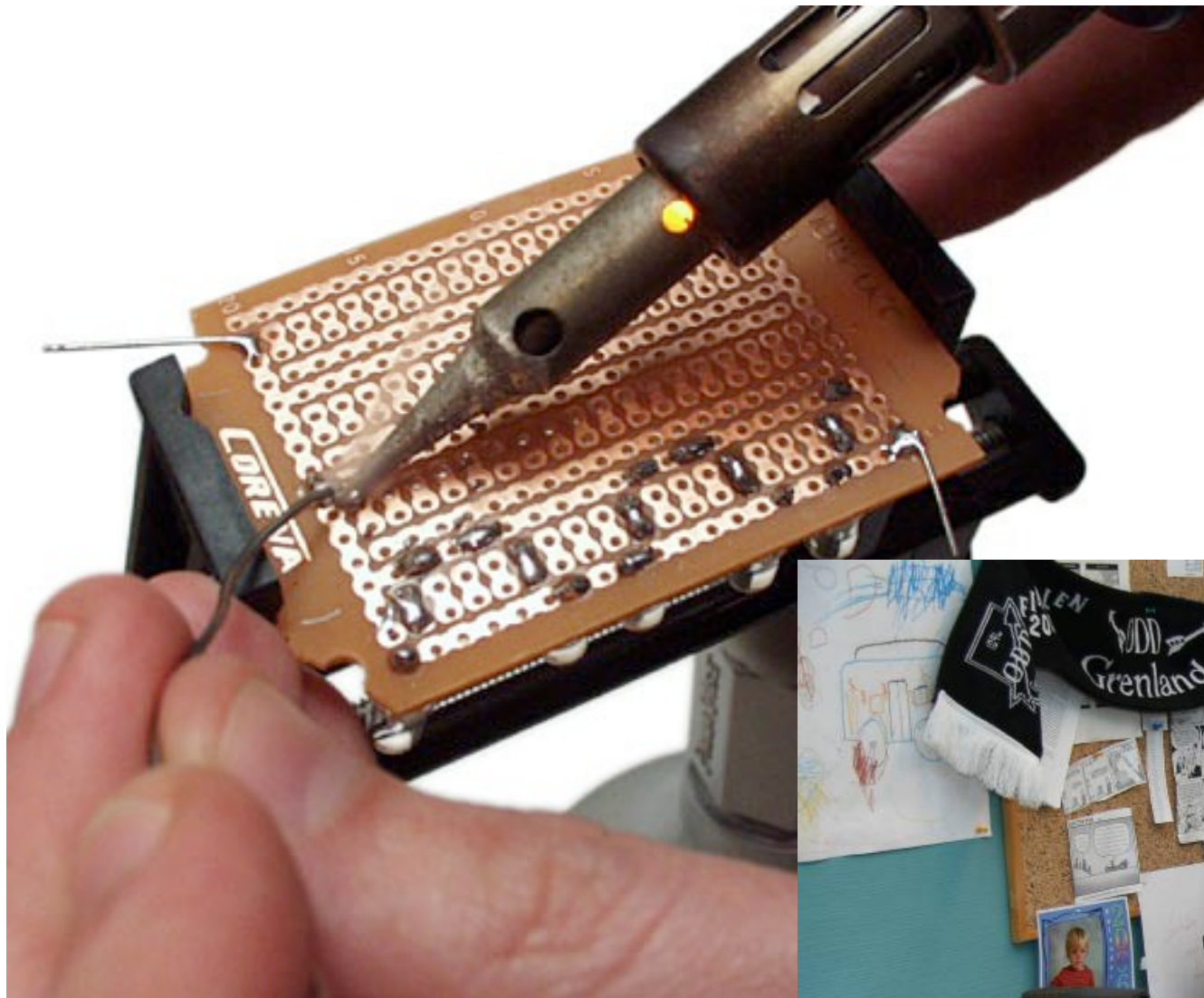


Respect the doers and create an autonomous organization

Respect the doers and create an autonomous organization



# Respect the doers and create an autonomous organization





Look for communication skills when hiring



Look for communication skills when hiring





Aim for approximately right rather than accurately wrong



Aim for approximately right rather than accurately wrong





Aim for approximately right rather than accurately wrong





Release early and release often



Release early and release often





Release early and release often





# Align innovation





# Align innovation



“Det kan du bare drite i”  
(no f&\*^\* way)



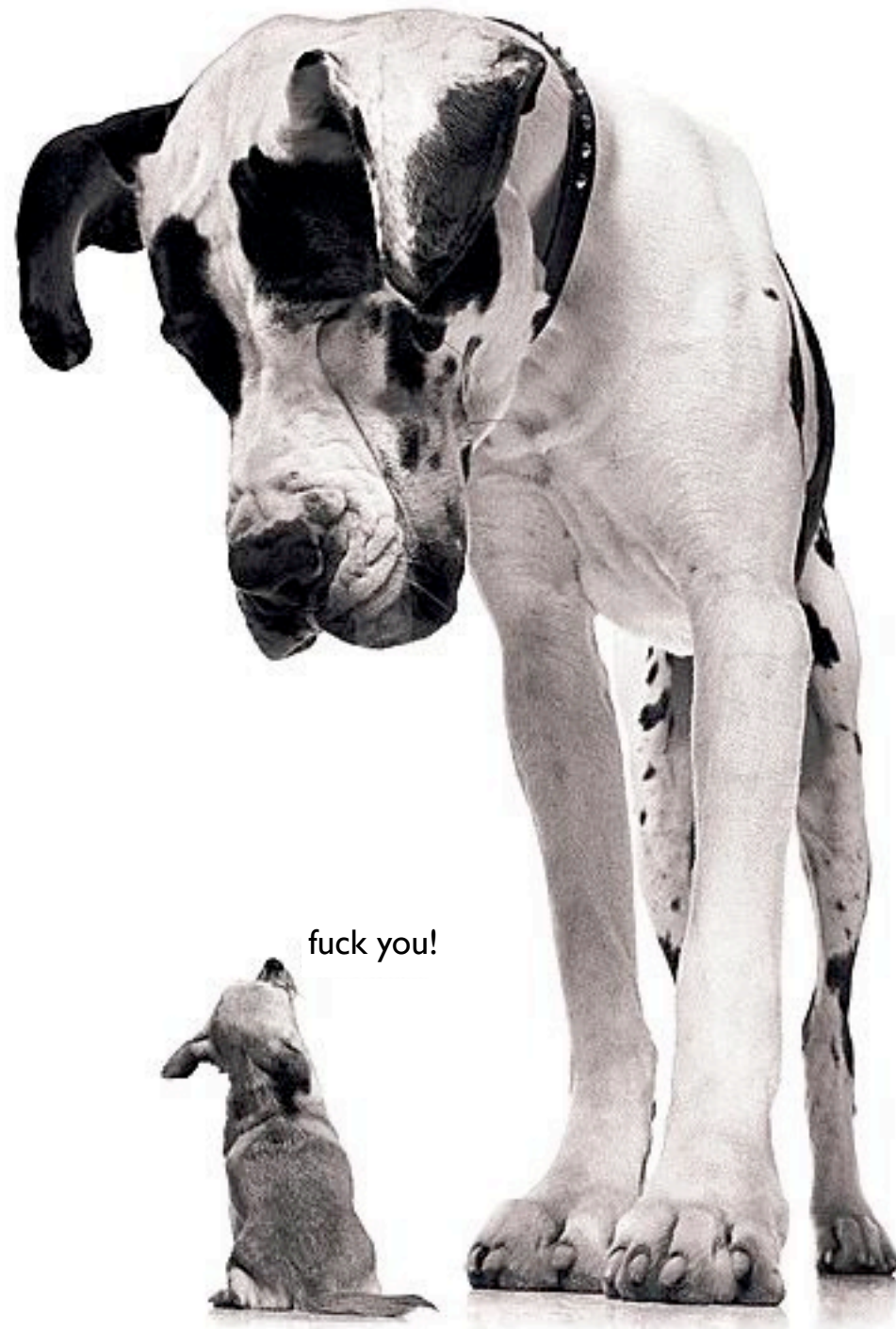
Per Haug Kogstad  
(arguably the most influential person and  
key driver behind TANDBERGs success.)

# Reward courage



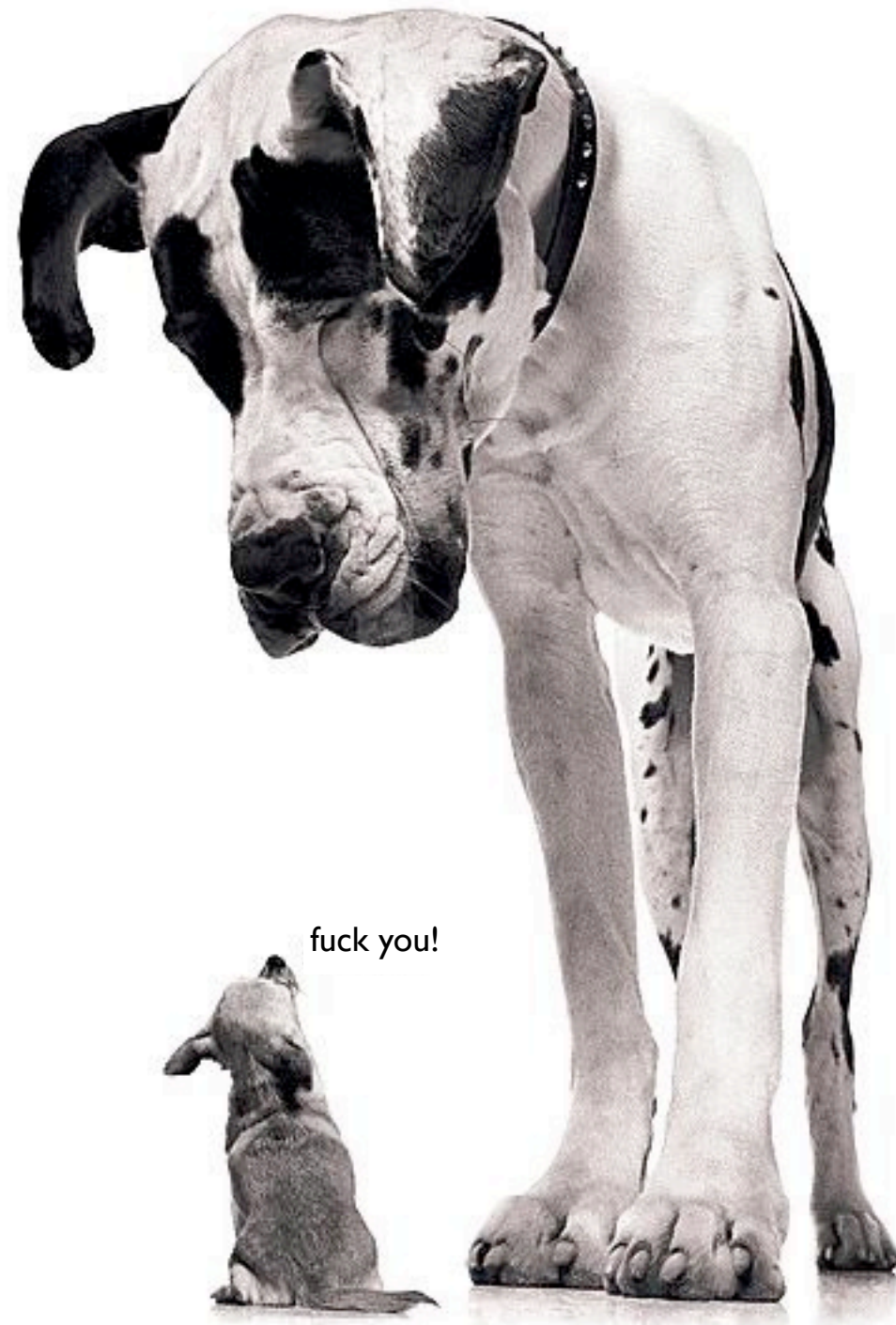


# Reward courage





# Reward courage



fuck you!

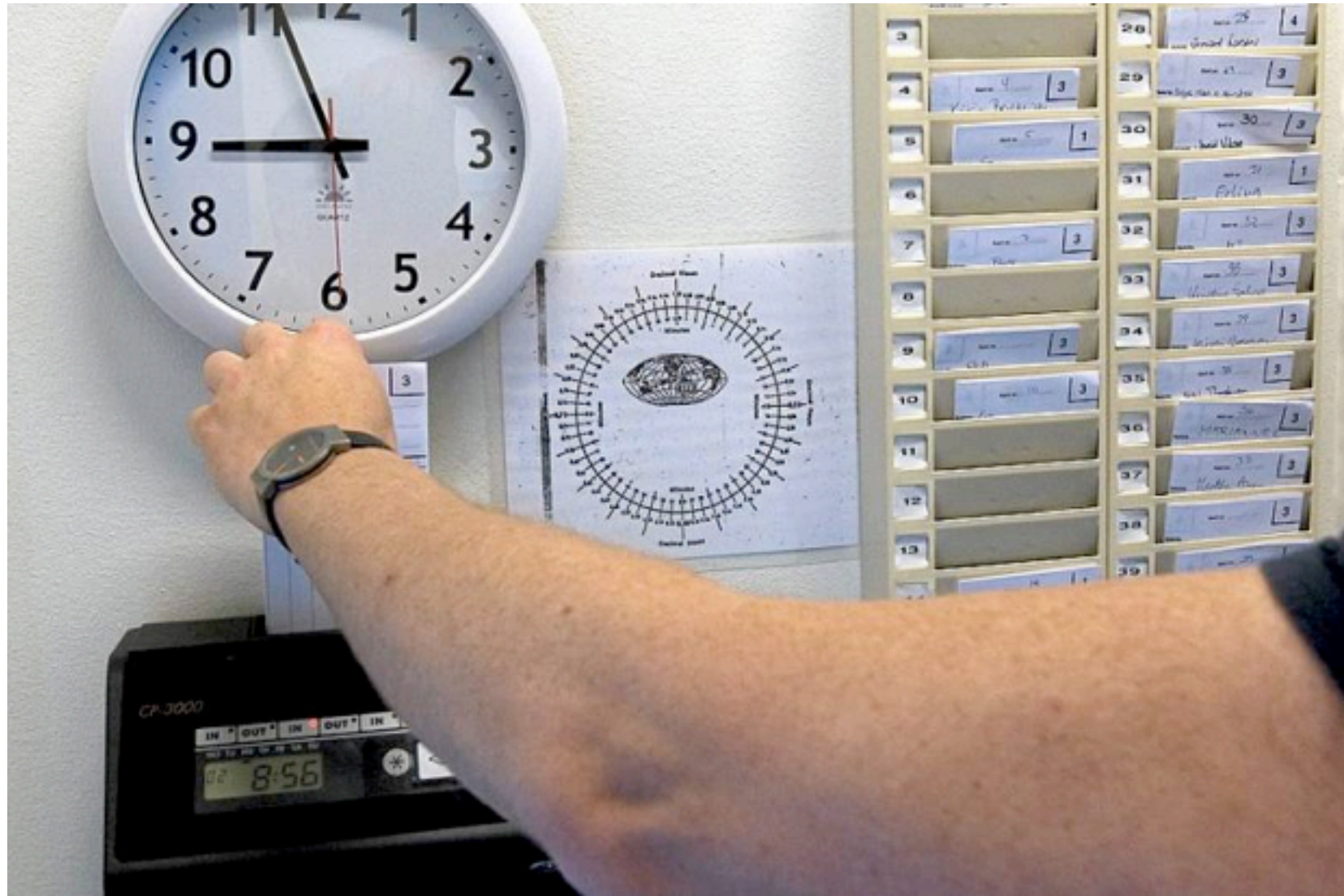
“Man **skal** bryte regler!”  
(you should break rules!)





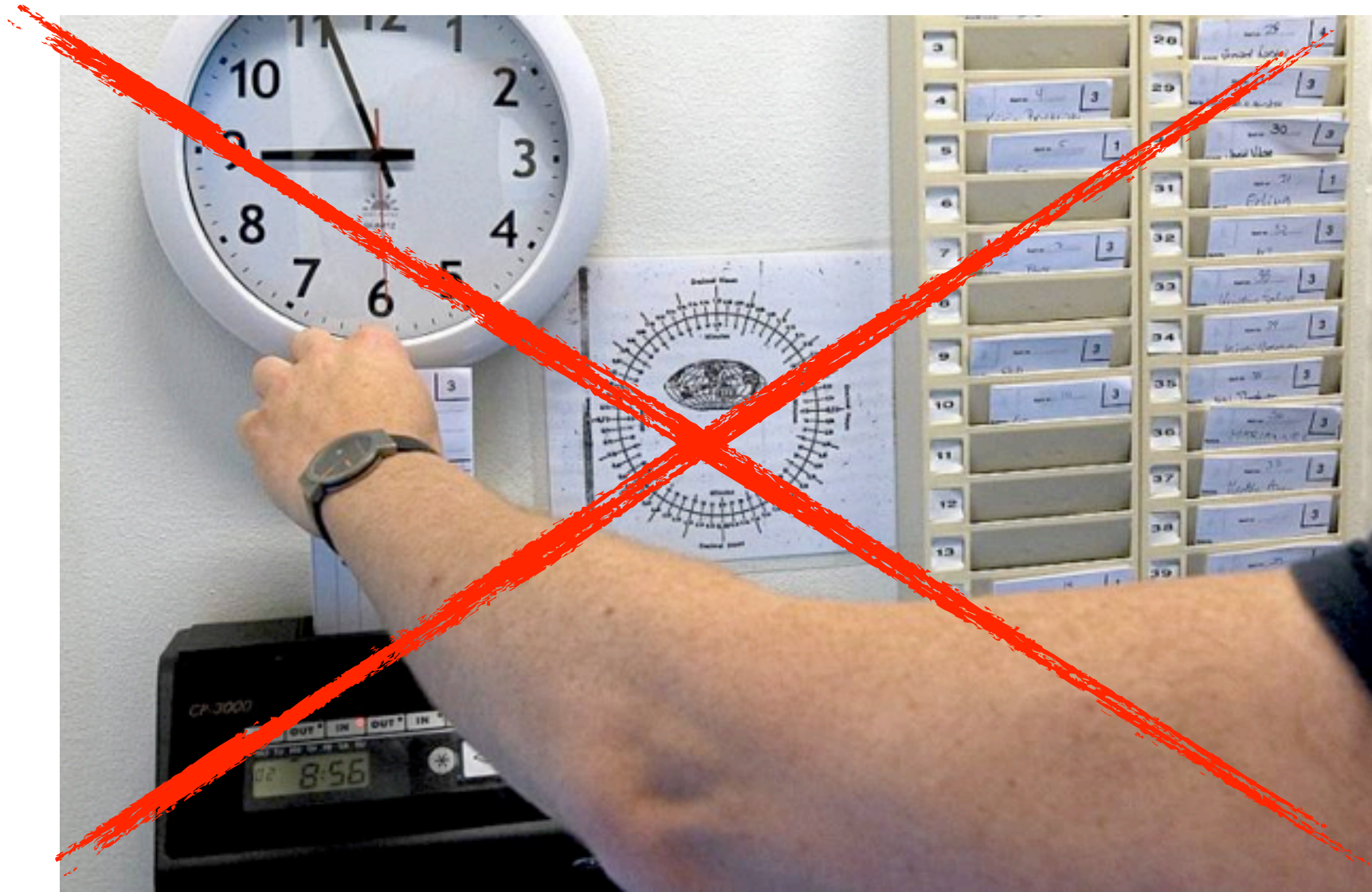
Trust your employees!

Trust your employees!



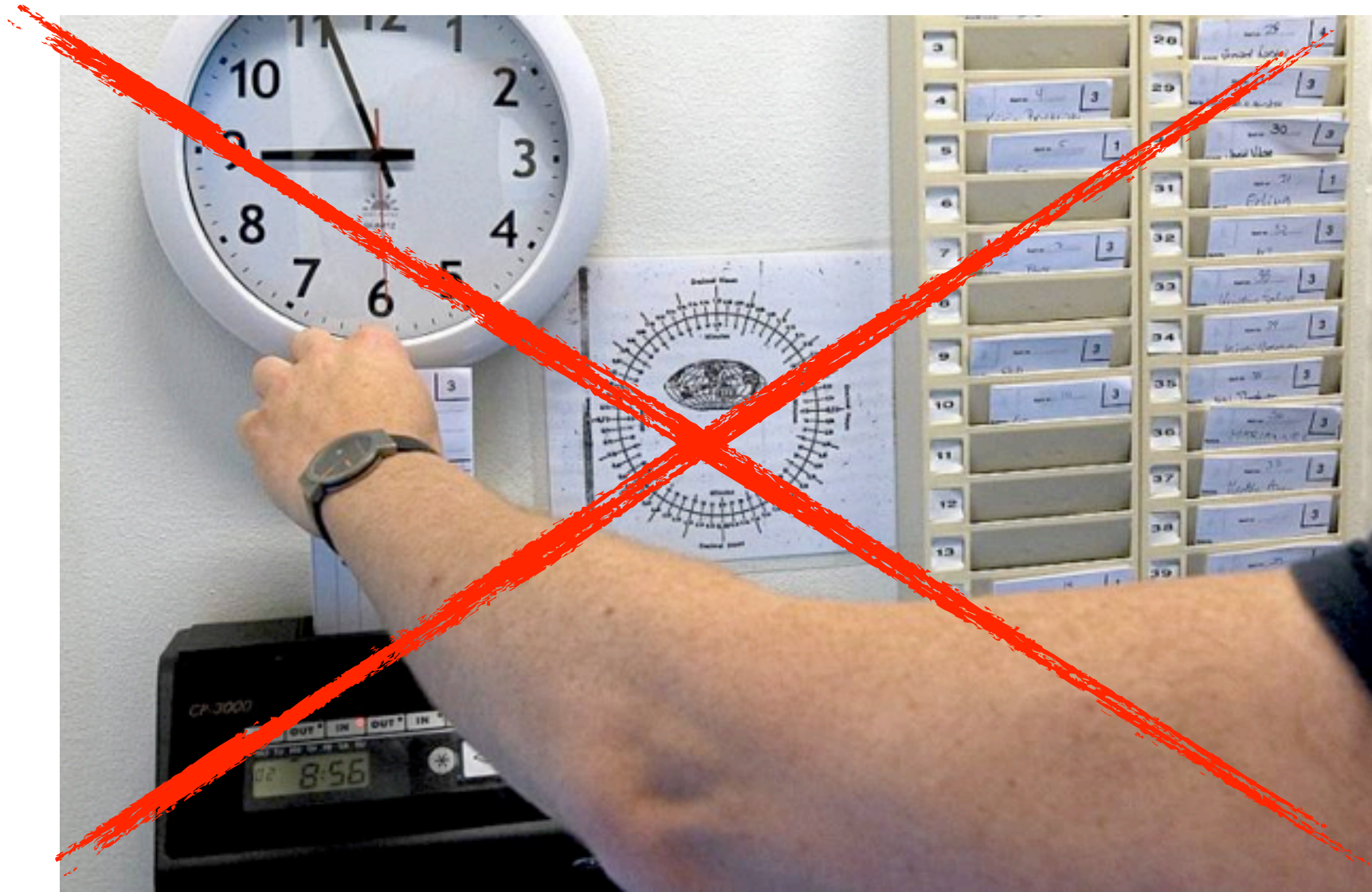


Trust your employees!





Trust your employees!



"What we don't do is treat our employees like they're all, you know, criminals,"

(Jenn Mann, SAS Institute)

# Principles for effective product development

- "Plans are nothing, planning is everything"
- Let the project and teams own their methodology
- Focus on communication, don't rely on documentation
- Treat engineers as professionals, not as resources
- Slack is essential
- Focus on the whole product
- Encourage failures
- Beware of the observer effect
- Respect the doers and create an autonomous organization
- Look for communication skills when hiring
- Aim for approximately right, rather than accurately wrong
- Release early and release often
- Align innovation
- Reward courage
- Trust your employees

# About Software Development



Few software projects are like running on a paved road where you can see the ...





... goal in the end of the road.

Most projects are more like...





**extreme orienteering**





in impossible terrain





with a group of people



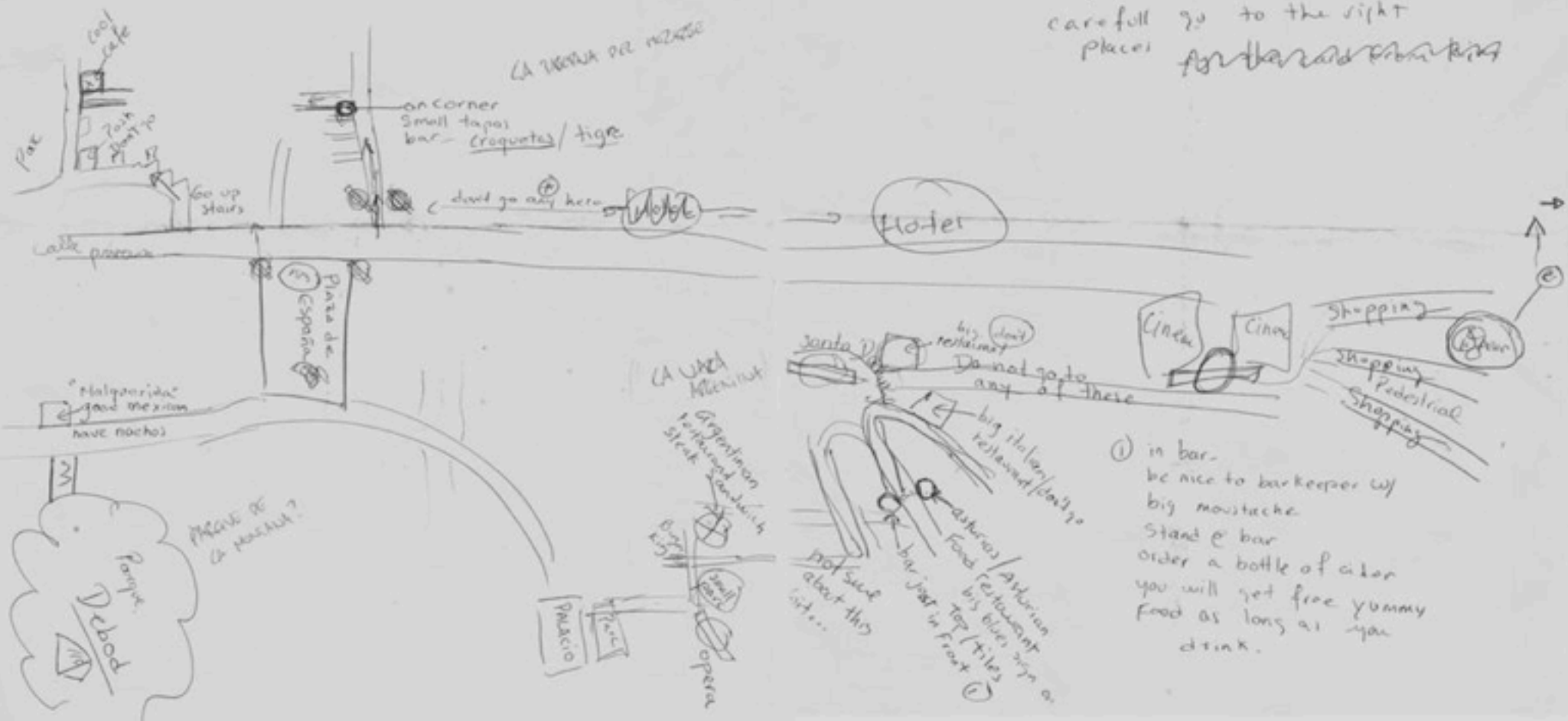
in the dark

ⓧ Exept Museo del Jamon = go there are many in the city if you want a "to go" sandwich, go there for a Jamon y queso with croissant!

ⓑ ↔

PLAZA del sol

ⓐ cross to the other side and go slightly left. there is a quarter ther all restaurant/tapas plac - FULL OF ENGLISH & AMERICANS so be carefull go to the right place! *for the road from park*



with only a sketchy map as guidance



You rush miracles, you get rotten miracles...

You rush miracles, you get rotten miracles...



Inigo: We need a miracle. It's very important.

You rush miracles, you get rotten miracles...



Inigo: We need a miracle. It's very important.



Inigo: We're in a terrible rush.

Miracle Max: Don't rush me, sonny.

You rush a miracle man, you get rotten miracles.



<http://www.youtube.com/watch?v=IoVWAAtAWat4E>

Inigo: I just hope it's enough to buy a miracle, that's all.

[Inigo knocks on the door. A face appears]

Inigo: Are you the Miracle Max who worked for the king all those years?

Inigo: We need a miracle. It's very important.

[after a while]

Inigo: Sir...sir??

Miracle Max: Huh?

Inigo: We're in a terrible rush.

Miracle Max: Don't rush me, sonny. You rush a miracle man, you get rotten miracles.



For any non-trivial project: Software development should be considered a continuous learning process and a cooperative game of communication between professionals. Effective software development can be achieved through frequently repeating cycles of preparing, changing, observing, reflecting, and learning.

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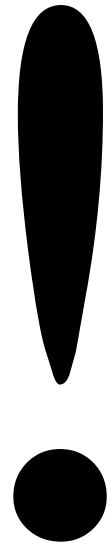
Problems in software development usually multiply and gets worse by exerting more control...



The more you tighten your grip, Tarkin, the more star systems will slip through your fingers.

(Princess Leia)







# Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it.  
Through this work we have come to value:

**Individuals and interactions** over processes and tools

**Working software** over comprehensive documentation

**Customer collaboration** over contract negotiation

**Responding to change** over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

Kent Beck  
Mike Beedle  
Arie van Bennekum  
Alistair Cockburn  
Ward Cunningham  
Martin Fowler

James Grenning  
Jim Highsmith  
Andrew Hunt  
Ron Jeffries  
Jon Kern  
Brian Marick

Robert C. Martin  
Steve Mellor  
Ken Schwaber  
Jeff Sutherland  
Dave Thomas



# The Seven Lean Principles of Software Development

- Eliminate Waste
- Amplify Learning
- Decide as Late as Possible
- Deliver as Fast as Possible
- Empower the Team
- Build Integrity In
- See The Whole

(Poppendieck, 2003)

## A subset of Systems Thinking by Deming:

- Cease dependence on inspection to achieve quality
- Move towards single suppliers and establish long-term relationships
- Drive out fear
- Break down barriers between departments
- Eliminate work standards
- Eliminate management by objective
- Remove barriers that rob people their right to pride of workmanship
- Institute a vigorous program of education and self-improvement

“Jeg var arbeidsløs og startet med en tom ølkasse” (Jan Christian Opsahl)

74

1000 Å LIT

# Gutteklubbens ugreie



SOLVEIG HAAVIK

MØTER JAN CHRISTIAN OPSAHL

**H**an er 95 prosent goni og fem prosent dritsekk. Andre pløke omvendt. Men denne hyperaktive, flåkjefta avart av en styrerleder skal sannsynligvis ha storparten av æren for at Tandberg og Tomra er de to norske teknologisektorene som gjør det aller best internasjonalt.

Og overarbeidende styreformann Jan Christian Opsahl raver omkring og leiser med fjærne, stolt og kry som en hane. For de siste månedene har interessen for Tandbergs videokonferansesystem svunget seg stilig foran og høyere mot svindende slaver, Tandberg-aksjen har på ny og på ny nådd all time high, og bare hva Aftenposten skriver!

Om «Q-free, en interessant nykommer på børs, ikke minst fordi selskapet satser internasjonalt på en norsk oppfinnelse. Det er ikke utenkelig at dette kan bli en ny Tomra eller Tandberg». Og de to - Tomra og Tandberg - har altså jeg skapt!

Han gliser og struter, spunkulerer rundt skrivebordet og viser frem storskjermen sin. Herfra kan han videokonferansere og se sine ansatte i kvitavet, sannet hvor de befinner seg i verden.

«Skjønner du at vi skal bli rike, eller? Det gliser og spraker bak brilleglassene. «At dere kommer til å bli stort, begynner jo verden endelig å skjønne. Men det har altså tatt meg 14 år. Og det har vært tungt. Folk mente jo at jeg var idiot da jeg begynte i Tandberg. Og husker du for noen år siden, da en berømt megler - jeg skal ikke nevne navn...»

*Jan Peder Sissener:*  
- Ja. Han sa at vi skulle gå konkurs.  
- Ajaja. Og da du ble ansatt i Tandberg, i 1988, fikk aksjene i været med 500 prosent. Men de har jo vært en smule rykkelige nderveis, da.

**Da var jeg hot, da. Jeg ble jo unemployed, ikke sant? Ingen kunne jo ansette den dritsekken, Jan, de ville ikke ta i meg med ildtang.**

- Jo da, men du ser jo fæsten, så ikke prøv deg!  
Han sender et elstet sideblikk og trekker triumferende frem en plakat fra en eller annen finansinstitusjon som gratulerer Tandberg med en vekst på 30159 prosent.

- Klarer du å regne så mange prosent, eller? Det viser seg jo at vi har vokst dobbelt så mye som Nokia de siste ti årene.  
- Og Morten Sandbye i Børsrevyler vider kaller Tandberg for Nordens nye teknologiseksser etter Nokia.

- Ja, ikke sant? Men når jeg ser sløt, da får jeg nesten prestasjonsangst. Det er fryktelig krevende, for da kommer alle forventningene. Det er sløt som holder deg våken ningen. Det er sløt som dynamikken i denne nettsene. For det er dynamikken i dette. For et er jo riktig som du sier, vi fikk selvfølgelig en stor smell i Australia i 1993-94...

*Der var vel da Jan Peder Sissener spidde konkurrer?*

- Ja. Og han sa at det ikke var et spørsmål om vi skulle gå konkurs, bare om når.

*Har du møtt Sissener igjen nå, etter at karsen begynte å gå rett til vær?*

- Ja, jeg var faktisk i en hyggelig middag hos Orkla Enskilda for noen uker siden. Da fikk jeg en fantastisk god flaske rødvin som jeg gladet meg over i pløken. Den fikk jeg av Jan Peder. Så du kan godt si at vi har skværet opp og har stor gjensidig respekt. Men det tok lang tid...

*Stor gitter og store smørbrøst, vet du, som det heter på fagsprøket. Han har...*

Jan Christian Opsahl knegger. Han har i likhet med Jan Peder Sissener - aldri vært kjent for å pakke ordene inn i bomull eller gå særlig stille i dørene.

Best kjent for å slenge med leppa ble han i 1988. Det var da han - etter tre år hos Erling Lorentzen i Brasil og lyskarriere til Dymo, Usinor og Tomra - ble headhunnet til Aker for å være visekonsernefjer under daværende konsernefjer Gerhard Heiberg. Fem uker etter tiltredelsen sa Opsahl takk for seg med følgende kraftfulle i dagspressen:

«Jeg fungerer ikke under Gerhard Heiberg. Ledelsesfilosofien i Aker er at sjefen tar alle beslutninger i all sin visdom. Deretter utfører slaverne ordre.»

Dagen derpå haglet fy telefonene. Slik gjorde man bare ikke. Tenk å innrømme offentlig at man ikke passer inn og atpilt være utaknemlig nok til å kritisere det bestående.

Gutteklubben Gei fikk bakoverveis. Headhunsterne smelte dørene igjen. Men det kom da noe godt ut av det: Investor Tharald

Brevig boket umiddelbart tak i overleperen og fikk ham til å bygge opp Tandberg.

- Akkurat det er jo historien Tharald etsker å fortelle, sier Jan Opsahl bredt.

- For da var jeg hot, da. Jeg ble jo unemployed, ikke sant? Ingen kunne ta i meg med ildtang.

Men Tharald tenkte: flott! For da fikk han tak i en finnk kar til en billig penge. Og så lo alle. For Tandberg var jo bare en påsebod på den tiden. Og Opsahl, han som liksom skulle være så veldig finnk, han ska' jo drive et konsern. Og så tenkte folk at dette var nok bare en overgangsordning.

Men jeg hadde bestemt meg, jeg. Dette skulle jeg få til. Og så har det jo gått bra og så da.

Han velter seg bakover i skinnstolen, folder hendene bak i nakken.

*Hvis Kjell Inge Røkke hadde vært i Aker den gangen, hadde du holdt ut lengre da?*

- Hvens skulle ha vært sjefen? Han eller jeg? kommer det lynrapt og gliset stikker seg fra øve til øve.

Han er ikke blitt særlig mer beskjeden med årene, Jan Opsahl. Bare mye rikere. Og litt mer integrert i klubben. For det er lov å slenge litt mer med leppa nå. Særlig hvis det har han. Han har til og med begynt å spille golf - selv om han synes det er dødkjædelig, det går jo allfor tregt. Og så har han skaffet seg digert videokonferansesystem og fine telefonlinjer på hytta i Stavens, og villa i Holmenkollen.

*Du har kanskje hørt at jeg har kjøpt meg en liten hytte i Nordmarka?*

*Du mener Tveenge-villaen til 25 millioner kroner?*

- 21 millioner, takk!

*Er du flytter inn?*

- Ja visst. Omtrent samme dagen. Det er litt festlig historie det der. Vi hadde jo et hyggelig gammelt hus ved Parkdammen hvor vi har bodd i 20 år. Og hadde egentlig ingen planer om å flytte. Men da sønnen vår dro til Dallas for å studere, ville vi pusse opp huset. Ingen store byggeprosjekter, men noe måtte rives og bygges opp igjen. Men det var omrives og bygges visting på alt, da vi ikke truet 42 ukers visting på alt, da kjøper jeg huset. Og etter et år så hadde jeg bestemt det, altså. Og etter et år så hadde jeg kommet på hundre tusen kroner og var ikke kommet på flekken. Og plutselig en dag treffer jeg Øystein Tveenge som sier at han skal selge Øystein Tveenge som sier at han skal selge huset. Og da tenkte jeg, fæen, da kjøper jeg huset. Så sat jeg der da, med et halvveis nedbødet. Så sat jeg der da, med et halvveis nedbødet. Så sat jeg der da, med et halvveis nedbødet. Så sat jeg der da, med et halvveis nedbødet.



FOTO: ESPEN RØST S.



# “Jeg var arbeidsløs og startet med en tom ølkasse” (Jan Christian Opsahl)

«Jeg fungerte ikke under Gerhard Heiberg. Ledelsesfilosofien i Aker er at sjefen tar alle beslutninger i all sin visdom. Deretter utfører slavene ordre.»

«Vi vingler fra grøftekant til grøftekant, og når vi så beslutter, har vi en så jævlig fart at vi treffer med 180 km i timen. Men da er vi også fremme før de andre har startet.»

«Hvis vi leverer 100 prosent kvalitet, så går vi konkurs. Vi må gå inn for 99,99 prosent, det er omtrent hva vi har råd til. Den siste 0,1 prosenten blir rett og slett for dyr. I elektronikk må det være rom for feilmargin.»



ØKONOMISK RAPPORT

18. April 2002

FOTO: ESPEN RØST S.



“Jeg var arbeidsløs og startet med en tom ølkasse” (Jan Christian Opsahl)

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**AUTONOMY**

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**MOMENTUM**

«Hvis vi leverer 100 prosent kvalitet, så går vi konkurs. Vi må gå inn for 99,99 prosent, det er omtrent hva vi har råd til. Den siste 0,1 prosenten blir rett og slett for dyr. I elektronikk må det være rom for feilmargin.»

**APPROXIMATELY RIGHT**



ØKONOMISK  
RAPPORT

18. April 2002

# Systems thinking vs Reductionism

(aka, Demingism vs Taylorism)

**Systems thinking** is the process of understanding how things influence one another within a whole

**Reductionism** is a philosophical position that a complex system is nothing but the sum of its parts, and that an account of it can be reduced to accounts of individual constituents.

**Systems thinking** is the process of understanding how things influence one another within a whole



TopSpeed

**Reductionism** is a philosophical position that a complex system is nothing but the sum of its parts, and that an account of it can be reduced to accounts of individual constituents.

