The MAX IV Way of *Agile* Project Management for the Control System.

Vincent Hardion, Mirjam Lindberg, Darren Paul Spruce

MAX IV

Individual and Interaction

Control group

KITS Contact is a member of the developer team

"Excellent way to distribute the awareness"

KITS Contact is a "Scrum master" Proxy

Beamline / Accelerator Local Contact is a Product Owner following the Scrum terminology

Beamline / Accelerator Subsystem

Pair programming, developers are encouraged to work together.

Code Review, each development is checked by another teammate in order to ensure the current quality standard. In KITS the code review is mandatory before deploying in operation.

Task Force, every one is engaged together to work on one particular task for a short period of time, when an emergency occurs.

Retrospective, looks back on how to improve the working environment and to reduce the technical debt.

Product Owner assignment, who wants to or can represent a group of users and understand this role.

Involvement, the Product Owner needs to devote time to stay engaged otherwise the team work without feedback.

Gaining trust, is a long term challenge especially company wide even if Agile has proven its efficiency.

More than one Product Owner i.e beamline projects, a good mediator is a must-have to resolve priority.
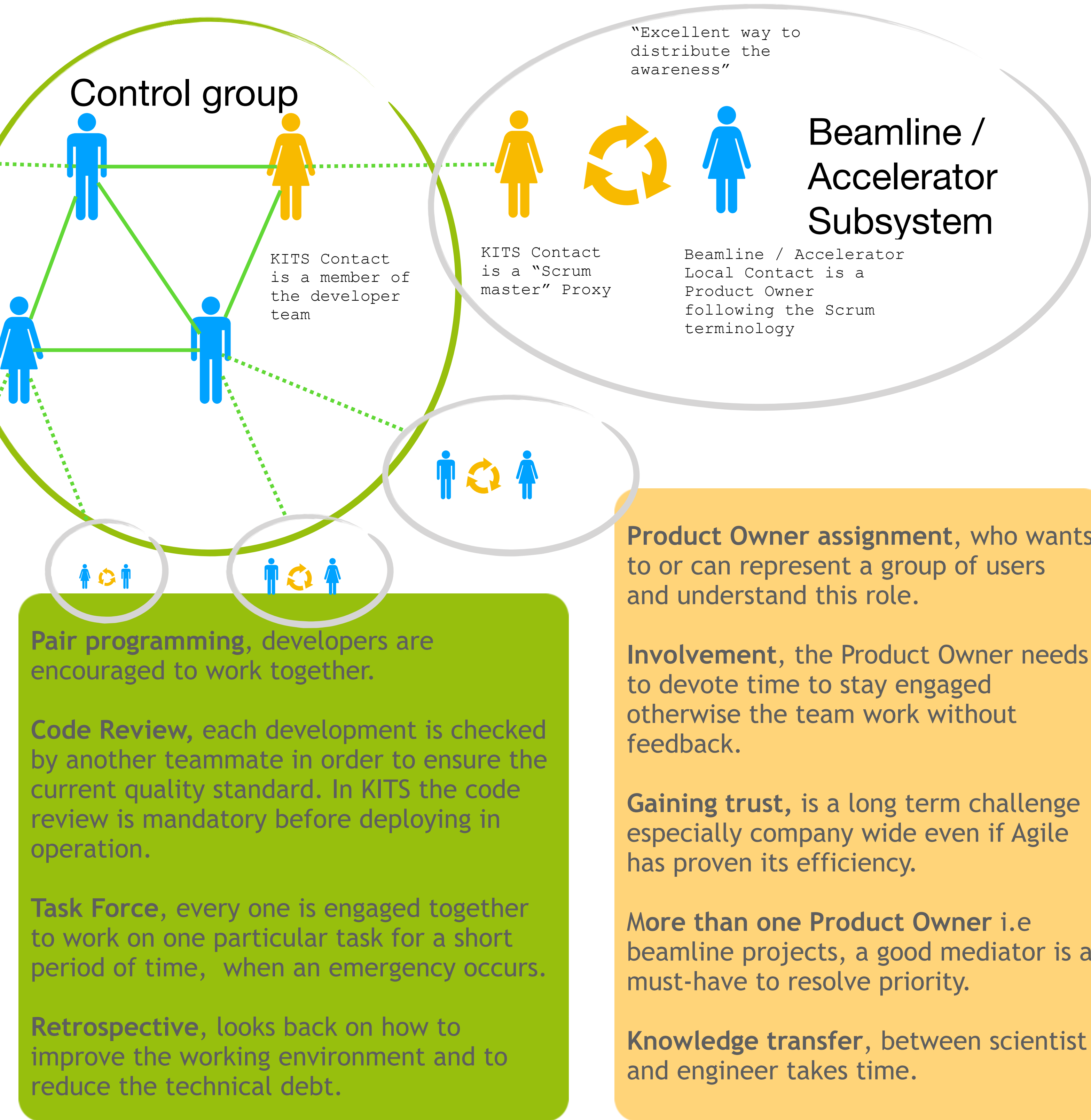
Knowledge transfer, between scientist and engineer takes time.

Working Software

Contract built on trust with the user built on trust rather than a detailed list of predefined requirements.

Winning the understanding of the customer for the iterative process.

Avoid working on architecture first and not refactoring afterward, is challenging for the developer with little Agile experience.

Minimum viable product. At any point of the project there is a working product in operation avoiding deadline rush.
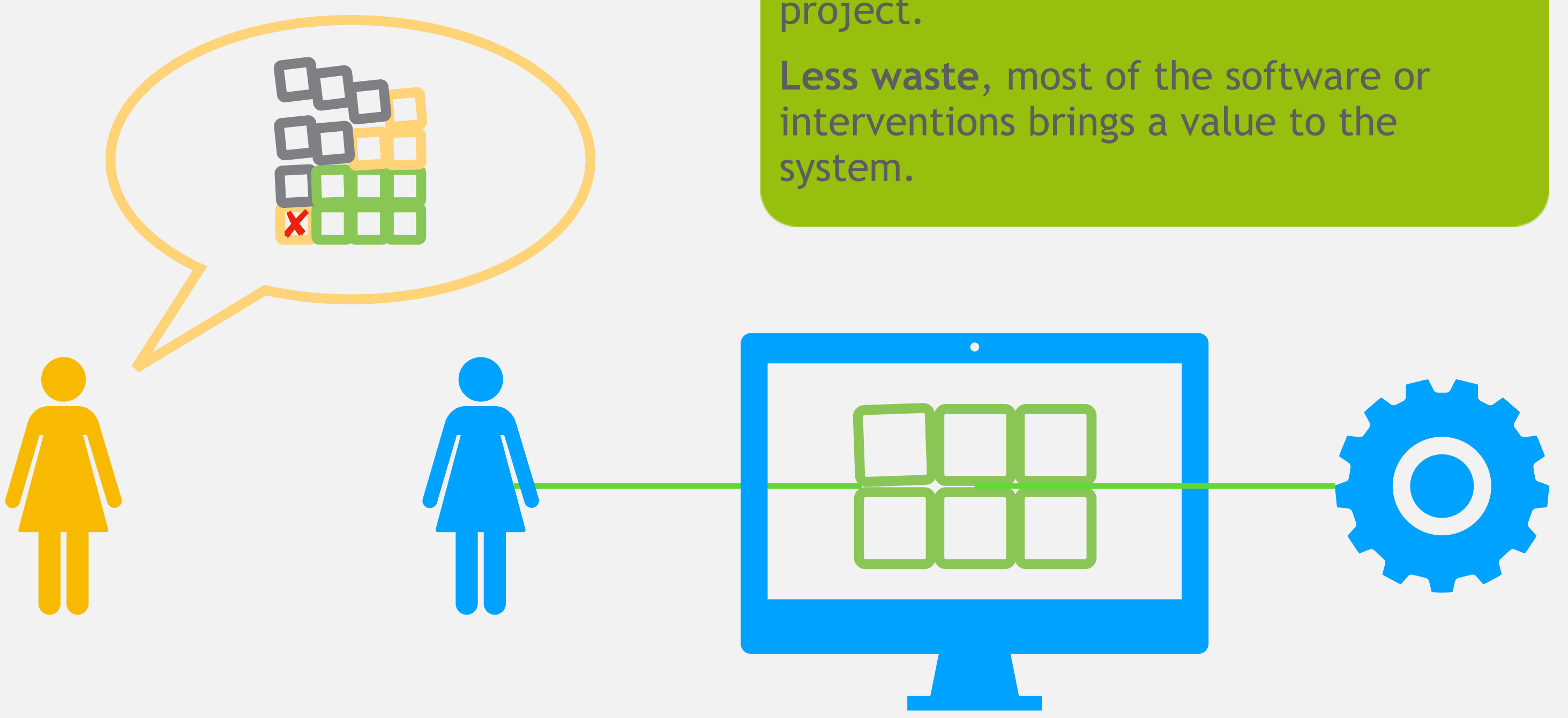
Reuse solution already developed instead of reinventing the wheel, get more time for the innovation.

Faster feedback, the User eXperience(UX) has usually a very high focus as the development follows the user's feedback.
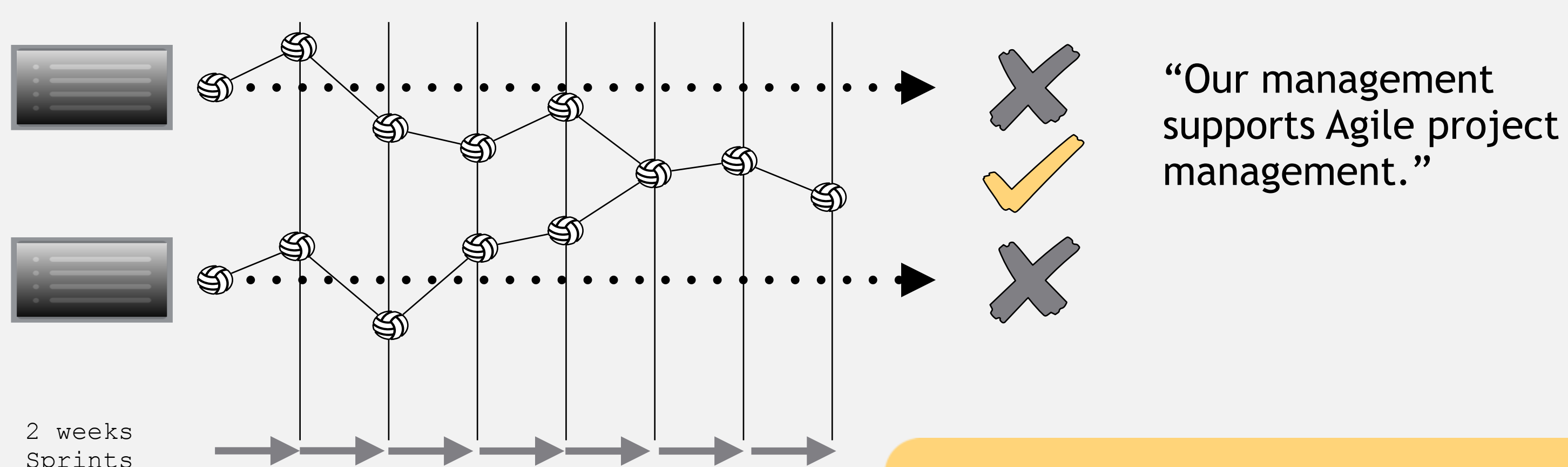
Refactoring is efficient as it occurs only on validated features.

Problem solving, major risk are treated first to prove the feasibility of the project.

Less waste, most of the software or interventions brings a value to the system.

Responding to change

2 weeks Sprints

"Our management supports Agile project management."

Just In Time, the Control teams really try to deliver the product on time without developing too far in advance. The user can start using the product and give immediate feedback. Few developments are wasted like unnecessary abstraction, mock up or unused features.

Same pace for everyone. A stand up meeting is held every morning. This is the right moment to synchronise with each other or ask for help. Having the same "Sprint" makes everyone aware of the delivery time, meaning the integration usually goes smooth.

Understand the Scope Trade, the PO likes the possibility to change but may want it as an addition to the scope.

Ready to validate, understand if the user will be ready to test the new feature to avoid planning development too far ahead.

3 months release ceremony, it's difficult to align every PO for a 3 months release ceremony (SCRUM) as the projects have different pace. This would be fantastic to join the effort for common features.

Readiness is tricky, deliver on time the idea is to work ahead of time on the most risky developments.

Be proactive, a substantial amount of time is devoted to poll the people in order to identify the risk, the trade off, understand the value.

Customer Collaboration

Time for own development, around 25% for continuous improvement or innovative projects to "sell". Additionally 10% can be used for innovation.

Long term vs short term, sharing the same vision is a real challenge.

Keep the involvement of the stakeholder in order for Agile to work. The iterative feedback is necessary since there is no detailed specification to check the progress against.

Integration with Waterfall is always tempting to provide a detailed time plan.

User Autonomy Level to adapt, people may have their own opinion and can end up building their own solution, with its own pros and cons.

User Oriented, all development are steered by the user's needs.

Work on possible solutions, when the development goes in the right direction, provide simple rather than complex solution.

Time to think, behind the specification of the product there are many assumptions that the user can clarify.

PULL system
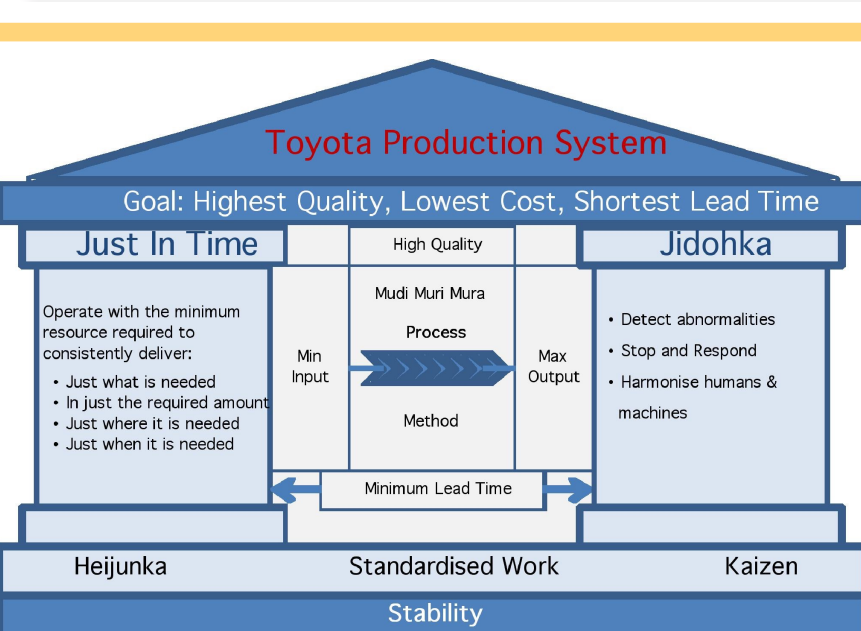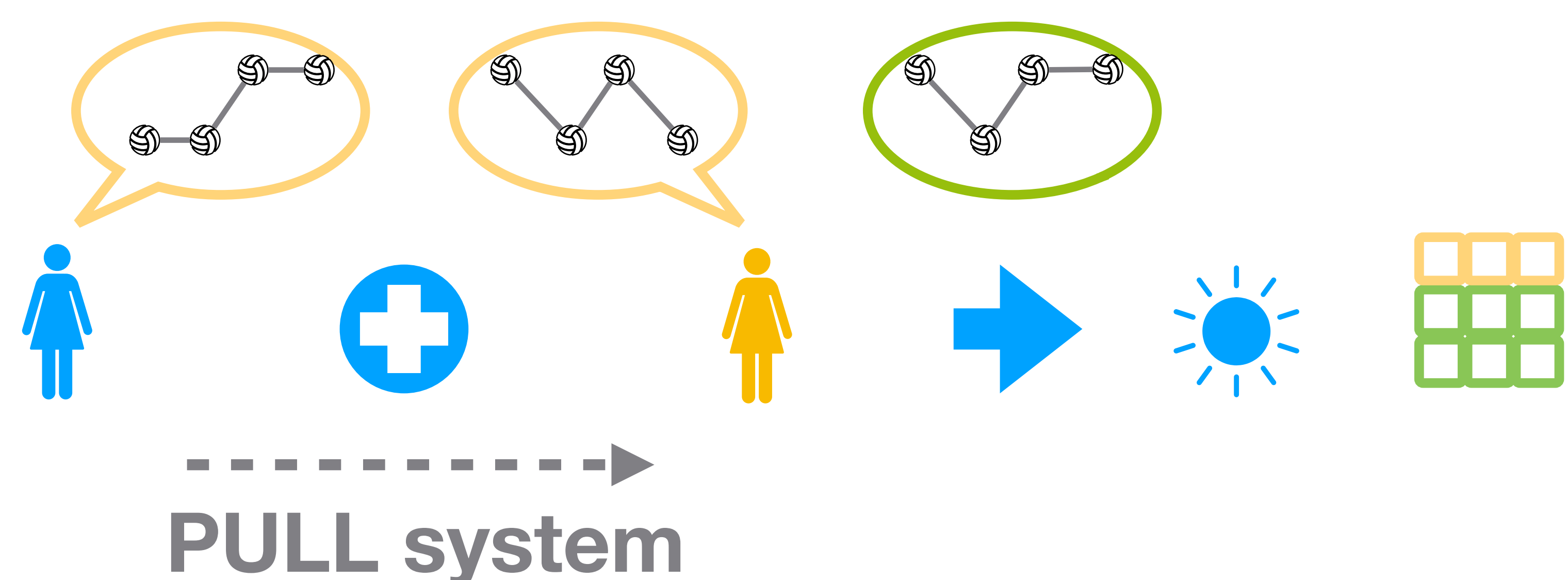
Projects management of synchrotron is both complicated and complex. Building scientific facilities are resource consuming although largely made out of standard and well known components. The industrial approach of project management resolves this complication by requiring analysis and planning to facilitate the execution of tasks. The complexity comes by all the research making unique the accelerators, the beamlines and its usage. Known unknown requires experiments which evolve continuously causing the development path to be naturally iterative. Agile project management has come a long way since its definition in 2001. Nowadays this method is ubiquitous in the software development industry following different implementation like Scrum or XP and started to evolve at a bigger scale (i.e Scaled Agile) applied within an entire organization. The versatility of the Agile method has been applied to a Scientific technical development program such as the MAX IV Laboratory control system. This article describes the experience of 7 years of Agile project management and the use of Lean Management principles to develop and maintain the control system.

Toyota Production System

Complex / Complicated / Chaotic / Simple
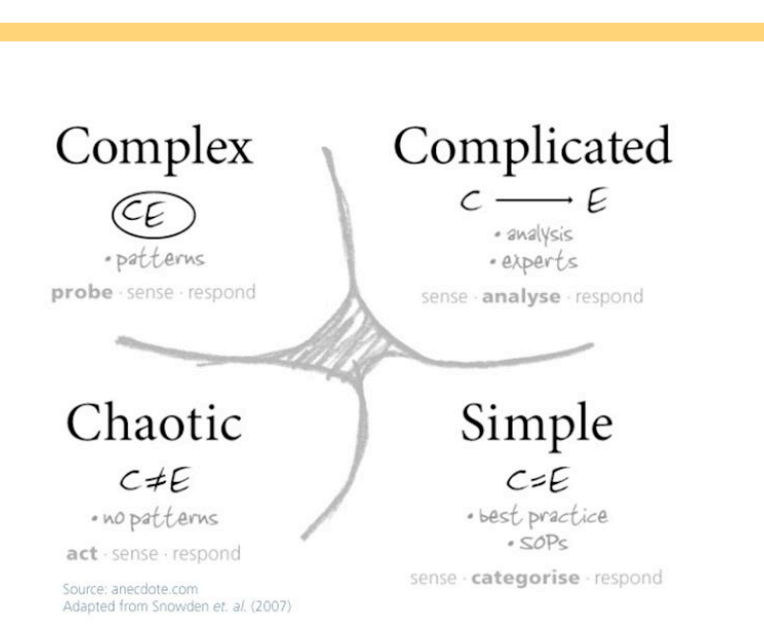
MAX IV Laboratory

has operated successfully for more than 30 years and is currently operating the new MAX IV synchrotron facility in Lund. Fully developed it will receive more than 2 000 scientists annually, from Sweden and the rest of the world. They will do research in areas such as materials science, structural biology, chemistry, geology, physics and nanotechnology. MAX IV is the largest and most ambitious Swedish investment in national research infrastructure. It is the brightest source of x-rays worldwide, inaugurated June 2016. MAX IV Laboratory is hosted by Lund University.