

# The Bionic Man: Towards Augmented Humanity

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# IDEA

- ◎ Mankind is facing a wave of **hybridization**
- ◎ Hybridization = augmentation / extension with artificial **devices integrated in the body** (incl. the mind)
  - **Sensors** (hearing, seeing, sensing the Internet, ...)
  - **Actuators** (limbs, heart, gland, “immuno-cells”,...)
  - **Other** (memory, CPU, ...)
- ◎ Nobody knows how to integrate/interface/adjust/tune these to the human recipient – example: cochlear implants
- ◎ Massive R&D needed, fundamental + applied

# AMBITION

- ◉ We learn how to **interface** all kinds of integrated devices to the human host
- ◉ We learn how to **adjust & tune** all kinds of integrated devices to the human host at deployment
- ◉ We learn how to **adapt** all kinds of integrated devices to the human host after deployment
- ◉ We obtain **carbon–silicon co-adaptation**
- ◉ Unimaginable perspectives in

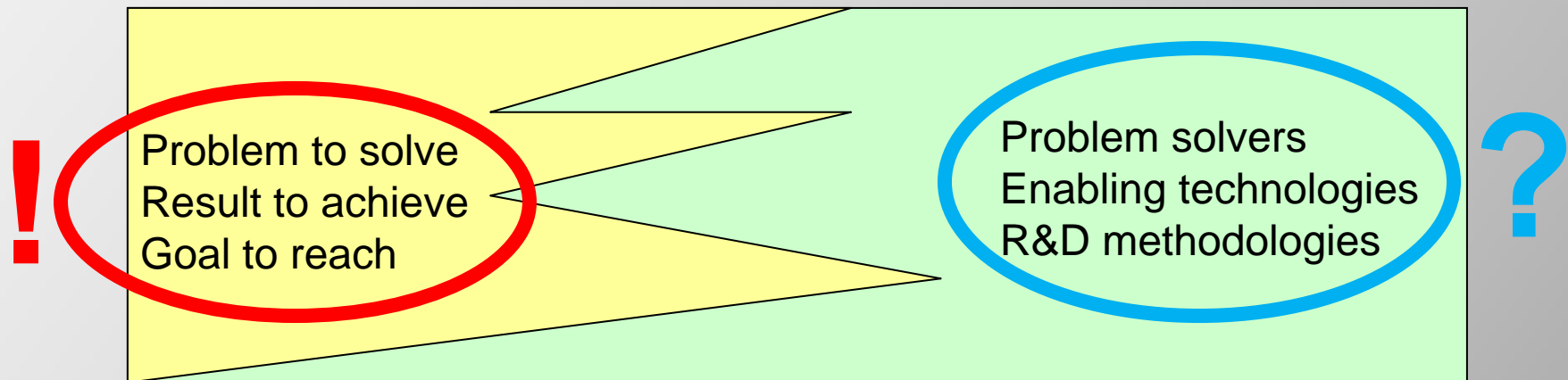
**Quality of Life / Health**

# IMPACT

- ◎ Individuals: improved quality of life by new or regained physical and/or mental abilities
- ◎ Industry and business: new, booming sector (great masses want to see, hear, think, remember better, get *really* connected, etc)
- ◎ Science: new alliances between disciplines , S/T challenges for centuries, human-driven modus operandi
- ◎ Philosophy: must rethink the notion of 'human'
- ◎ Society: co-adaptation, co-evolution of natural & artificial

# INTEGRATION

- ⦿ **New alliances** between disciplines needed (Physiology, machine learning, Control theory, Electrical and mechanical engineering, Audiology, AI, HCI, Linguistic, Materials)
- ⦿ In general: medical science, computer science, material science, engineering, psychology, sociology, ...
- ⦿ Need **new infrastructures** (journals, conferences, institutes, funding schemes) **grouped around human skills & abilities**: e.g. “augmented vision” or “improved immune systems”
- ⦿ **This idea is goal-driven**, needs integration with enablers



# PLAUSIBILITY

- ⦿ Some problems have been already addressed, e.g., cochlear implants, artificial heart, limbs (e.g., OptiFox project)
- ⦿ **This Flagship can have a well-grounded, goal-oriented start** through (almost) existing hybridization devices
- ⦿ **Flagship is sustainable and extendable** by the possible next levels (interfaces, adaptation) and new extensions

**Health - ICT - Engineering confluence**

Current status: open for partnerships, need enablers