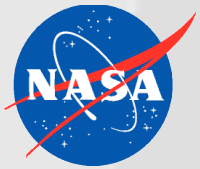
Concurrent Design: Increased innovation, creativity, quality, and efficiency, through all project phases



Presented
by
Dr. Knut I. Øxnevad
Founder and CEO
SIMTANO™

at
the
the "Undervannsoperasjoner 2008" Conference
under
Section
"Prosjekter som kommer"

StatoilHydro

Haugesund, Norway
August 6-7, 2008

SIMTANO™
BRINGING CONCURRENT DESIGN DOWN TO EARTH

Vdeo: http://www2.jpl.nasa.gov/videos/phoenix/phx20070924/phx20070924-480.mov; Image:Courtesy StatoilHydro

Systems: Larger and More Complex

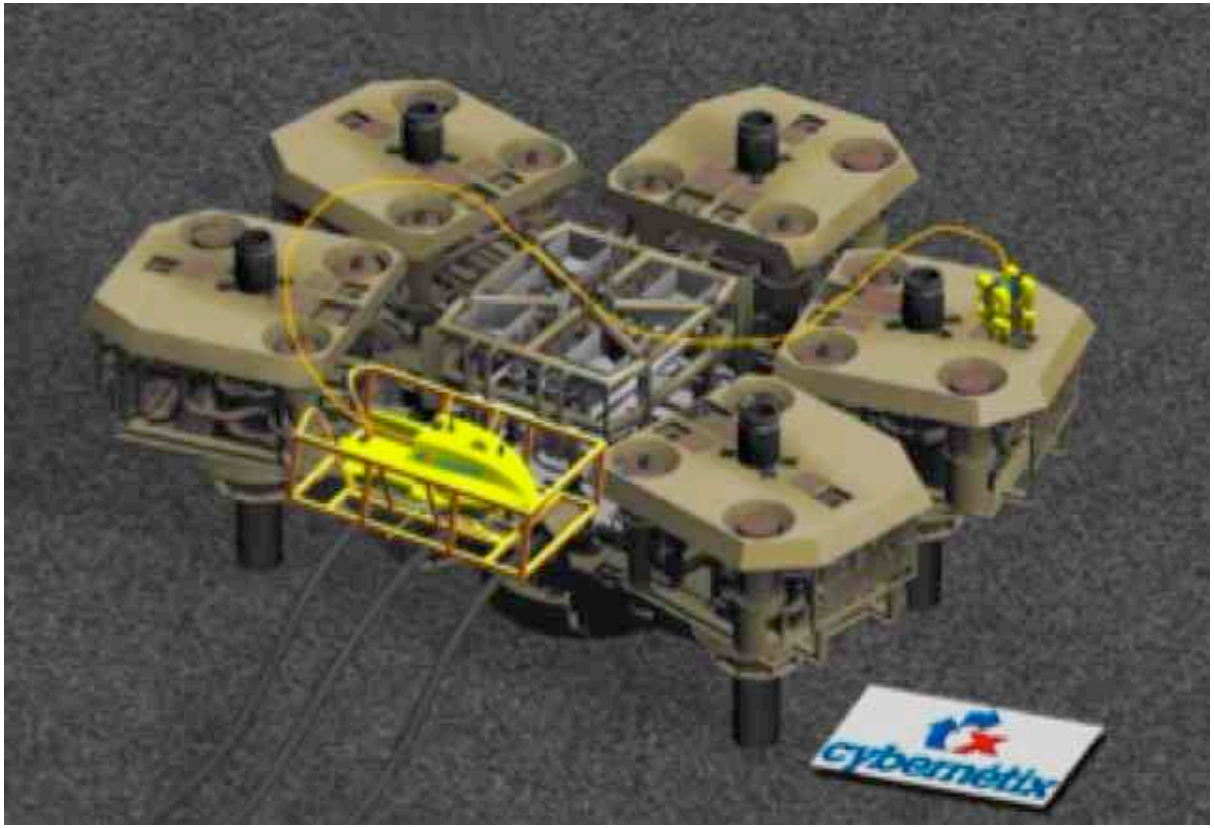
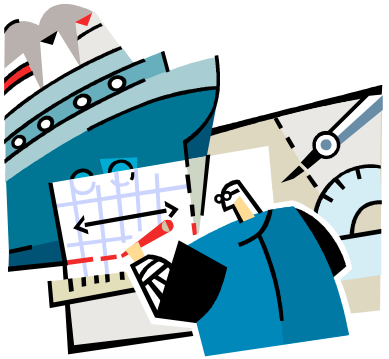


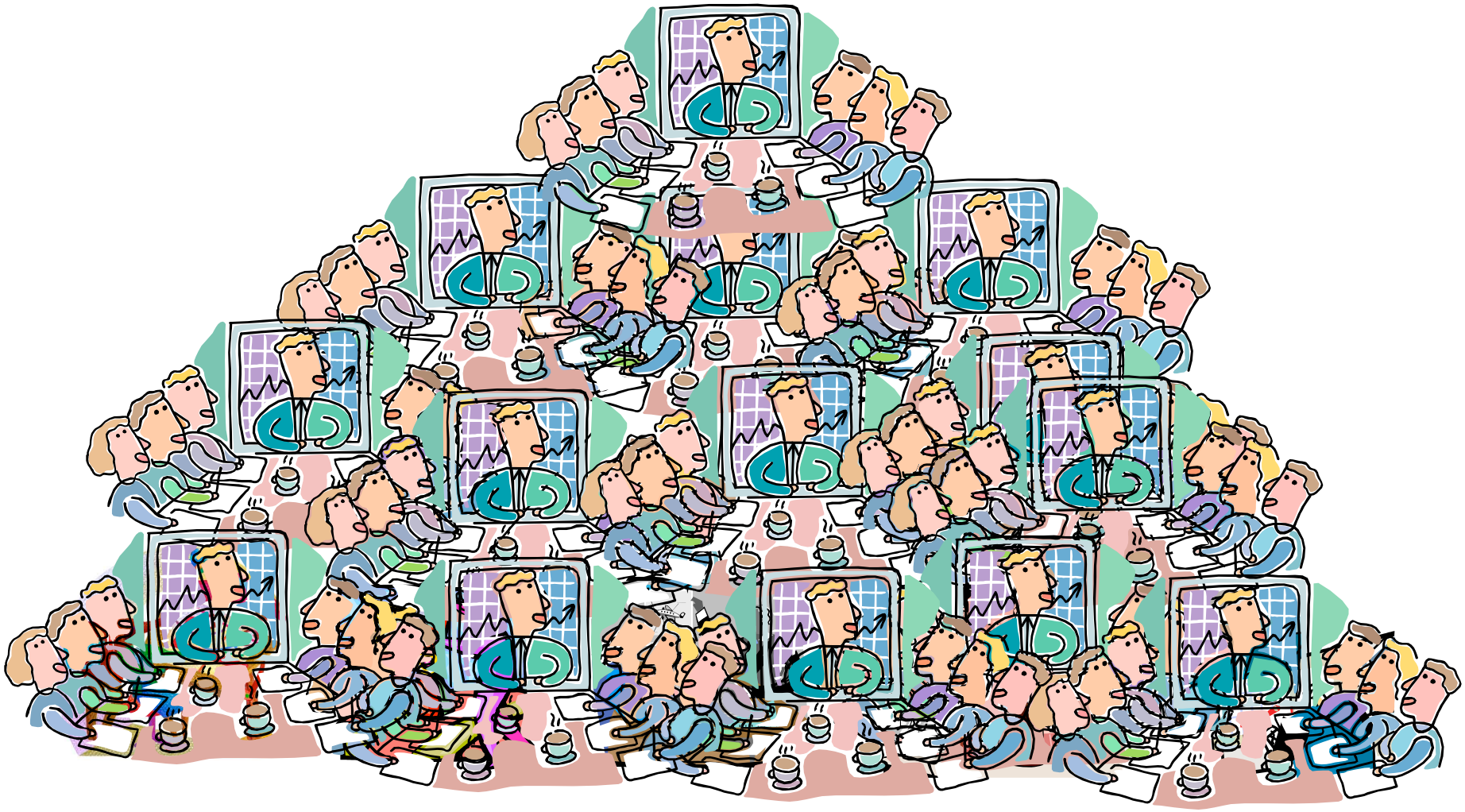
Image: www.Cybernetix.fr

Work: More Specialised and More Interdisciplinary

- CONFLICT -



Solution A:
Meetings, Meetings, and even more Meetings....????



Solution B: Working in Real-Time

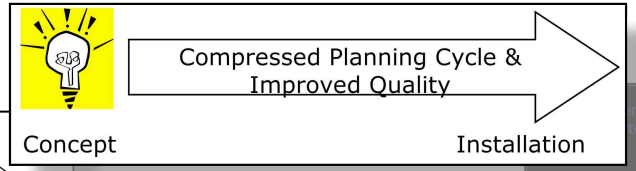
Photo, Courtesy Ben Shaw, Courtesy JPL

Concurrent Design

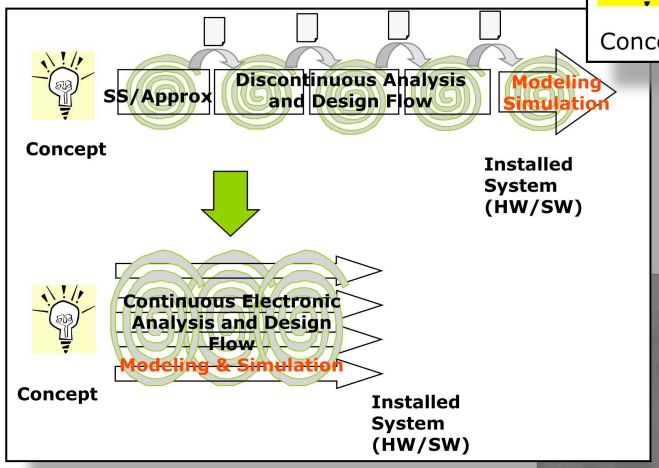
What we want to achieve!

Quality and Innovation (Improved)
–Better Reports, Plans, and Studies
–Less problems during implementation
–Better decisions from the early project phases
–New and Innovative solutions
Efficiency (Improved)
- Less time spent on unproductive work
Utilization of Staff (Improved)
–Effective way of training new staff
–Better utilization of senior staff
Project Execution (Improved)
FUN Factor (Improved)

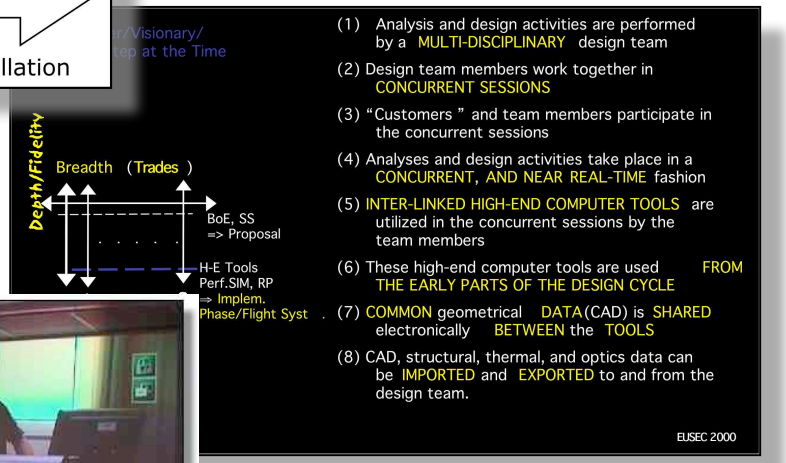
How!



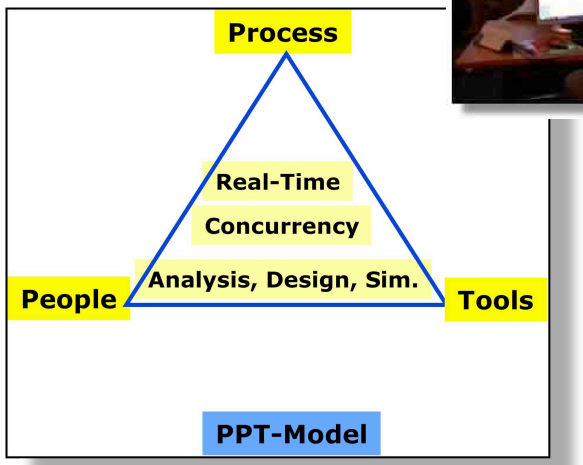
Continuous Work Process

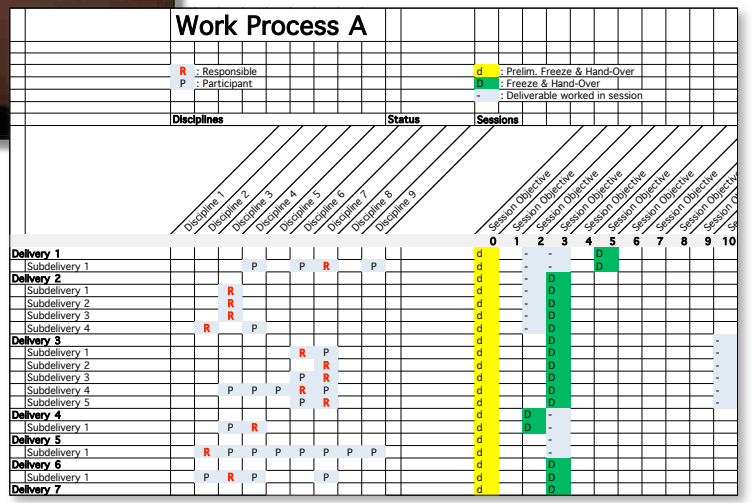


Parallel



Multidisciplinary
Teams, Geographically
Independent





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Projects

1. Well Planning

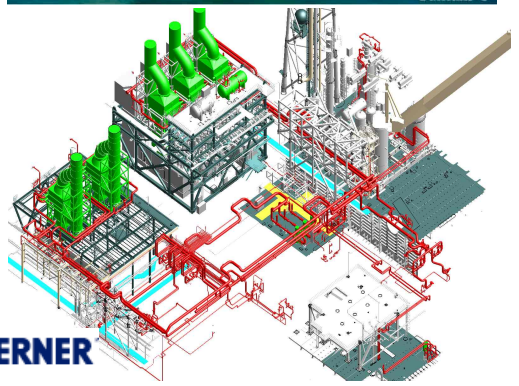
STATOIL

- Gullfaks - RTD [Statoil] (Spring 2005)*
- Kvitebjørn - RTD [Statoil](Spring 2007) (No Eval.)

2. DVM

STATOIL

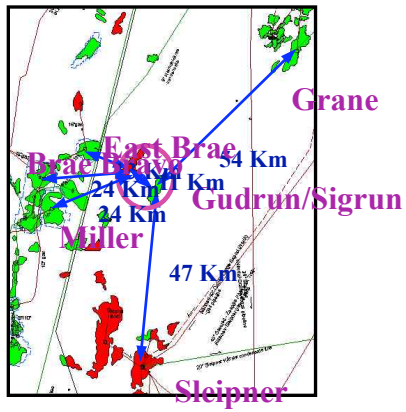
- Åsgard B, Top-side Modifications [Statoil - Aker Reinertsen] (Fall of 2005) AKER REINERTSEN
- Kvitebjørn, Top-side Modifications [Statoil - Aibel] (spring 2007) aibel
- Statfjord B, Snorre B PIG Lock Modification [Statoil - Aker Kvaerner Offshore Partners (Spring 2007) AKER KVÆRNER



3. TP ANT

STATOIL

- Early Phase Field Development, Gudrun [Statoil] (Spring 2006, Spring 2007)*
- Early Phase Field Development, Sygna [Statoil] (Fall 2006, Spring 2007) (No Eval.)



Images Courtesy StatoilHydro and Aker

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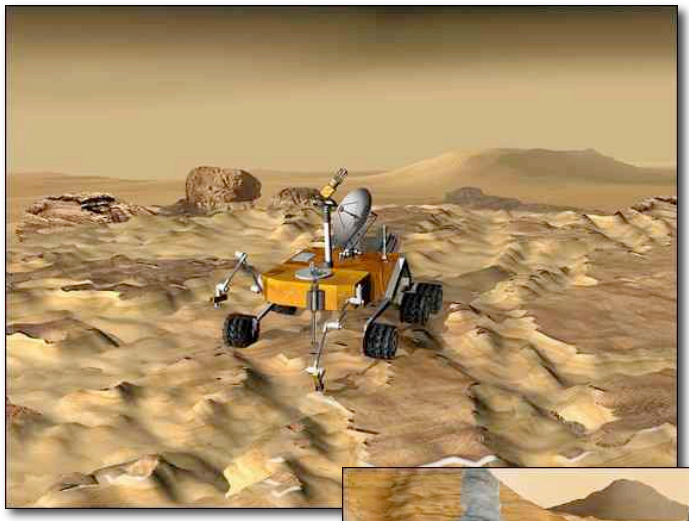
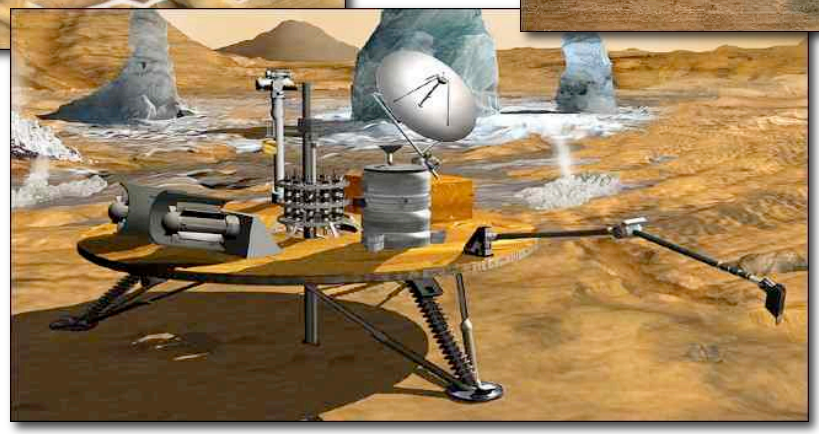
Mars Exploration 2010-2020
Early Phase, Concept Development



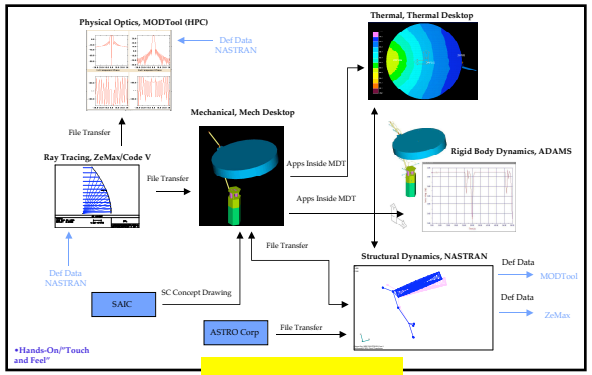
Astrobiology
Field Laboratory

Sample Return



Deep Drill

Foundation



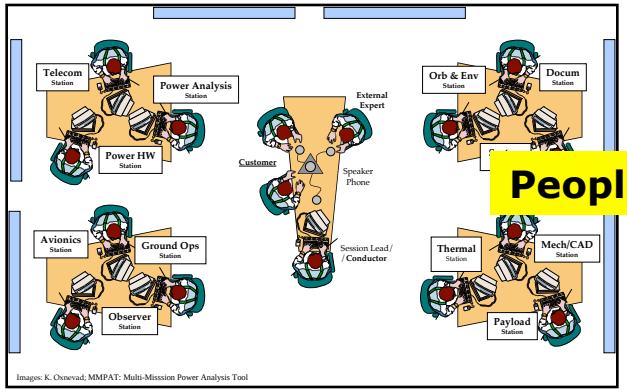
Process

Real-Time

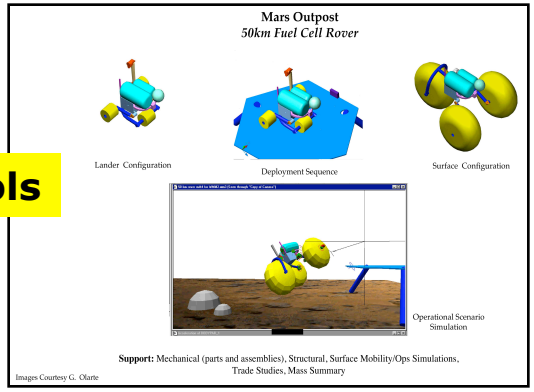
Concurrency

Analysis, Design, Sim.

People



Tools



PPT-Model

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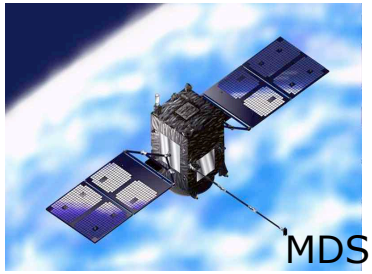
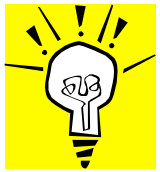
Concept to Implementation

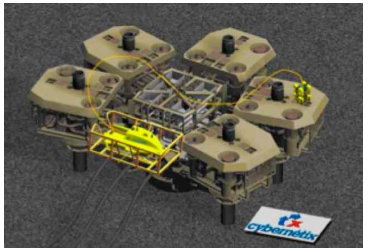
Concept

System





Compressed Planning Cycle &
Improved Quality

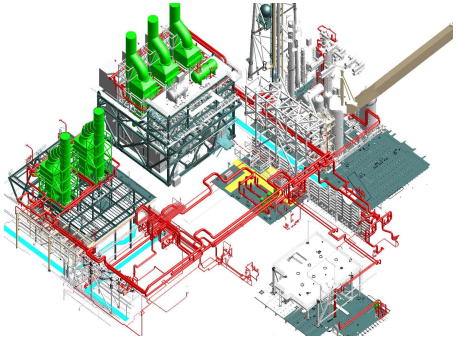


Concept

System

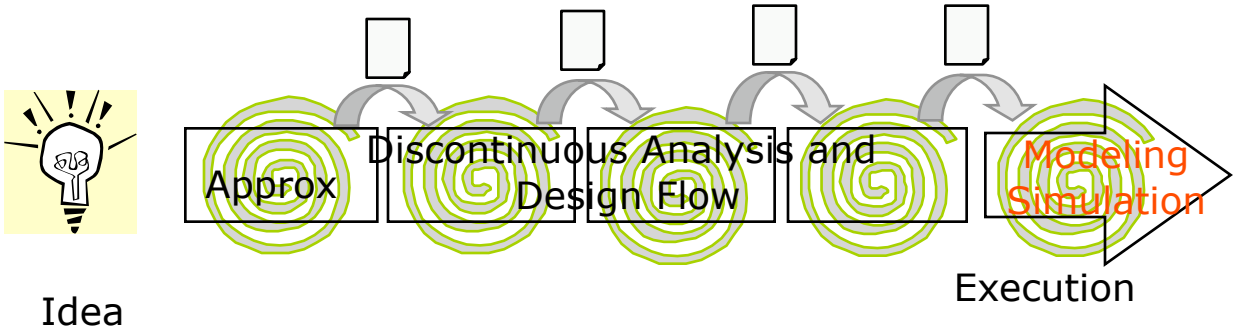
Scope of Work, M1

Installation

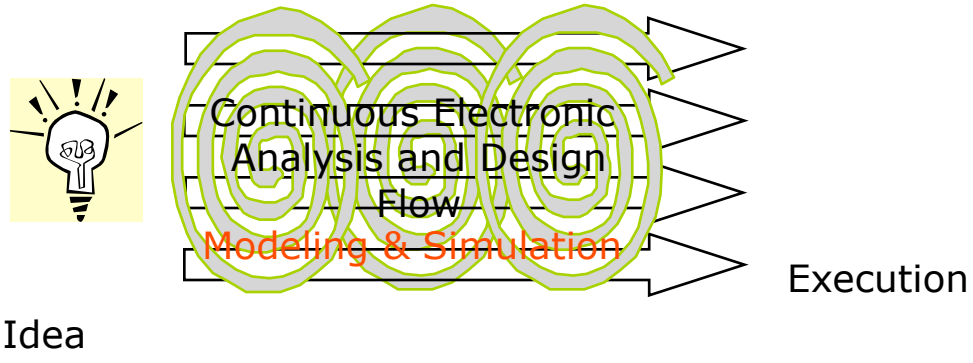


Images Courtesy StatoilHydro, Aker, JAXA

Work Flow Improvement



Serial



Parallel

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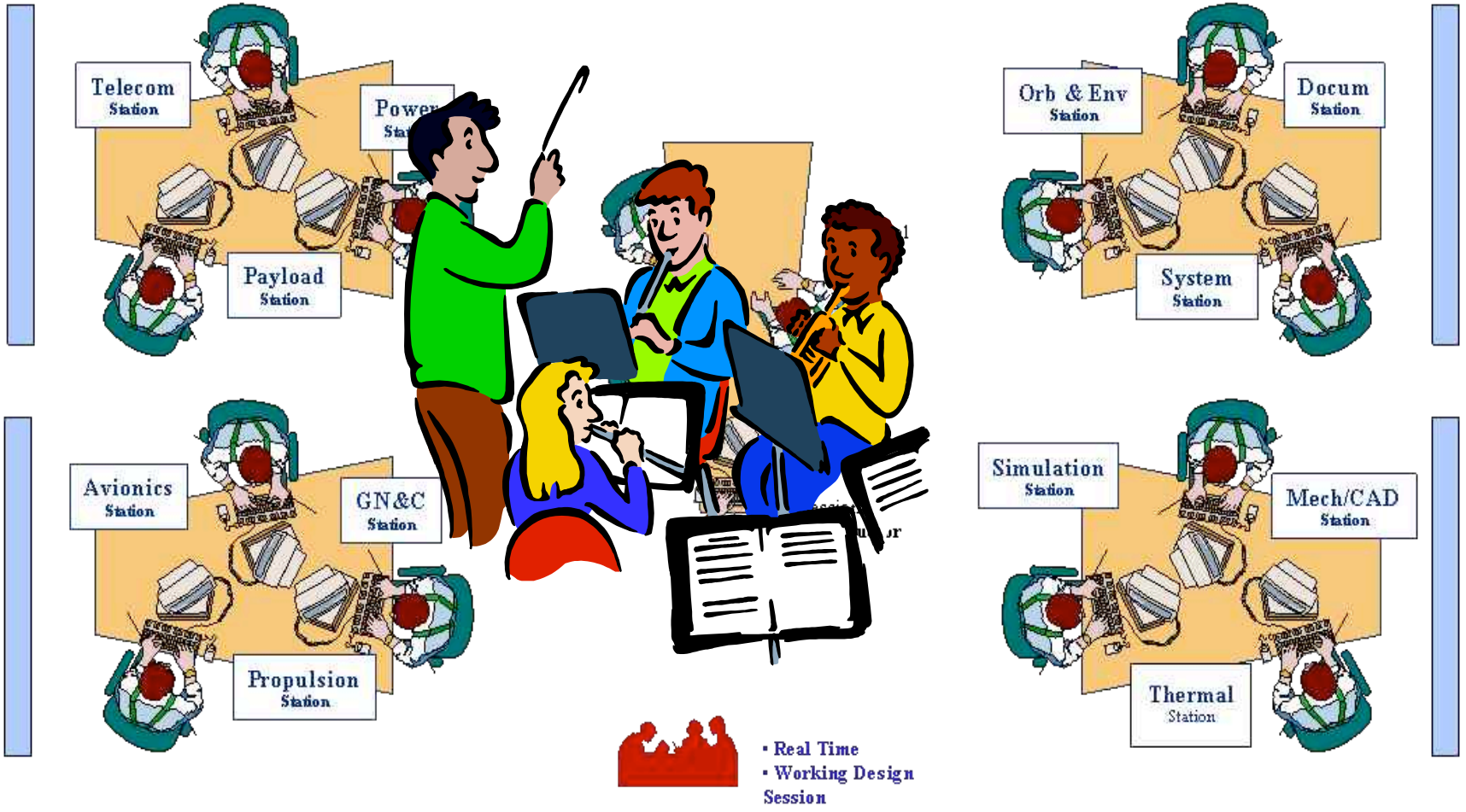
A Concurrent Design Work Arena



Session: 3.5 hours

SIMTANO

In Other Words…

Geologist

Geophysicist

Geochemist

Res.Eng

Drilling

Facilities

Economy

Customer

Facilitator/ Conductor

Session Plan

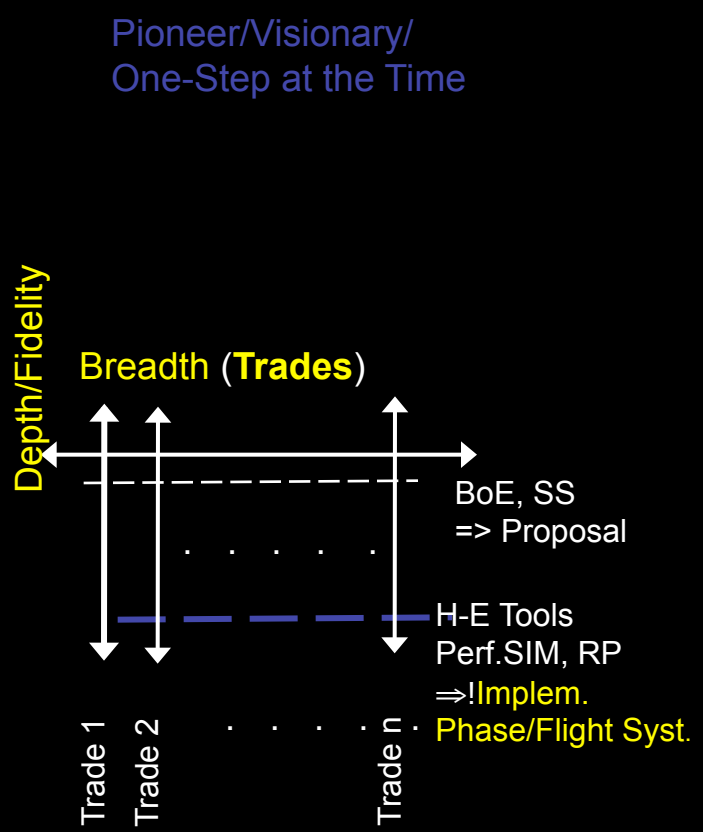
Work Process A

R : Responsible
P : Participant

d : Prelim. Freeze & Hand-Over
D : Freeze & Hand-Over
- : Deliverable worked in session

Disciplines									Status	Sessions										
	Discipline 1	Discipline 2	Discipline 3	Discipline 4	Discipline 5	Discipline 6	Discipline 7	Discipline 8	Discipline 9		Session Objective	Session Objective	Session Objective	Session Objective	Session Objective	Session Objective	Session Objective	Session Objective	Session Objective	Session Objective
											0	1	2	3	4	5	6	7	8	9	10
Delivery 1										d		-	-		D					
Subdelivery 1				P		P	R		P	d		-	-		D					
Delivery 2										d		-	D							
Subdelivery 1			R							d		-	D							
Subdelivery 2			R							d		-	D							
Subdelivery 3			R							d		-	D							
Subdelivery 4		R		P						d		-	D							
Delivery 3										d			D							-
Subdelivery 1						R	P			d			D							-
Subdelivery 2							R			d			D							-
Subdelivery 3						P	R			d			D							-
Subdelivery 4			P	P	P	R	P			d			D							-
Subdelivery 5						P	R			d			D							-
Delivery 4										d		D	-							
Subdelivery 1			P	R						d		D	-							
Delivery 5										d			-							
Subdelivery 1		R	P	P	P	P	P	P	P	d			-							
Delivery 6										d			D							
Subdelivery 1		P	R	P			P			d			D							
Delivery 7										d			D							

"The Eight Principles of Concurrent Design"



(1)! Analysis and design activities are performed by a MULTI-DISCIPLINARY design team

(2) Design team members work together in CONCURRENT SESSIONS

(3) "Customers" and team members participate in the concurrent sessions

(4) Analyses and design activities take place in a CONCURRENT, AND NEAR REAL-TIME fashion

(5) INTER-LINKED HIGH-END COMPUTER TOOLS are utilized in the concurrent sessions by the team members

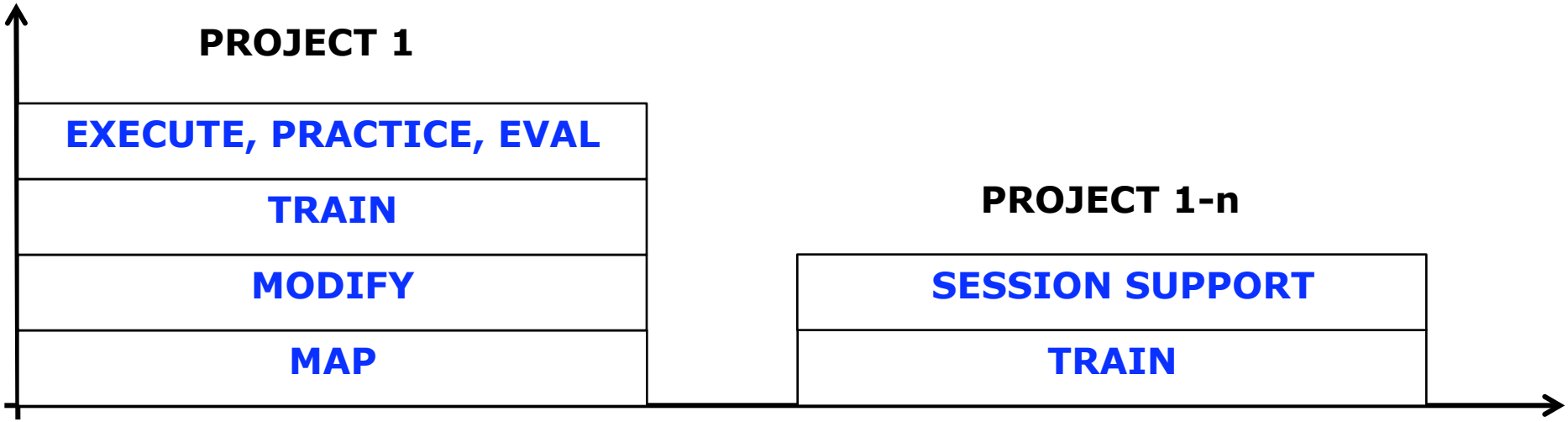
(6) These high-end computer tools are used FROM THE EARLY PARTS OF THE DESIGN CYCLE

(7) COMMON geometrical DATA (CAD) is SHARED electronically BETWEEN the TOOLS

(8) CAD, structural, thermal, and optics data can be IMPORTED and EXPORTED to and from the design team.

EUSEC 2000

Implementation Schedule



1. **Map** and define Problem Areas, Objectives, Products to be generated, success criteria, and participating disciplines **(3 weeks)**
2. **Modify Course:** Set up List of Suggested Improvements, Develop Session Plan, Management Review **(2 weeks)**
3. **Train** team members and facilitator/conductor, and project managers **(1 week)**
4. **Specify, Set up**, and **test** defined **work arena**, install analysis and design tools, video conference, etc. Define, document, and test interfaces between tools **(3-6 months)**
5. **Execute** Initial Project, **Practice, and Evaluate** **(12 weeks and up)**

Dr. Knut I. Oxnevad, Founder and CEO

Oxnevad is the founder and CEO of SIMTANO™, Inc, formerly Concurrent Design Laboratories (CDL). SIMTANOTM uses "The Eight Principles of Concurrent Design" and the "People, Process, and Tools – ModelTM to improve the work-processes for its corporate clients. These methodologies were developed over the last 12 years through Oxnevad's research and implemented and tested at the Jet Propulsion Laboratory – California Institute of Technology.

Oxnevad worked there from 1996 to 2005. During his tenure at JPL, he set up and led state-of-the-art concurrent design teams – Next generation Project Development Teams - the NPDT's both at JPL and other NASA centers. These teams performed advanced studies of space payloads, satellites, and surface/subsurface systems. One of his design teams developed rover and lander missions beyond 2010 for Mars, the Moon and other celestial bodies.

Oxnevad received his Ph.D. from Old Dominion University, Norfolk, VA in 1996, where he proposed a new design approach for spacecraft." In 2000, he defined and published "The Eight Principles of Concurrent Design," enabling radical changes in current design process approaches. He is a graduate of International Space University, chaired the New Design Paradigms Workshops, and ran the Design Process Improvement (DPI) Project within the NASA Engineering Training (NET) office. He has published 10 papers and given more than 30 talks at institutions and conferences in the USA, Europe, and Japan on the topics of concurrent design and design process improvements. He has received international awards for his work, and consults through SIMTANOTM national and international institutions on design/work process improvements.

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