

***Machines: are we becoming them
or are they becoming us?***

M. Silberstein PhD

J. Wunderlich PhD

***Machines: are we becoming them
or are they becoming us?***

Part 1: **NEW SCHOOL vs. OLD SCHOOL**

J. Wunderlich PhD

New-School

TEDIOUS OR HIGH-PRECISION TASKS



New-School

TEDIOUS OR HIGH-PRECISION TASKS



VIDEO: <https://www.youtube.com/watch?v=UtBa9yVZBJM>

New-School

TEDIOUS OR HIGH-PRECISION TASKS



VIDEO: <https://www.youtube.com/watch?v=sjAZGUcirP8>

New-School



Old-School qualities lost?

TEDIOUS OR HIGH-PRECISION TASKS



ARTISANS

e.g., Glass-blowing in Italy

VIDEOS by J Wunderlich 2008, Borano Italy:

http://users.etown.edu/w/wunderjt/personal_pictures/MVI_5139.AVI

http://users.etown.edu/w/wunderjt/personal_pictures/MVI_5141.AVI

http://users.etown.edu/w/wunderjt/personal_pictures/MVI_5142.AVI



Customer Service

VIDEO: <https://www.youtube.com/watch?v=QBU2GYxs1uc>

New-School



Old-School qualities lost?

TEDIOUS TASKS



Human interaction of Customer Service

New-School

TEDIOUS OR HIGH-PRECISION TASKS



New-School

TEDIOUS OR HIGH-PRECISION TASKS



New-School



Old-School qualities lost?

TEDIOUS OR HIGH-PRECISION TASKS



Home delivery **installation**



Package- delivery **accountability**

CLEAN-UP of Human or Nature's Mess



*This excretes
large ice cubes*

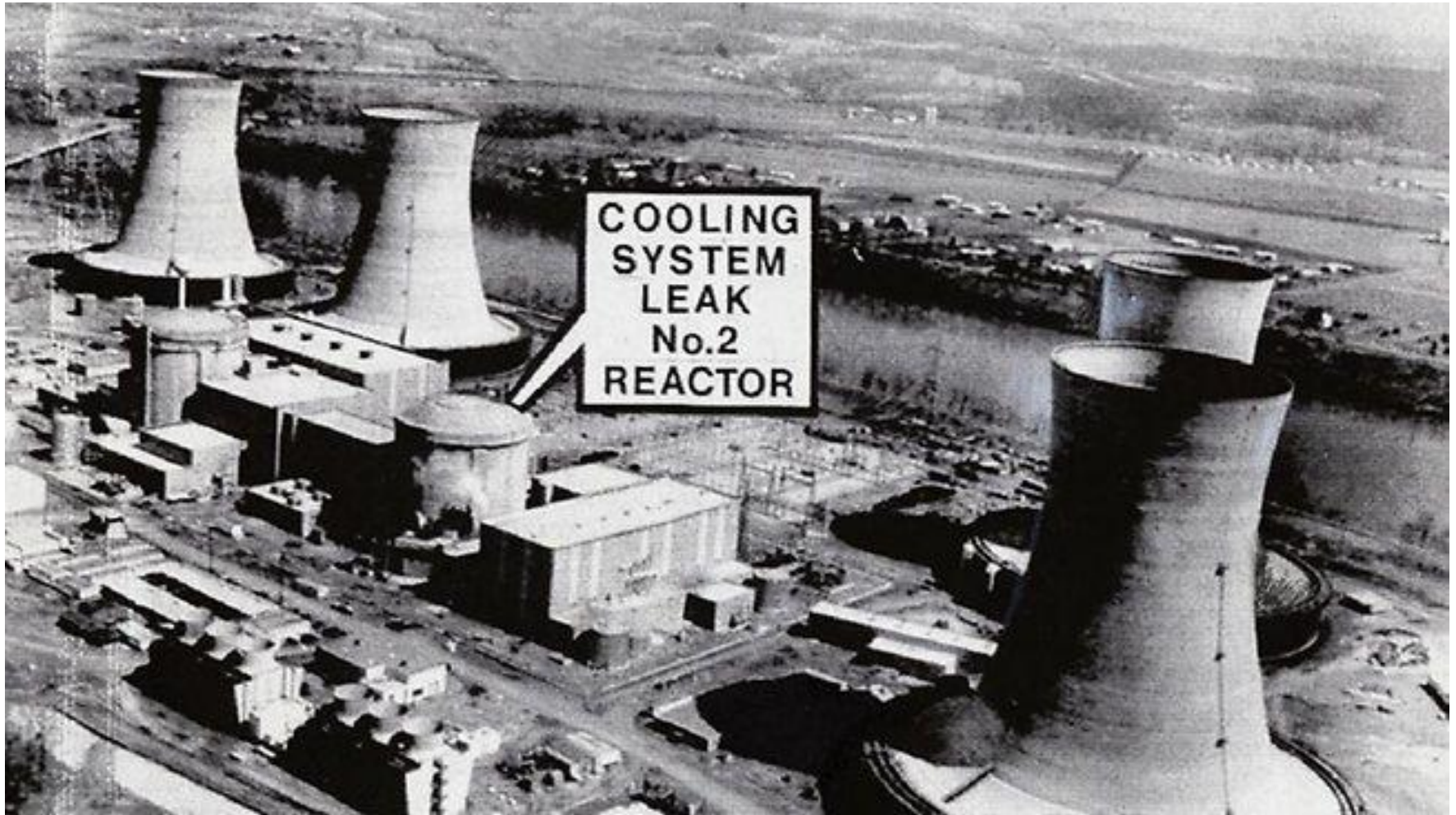


Image from: http://dvice.com/archives/2007/02/roombalike_snowplow_robot_uses.php

Image from: <http://www.robotvacuumcleaner.org/2009/09/roomba-pet-series-532-and-562-features>

CLEAN-UP of Human or Nature's Mess

- Robots don't get sick from contamination



CLEAN-UP of Human or Nature's Mess

- 2014 US Military robots fight Ebola
- Disinfect in minutes using ultraviolet technology

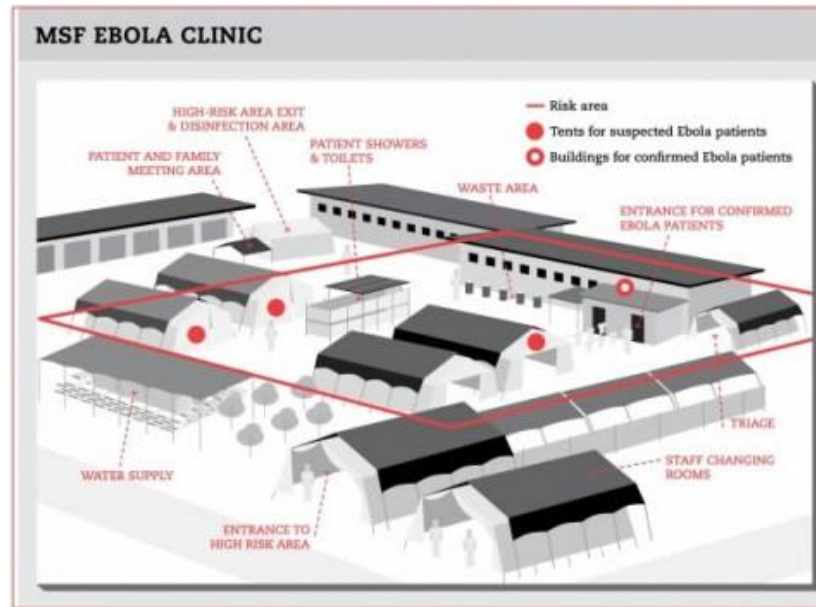


New-School



Old-School qualities lost?

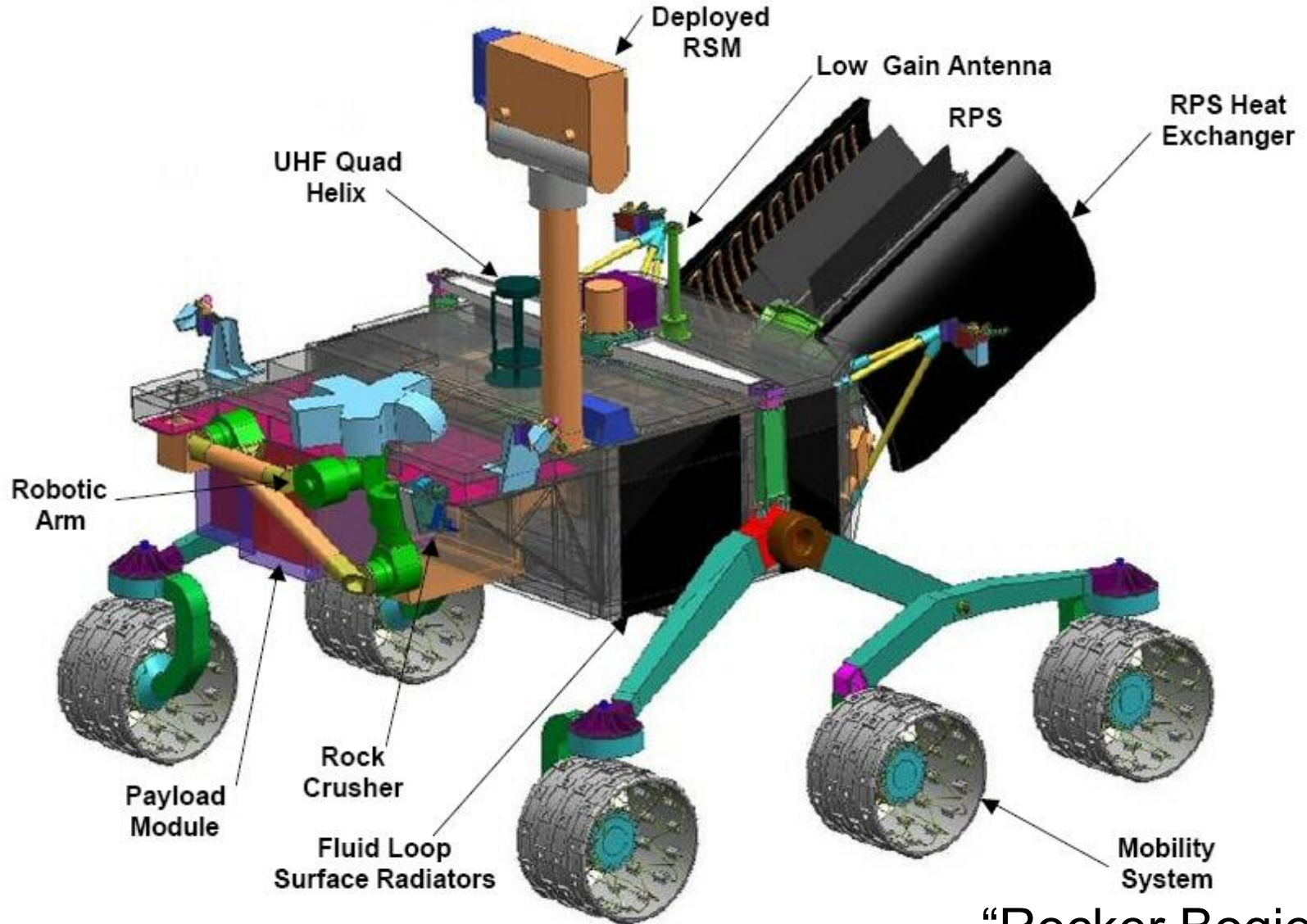
CLEAN-UP



Doctors Without Borders -- personal attention

VIDEO: <http://www.pbs.org/wgbh/pages/frontline/ebola-outbreak/>

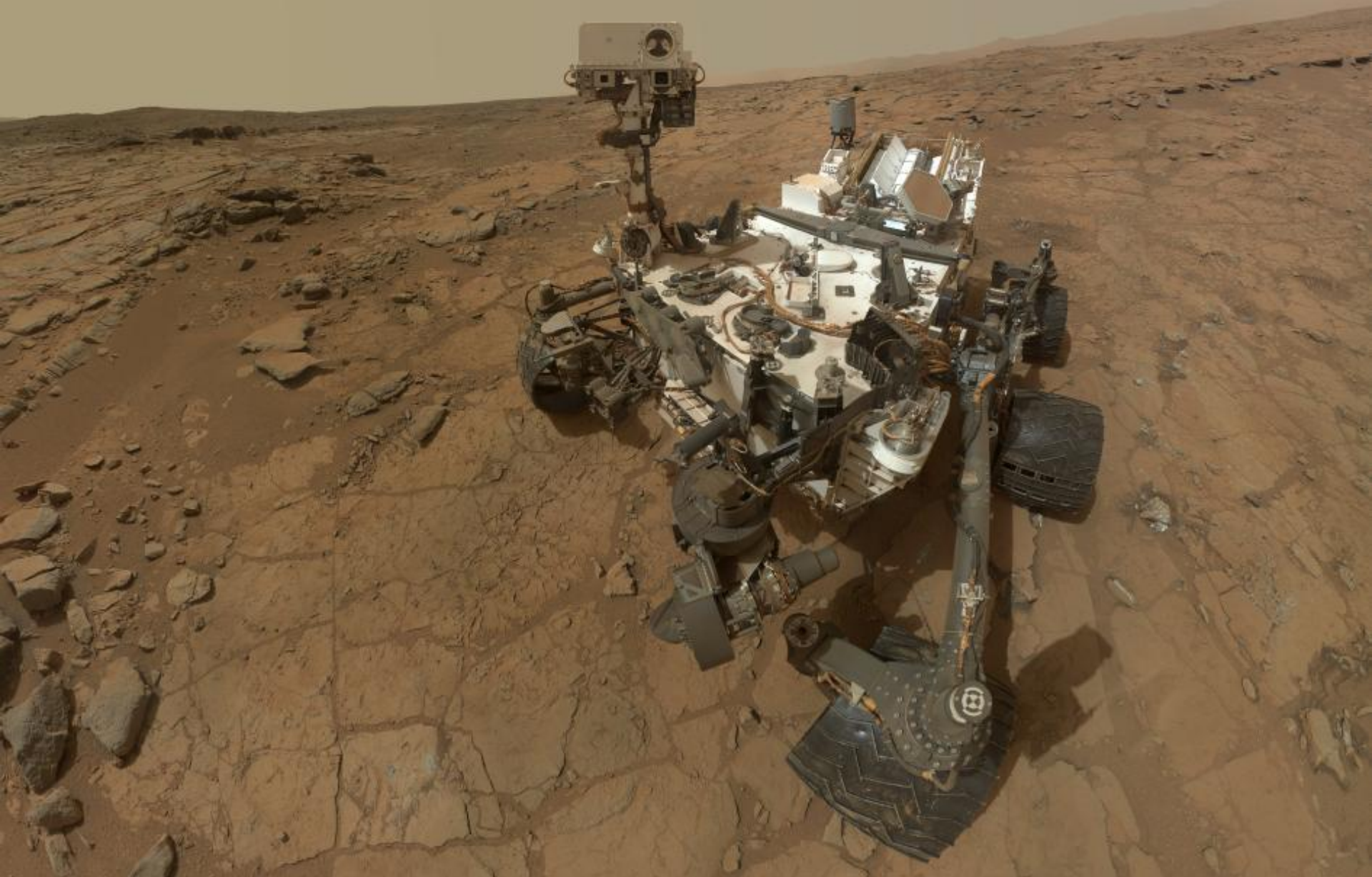
2014 Mars Science Lab "Curiosity"



“Rocker Bogie”



New-School

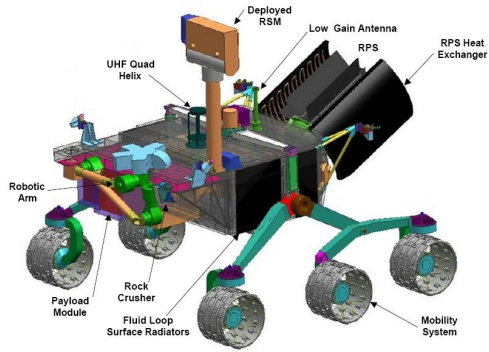




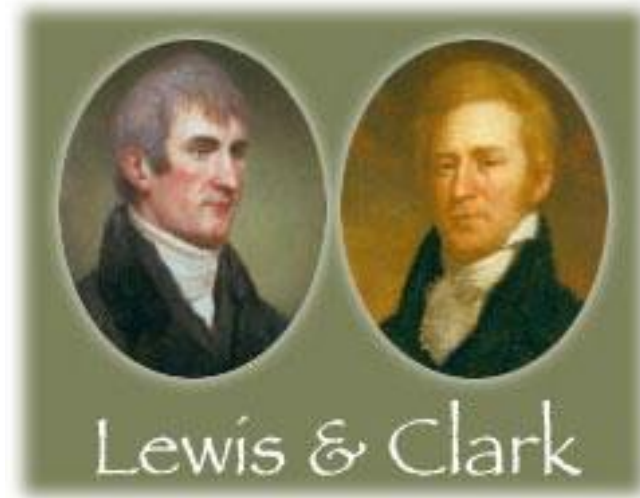
Boston Dynamics's "Big Dog"

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

New-School



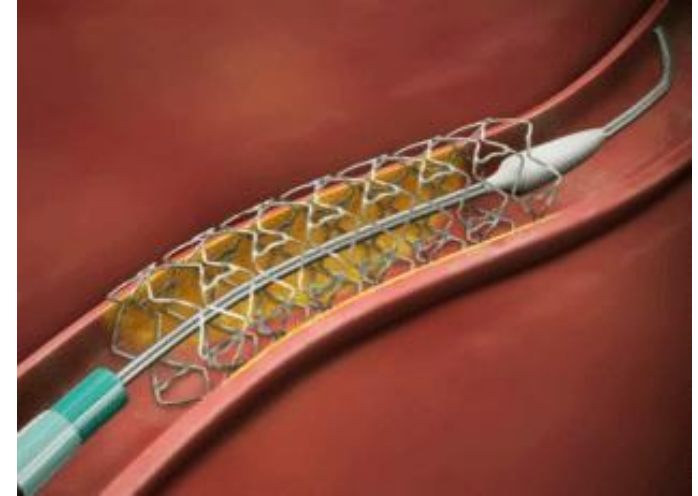
Old-School qualities lost?



Human-to-Human First Contact/

2014 Hansen Medical Completes First Robotic Prostatic Artery Embolization Procedure in US

by Dr. Sandeep Bagla, Inova Alexandria Hospital in Virginia using the Magellan™ Robotic System



SOURCE: http://www.robotictrends.com/service_healthcare/article/hansen_medical_completes_first_robotic_prostatic_artery_embolization_proced/?utm_source=RoboTrends&utm_medium=email

Image from: <http://cdn.medgadget.com/wp-content/uploads/2012/06/Magellan-Robotic-System.jpg>

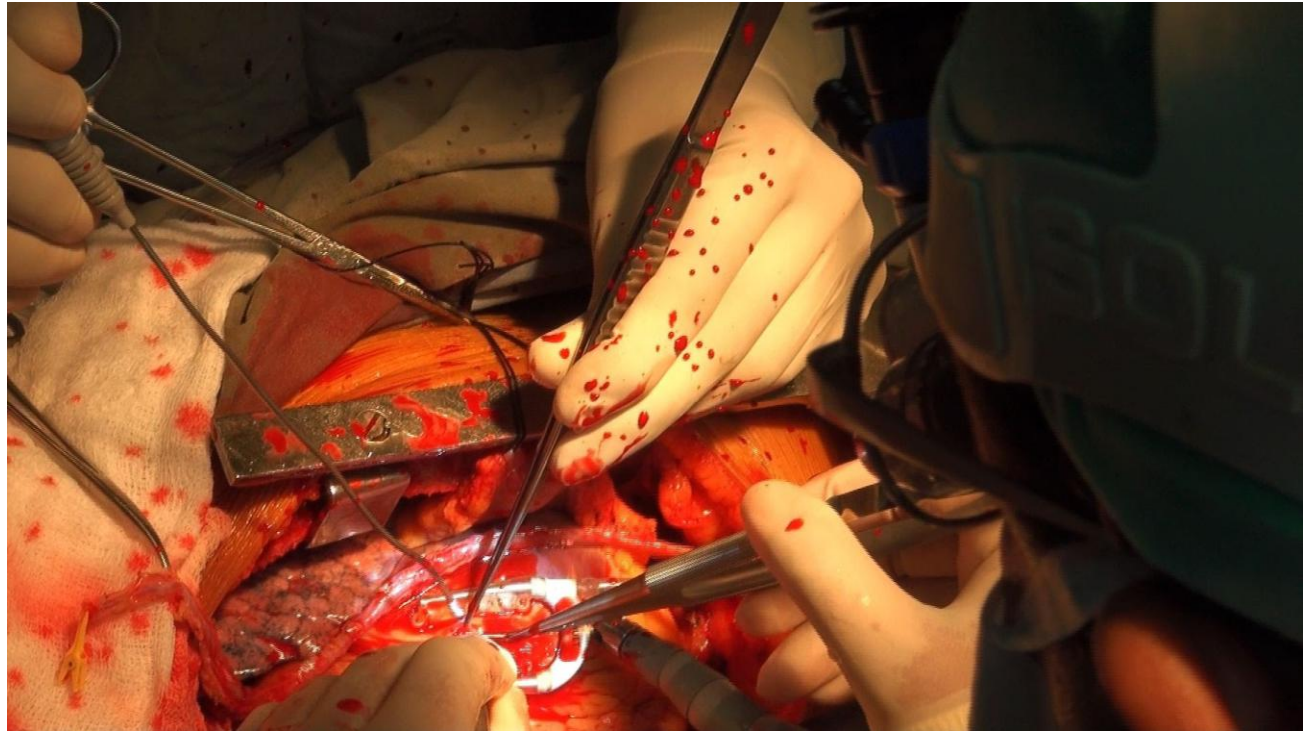
Image from: <http://cdn.medgadget.com/wp-content/uploads/2012/06/Magellan-Robotic-System.jpg>

New-School



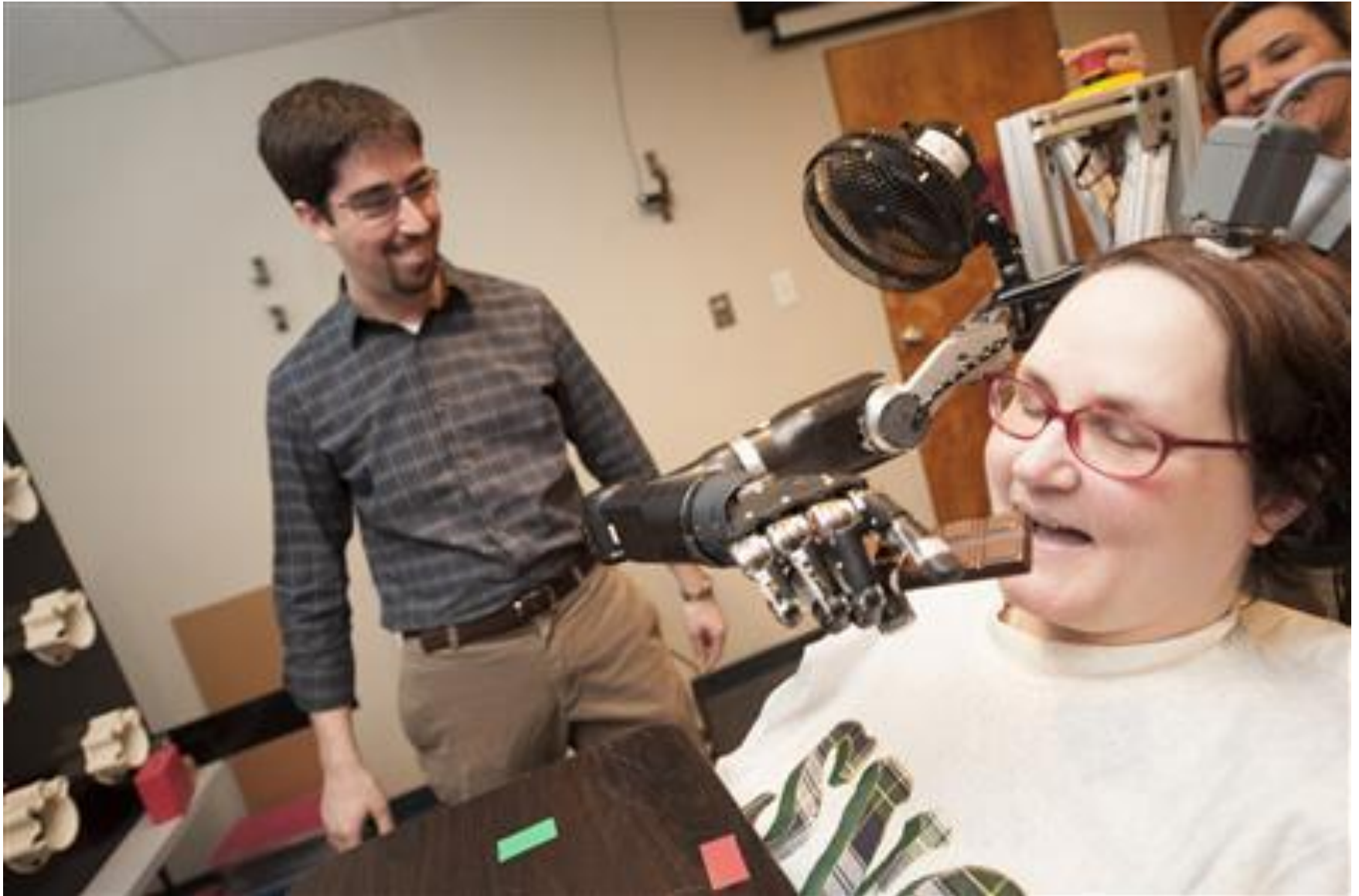
Old-School qualities lost?

Surgery



Adaptability of human mind and hands

2014 MIND-CONTROLLED PROSTHETICS



2014 MANEUVERABILITY FOR THE DISABLED



© JUDE EDGINTON

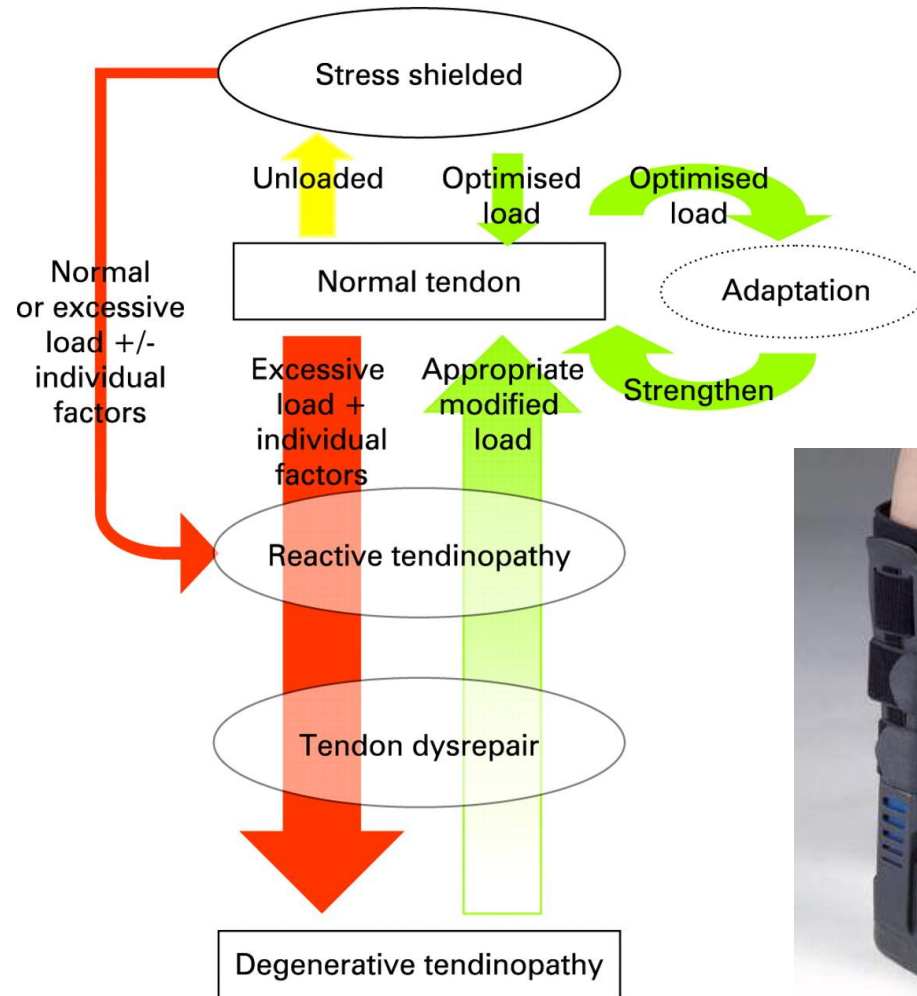
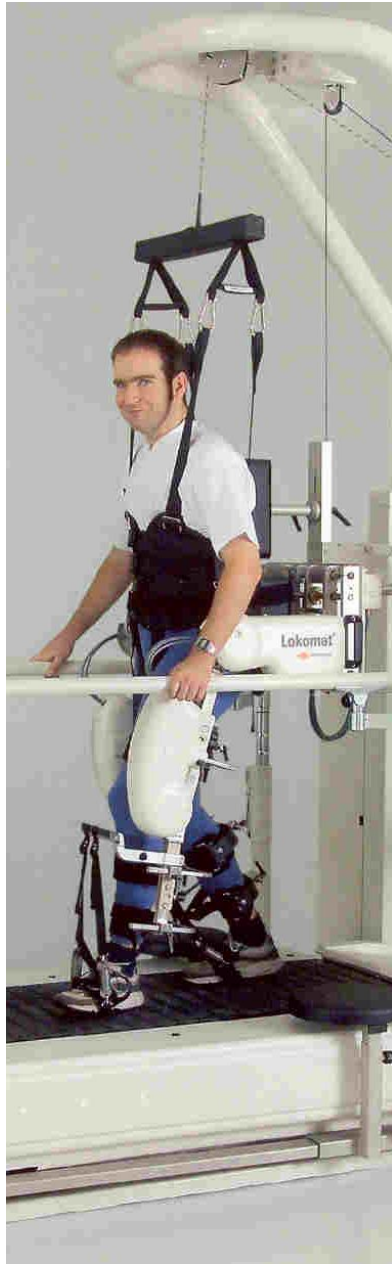
2014 ROBOTICS-ASSISTED REHAB FOR INJURIES



New-School

Old-School qualities lost?

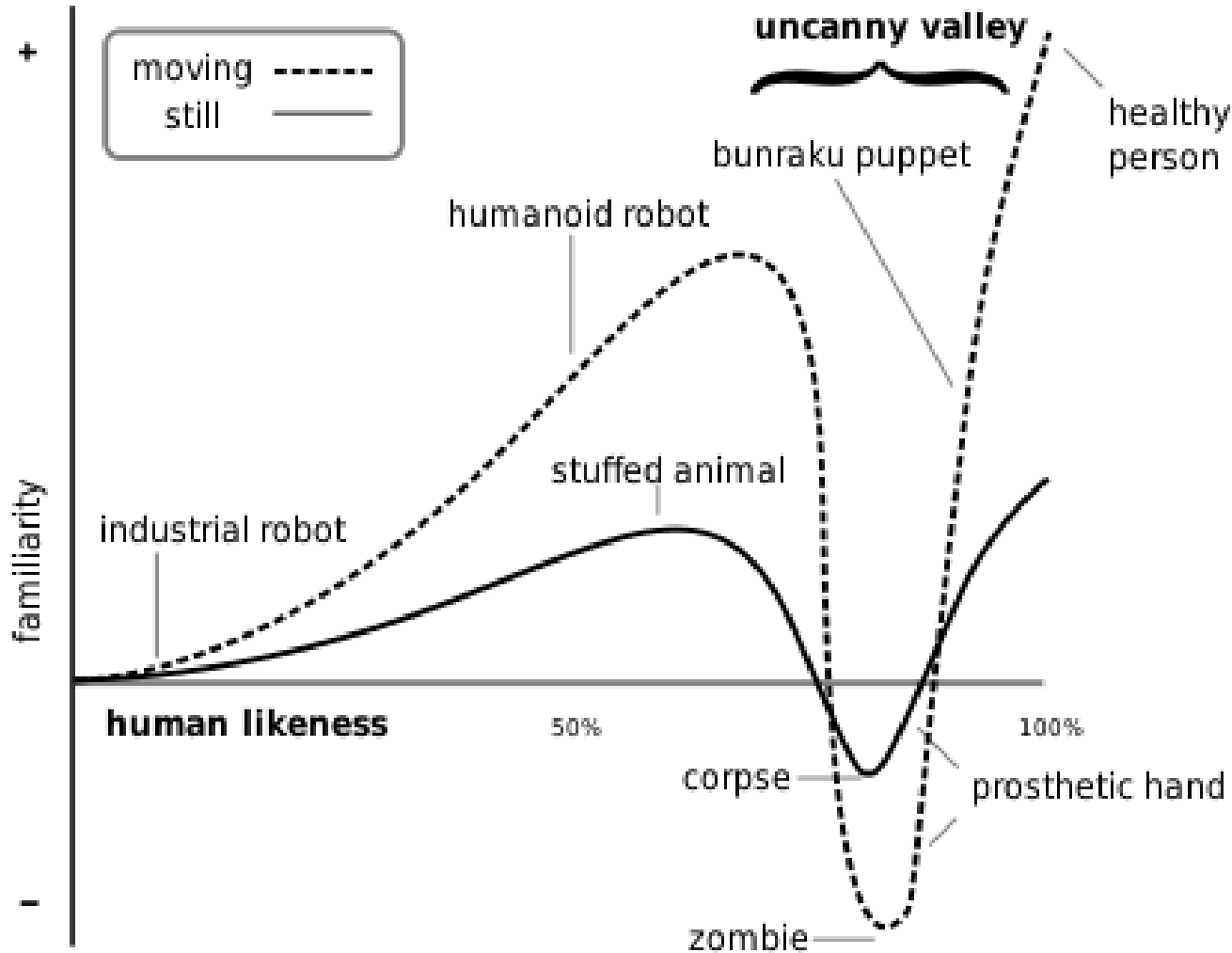
ASSISTING THE DISABLED or INJURED



Added strength from healing under load

New-School

“Uncanny Valley” frightens humans



ASSISTANTS / COMPANIONS



Honda's "Asimo"



Bunraku Puppet

Image from: http://upload.wikimedia.org/wikipedia/commons/thumb/f/f0/Mori_Uncanny_Valley.svg/450px-Mori_Uncanny_Valley.svg.png

Image from: http://www.21stcentury.co.uk/robotics/honda_asimo_robot.asp

Image from: http://www.21stcentury.co.uk/robotics/honda_asimo_robot.asp

New-School

ASSISTANTS / COMPANIONS

ACTROIDS

“Repliee Q2 can mimic such human functions as blinking, breathing and speaking, with the ability to recognize and process speech and touch, and then respond in kind.”

VIDEO:

<http://www.youtube.com/watch?v=rOqfrM8aiOQ>



New-School

ASSISTANTS / COMPANIONS

ACTROIDS

2015 New Japanese hotel to be staffed by robots



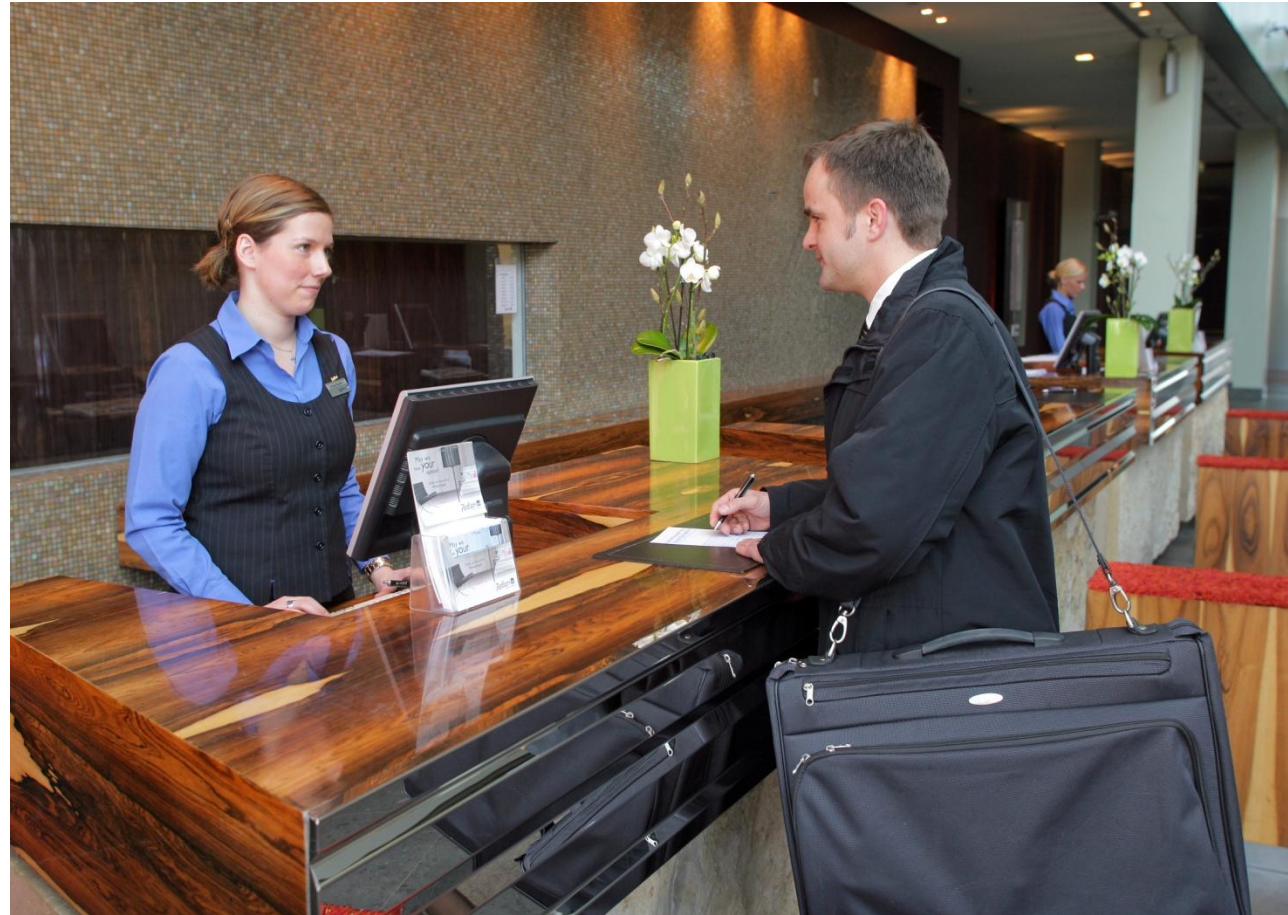
Image from: <http://www.cnn.com/2015/02/04/travel/japan-hotel-robots/>

New-School



Old-School qualities lost?

ASSISTANTS / COMPANIONS



Sincere Hotel Hospitality (genuine empathy)

2011 Companion NAO Next Gen



2014 **VIDEO** (NAO and Asimo in first 12 minutes): <https://www.youtube.com/watch?v=S5AnWziHtWA>

2014 Companion Jibo



New-School



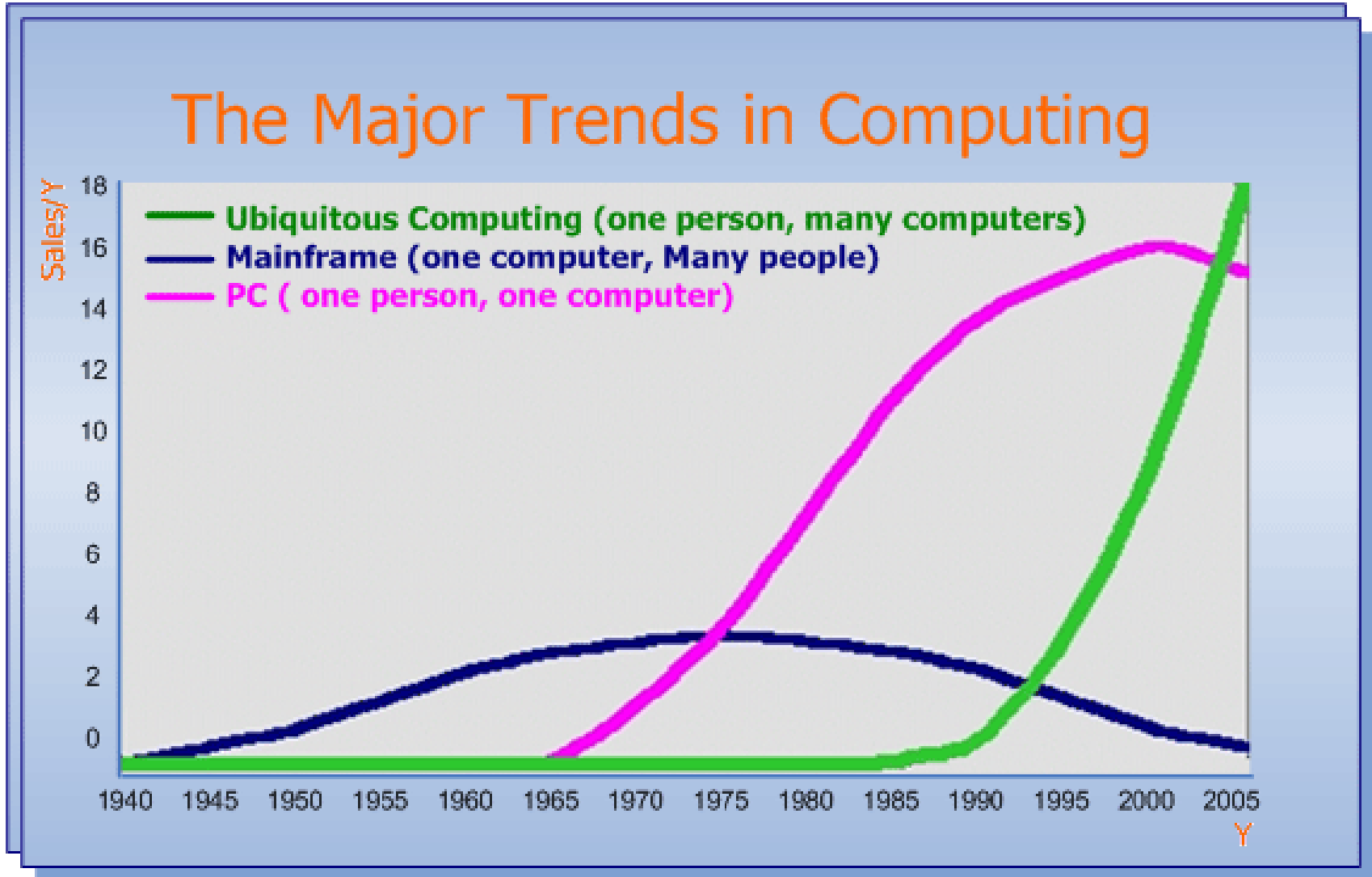
Old-School qualities lost?

ASSISTANTS / COMPANIONS



Less human relationships ?

UBIQUITOUS COMPUTING



New-School

ASSISTANTS / COMPANIONS

UBIQUITOUS COMPUTING



New-School



Old-School qualities lost?

ASSISTANTS / COMPANIONS



Face-to-Face
with people

2014 "BEAR"

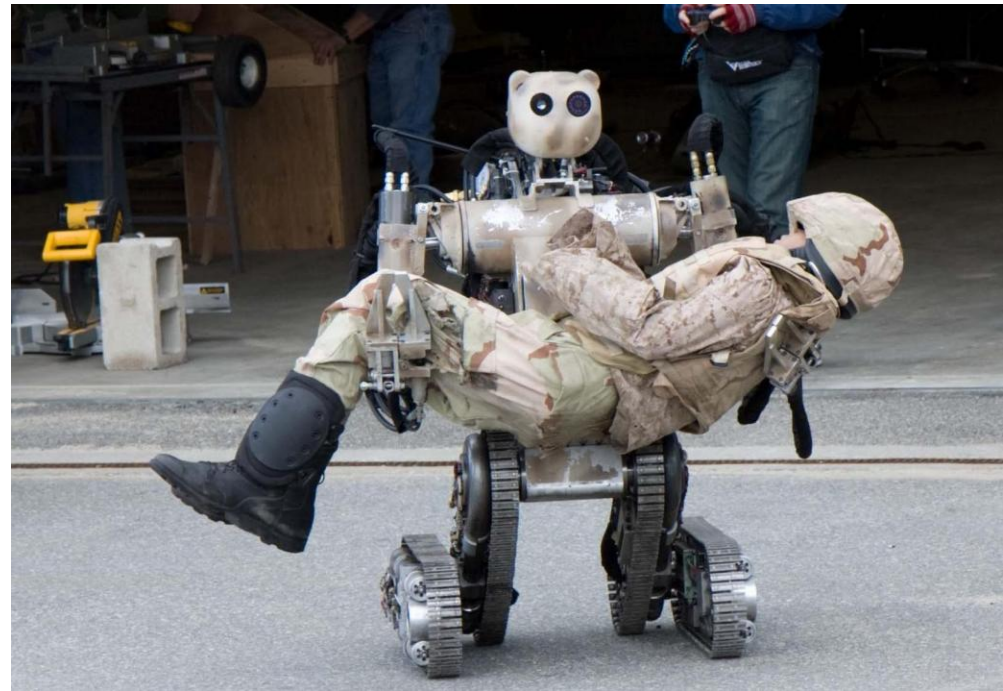
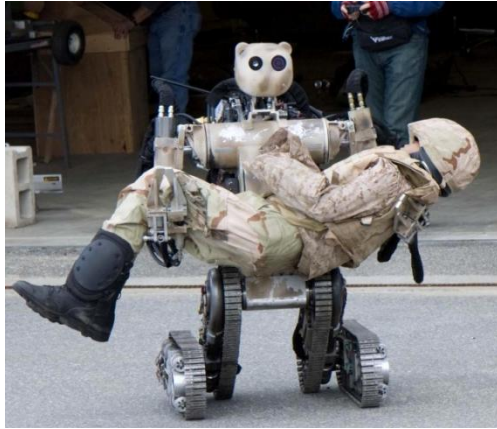


Image from : : http://www.pirotechnologies.com/wp-content/uploads/2014/11/military_battlefieldbear_800_070623.jpg

Image from : : <http://www.pouted.com/wp-content/uploads/2013/02/bear-robot.jpg>

New-School



Old-School qualities lost?

SEARCH AND RESCUE



Adaptiveness of a first-responders

New-School

SUPER-HUMAN RESPONSES



2015 drones

Northrop Grumman Corp.



New-School



Old-School qualities lost?

SEARCH AND RESCUE



**“Rules of Engagement”
Geneva Convention**

Advanced Robot Design often driven by Robot Autonomy

*Robots are mobile, dexterous, and/or sensory extensions
of Machine Intelligence*

**Machine Learning
and
Autonomy**



**Robotic
mechanisms and sensors**

Human Mind



**Human
appendages and senses**

	J. Wunderlich ongoing AI Research	Can human do?	Can bug do? (spider)	Can Conventional Computer Program do?	Can Symbolic AI Program do?	Can Artificial Neural Network do?	Comments
	<u>BASIC ANIMAL ABILITIES:</u>						
1	Acquire and retain knowledge	yes	yes	yes	yes	yes	
2	Solve problems	yes	yes	yes	yes	yes	
3	Learn and adapt	yes	yes	no	somewhat	yes	Evolution
4	Motor coordination	yes	yes	somewhat	somewhat	somewhat	Survival
5	Acquire energy	yes	yes	somewhat	somewhat	somewhat	Survival
6	Protect self	yes	yes	somewhat	somewhat	somewhat	Survival
7	Sensory processing	yes	yes	yes	yes	yes	
8	Real-time thought	yes	yes	yes	yes	yes	
9	React instinctively	yes	yes	no	not yet	not yet	
10	Anticipate	yes	yes	yes	yes	yes	
11	Predict	yes	yes	yes	yes	yes	
12	Communicate	yes	yes	yes	yes	yes	
13	Generalize	yes	yes	no	somewhat	yes	
14	Associate	yes	yes	somewhat	somewhat	yes	
15	Recognition patterns	yes	yes	somewhat	somewhat	yes	
16	Robust under partial failure	yes	yes	no	no	yes	
17	Autonomous thought	yes	yes	no	somewhat	somewhat	
18	Drive to reproduce	yes	yes	no	not yet	not yet	
19	Stability, repeatability, predictability	somewha t	somewha t	yes	yes	somewhat	Uncertainty
20	Multitask	yes	yes	yes	no	yes	

	J. Wunderlich ongoing AI Research	Can human do?	Can bug do? (spider)	Can Conventional Computer Program do?	Can Symbolic AI Program do?	Can Artificial Neural Network do?	Comments
	<u>COMPLEX ABILITIES:</u>						
21	Abstraction	yes	unlikely	no	no	somewhat	
22	Intuition	yes	unlikely	no	not yet	not yet	
23	Common sense	yes	yes	no	not yet	not yet	
24	Manipulate tools	yes	no	yes	yes	yes	Evolution
25	Heuristics	yes	yes	somewhat	yes	no	
26	Inference	yes	yes	somewhat	yes	somewhat	
27	Hypothesis testing	yes	somewhat	somewhat	yes	no	
28	Self-discipline, impulse-control	yes	unlikely	no	somewhat	no	
29	Ethical behavior	yes	unlikely	no	somewhat	somewhat	coded/trained
30	Selective awareness (filtering)	yes	yes	yes	yes	yes	
31	Open to inspection	somewhat	somewhat	yes	yes	somewhat	
32	Emotions	yes	unlikely	no	not yet	not yet	
33	Imagination	yes	unlikely	no	not yet	not yet	
34	Creativity	yes	unlikely	no	not yet	not yet	
35	Passion	yes	unlikely	no	not yet	not yet	
36	Playfulness	yes	unlikely	no	not yet	not yet	Evolution
37	Empathy	yes	unlikely	no	not yet	not yet	
38	Courage	yes	unlikely	no	not yet	not yet	
39	Leadership	yes	unlikely	no	not yet	not yet	
40	Self awareness	yes	unlikely	no	not yet	not yet	
41	Awareness of mortality	yes	unlikely	immortal?	immortal?	immortal?	Replace parts
42	Group psychology	yes	unlikely	somewhat	somewhat	somewhat	Networking
43	Socially Network into Cloud	yes	no	somewhat	yes	yes	Humanity?

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