



ROBOTS IN HEALTHCARE

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WHAT IS A ROBOT?



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IT WAS: 'CAGED IN INDUSTRY'

The International Organization for Standardization ISO 8373 definition: "An automatically controlled, reprogrammable, multipurpose, manipulator programmable in three or more axes, which may be either fixed in place or mobile for use in industrial automation applications."



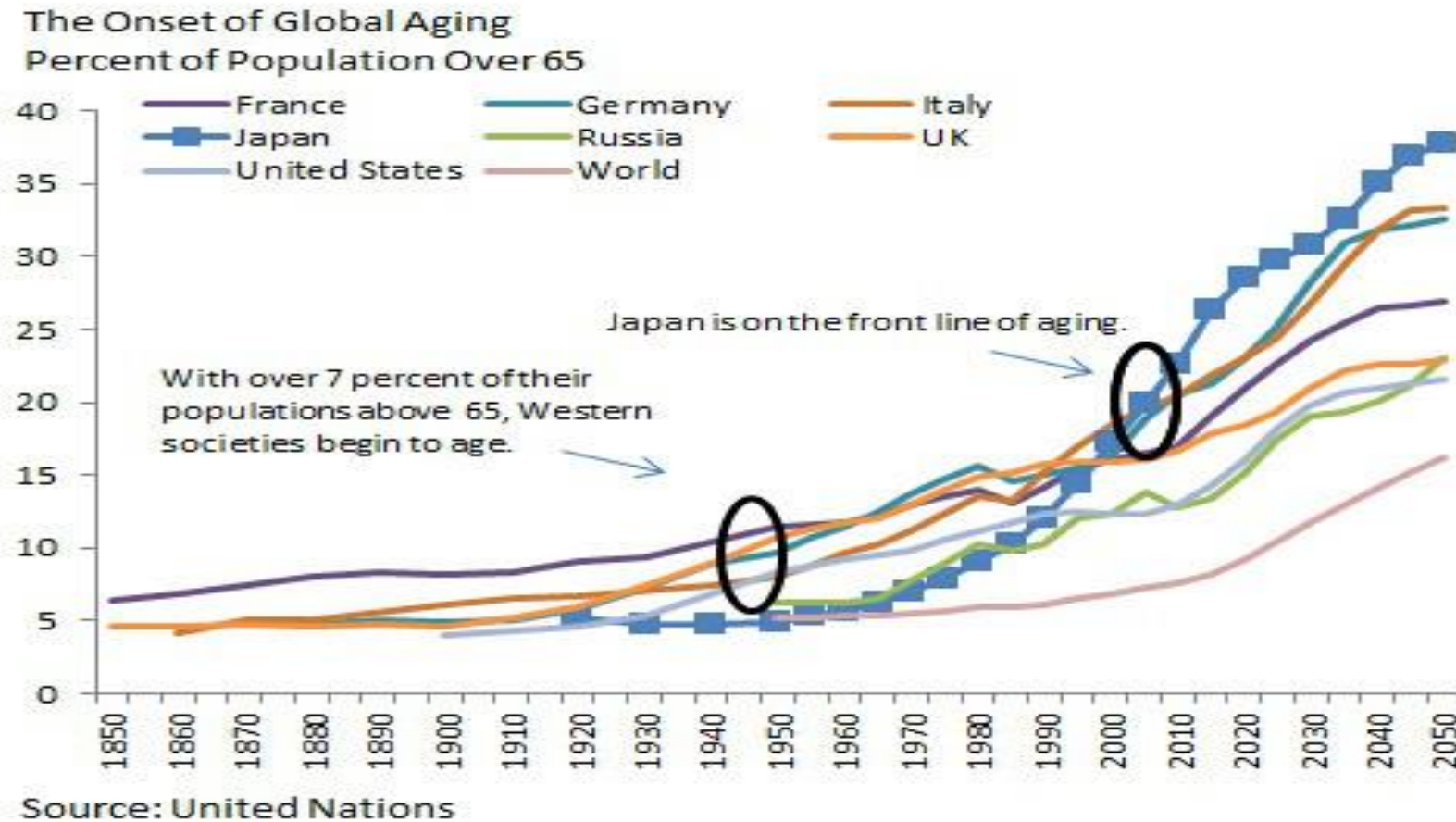
IT IS: UNCAGED IN HOMES AND HOSPITALS

1. A machine capable of carrying out a complex series of actions automatically, especially one programmable by a computer.
2. (Especially in science fiction) A machine resembling a human being and able to replicate certain human movements and functions automatically.

Definition of `robot`. Oxford English Dictionary. Retrieved November 27, 2016.



WHY ROBOTS IN HEALTH CARE?



ROBOTS AS A GAME CHANGER?

Robots have the potential to be a game changer in healthcare: improving health and well-being, filling care gaps, supporting care givers, and aiding health care workers. However, before robots are able to be widely deployed, it is crucial that both the research and industrial communities work together to establish a strong evidence base for healthcare robotics, and surmount likely adoption barriers.

Healthcare Robotics Laurel D. Riek Computer Science and Engineering University of California, San Diego

Communications of the ACM. In Press c 2017 ACM. DOI: <http://dx.doi.org/10.1145/0000000.0000000>

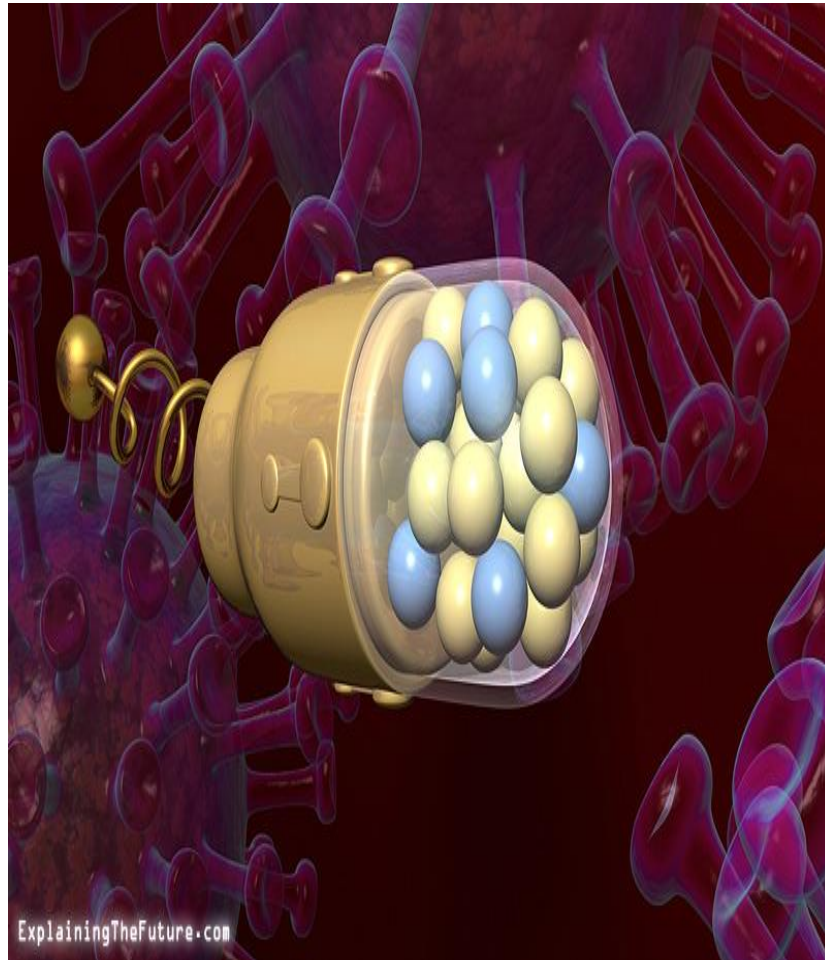


ROBOTS IN HOMES, HOSPITALS, REHABILITATION CENTRES, NURSING HOMES



TYPES OF ROBOTS AND HUMAN PROXIMITY

1. Nano-robots inside the body



TYPES OF ROBOTS AND HUMAN PROXIMITY

2. Wearable exo-skeletons



TYPES OF ROBOTS AND HUMAN PROXIMITY

3. Robots touching your body

- Wrist surgery
- Da Vinci surgery



TYPES OF ROBOTS AND HUMAN PROXIMITY

4. Robots helping doctors

- Telemedicine
- Stroke aid
- Blood pressure
- Blood taking



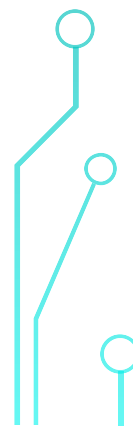
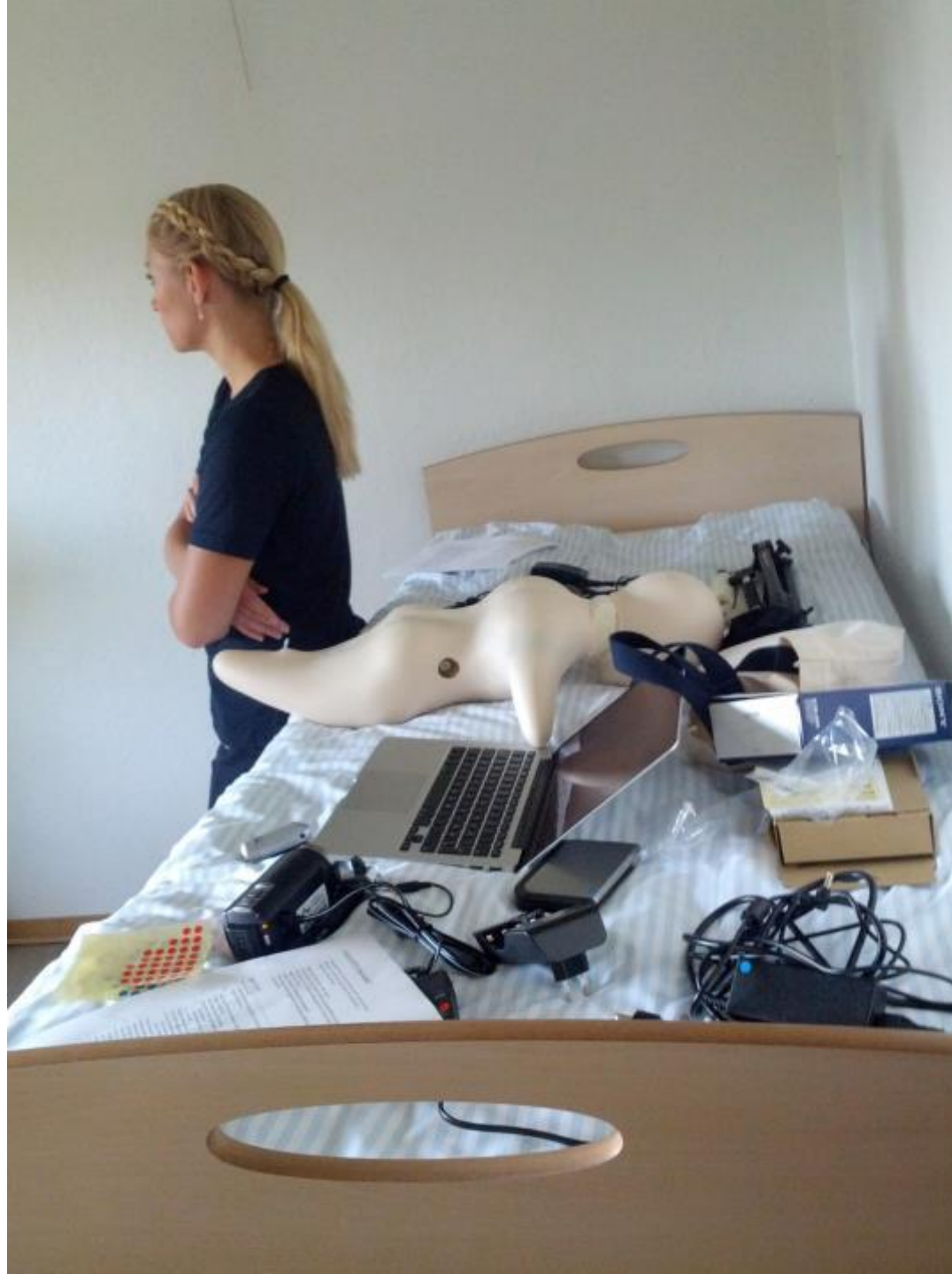
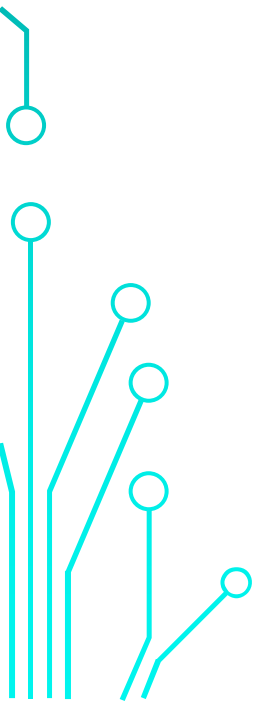
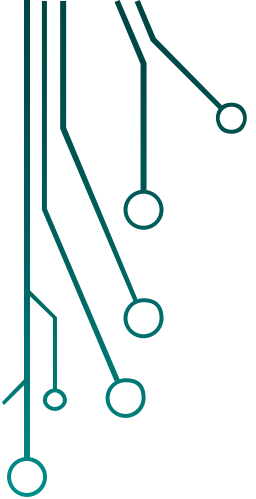




ICSR 2015

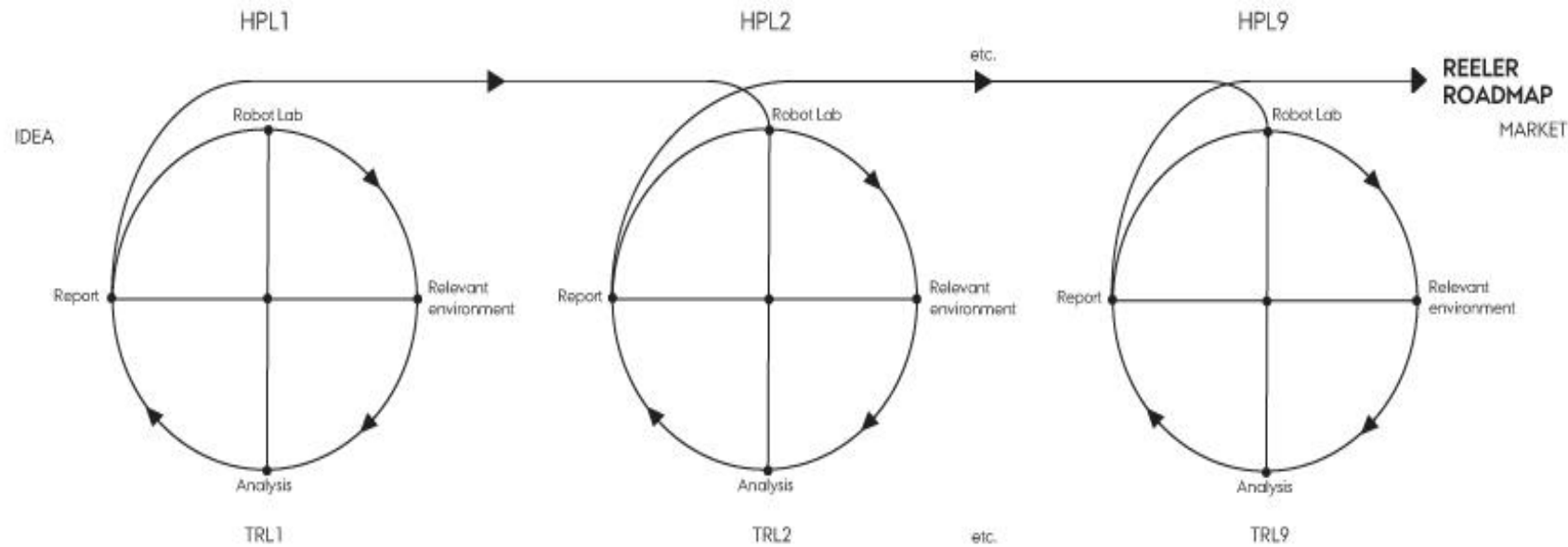
INTERNATIONAL CONFERENCE ON SOCIAL ROBOTICS



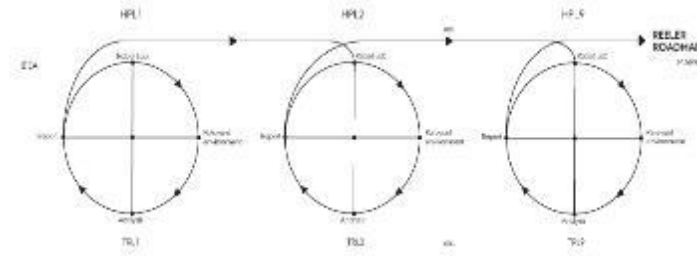


REELING ETHICS: MORE THAN 20 ETHICAL ISSUES FOUND

REELER Responsible Ethical Learning in Robotics



REELING ETHICS



ETHICAL ISSUES: CASE 1

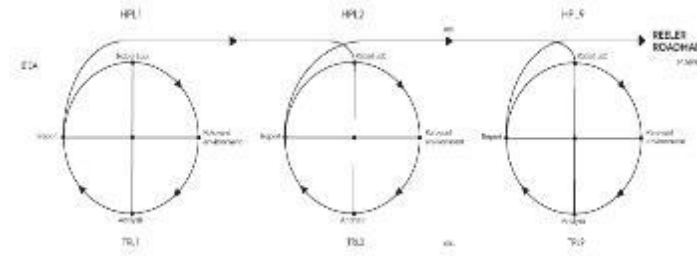
Given the close proximity of many health robots, should affected stakeholders like family members be more involved in the physical design of the product; how it looks, how it feels to wear, how it feels to operate/work with?

ETHICAL ISSUES: CASE 2

Professional pride and engagement

To what extent should human professional pride and engagement be prioritised in the encounter with robots? How not to build robots that do turn affected stakeholders into submissive and thus potentially irresponsible persons?

REELING ETHICS



ETHICAL ISSUES: CASE 3

Should roboticists be aware of the ways in which they exclude specific people through their design? How will the excluding mechanisms unfold when the robot is used in practice? Who is responsible for taking care of those people who are excluded from using the robot?

ETHICAL ISSUES: CASE 4

Do roboticists have a responsibility to communicate realistic ideas and visions about their robots? What effects does public images of robots – that are often unlike the robot in development and practice - have in society among policy and decision makers for example?

Telenoid in Japan and Denmark



Same robots in healthcare and classrooms
Paro and Silbot in Denmark



Experiments far from movies

REELER FINDING: ROBOTS ARE BASED ON FORMER ROBOTS AND AVAILABLE TECHNICAL SOLUTIONS





SOLUTIONS BEFORE PROBLEMS?

Solutions are co-producing how to define 'problems'.

Robots as a solutions to a problem come with certain perspectives, values, identities, and rooms for reflection.

Social technologies at work

PROBLEMS AND SOLUTIONS

An anthropological perspective:

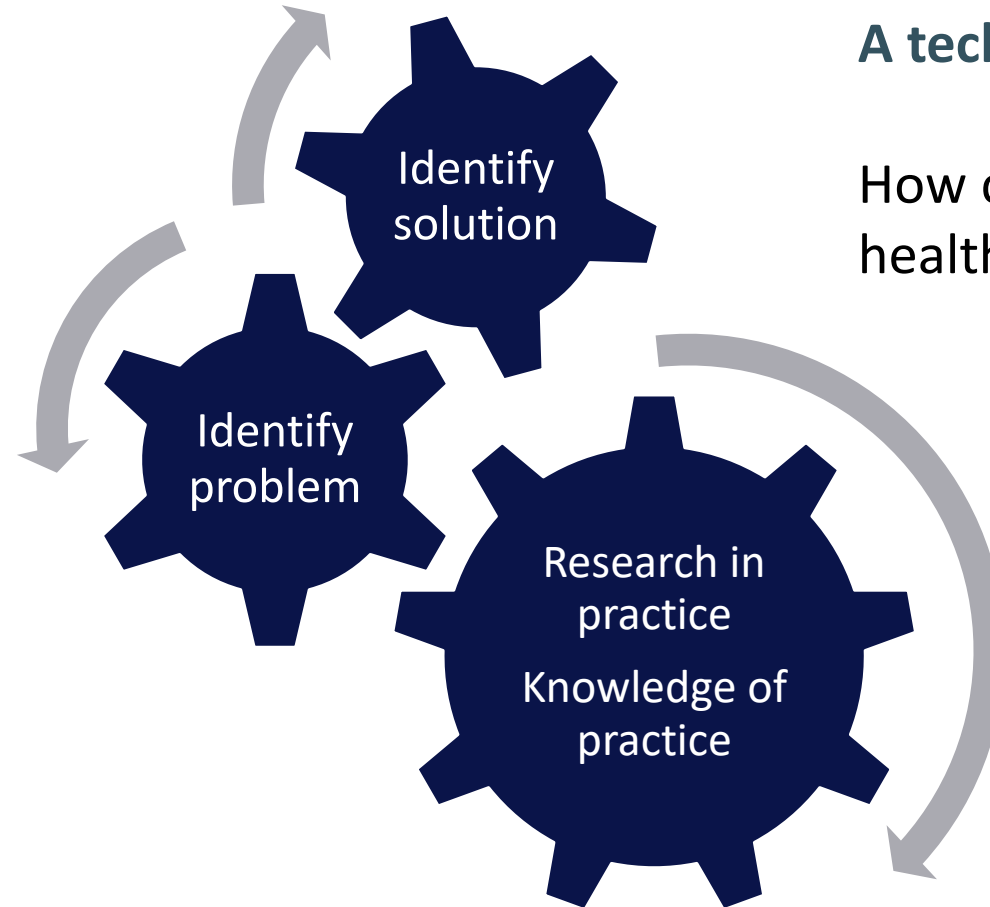
How can we find new solutions to elderly care?

How do robots in practice influence ?

- Social relations
- Kin
- Moral obligations

A technical perspective:

How can robots help with healthcare issues?





REELER

- RESPONSIBLE ETHICAL LEARNING IN ROBOTICS

The project aims at aligning roboticists' visions of a future with robots with empirically-based knowledge of human needs and societal concerns through a new proximity-based human-machine ethics that take into account how individuals and community connect with robot technologies.



REELER APPROACH

HUMAN PROXIMITY SPECTRUM



MAIN CONCLUSION

“As the chapters have made clear, Telenoid most often becomes something completely different to what its designers intended and clearly changes purpose in actual use ‘to the point where its original function may be lost altogether’”.

Leeson 2017, 229-230

