

Digital transformation is currently key for the industrial sector to guarantee competitiveness, modernisation and internationalisation. However, sustainable operations must keep workers, their productivity, job satisfaction and health at the centre of this transformation. Using case studies in garment and automotive industries, Operator

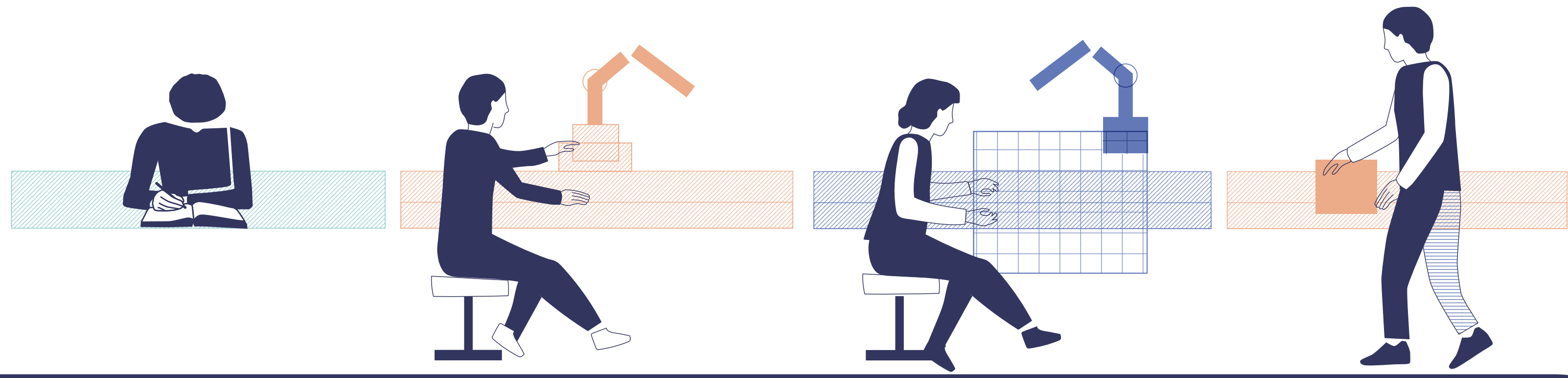
will seek to reconcile Productivity, Ergonomics and Mental health. It will do so by performing automatic monitoring of human motion through wearable devices towards the design of ideal work methods, ubiquitous exposure analysis through environmental sensors, and self-reporting tools to support mental wellbeing. Thus, Operator approaches the Industry

4.0 workplace holistically from the point of view of the workers, gathering and crossing quantitative and qualitative data, building a richer picture of workers' wellbeing and enabling better predictive models. The resulting technology can then be commercialised by the promoters of the project to industrial production units which have gone, or are going, through the process of digital transformation.

▲ COGNITION • Self-Reporting • fNIRS

▲ PRODUCTIVITY • IMU

▲ ERGONOMICS • IMU • EMG • ECG



DATA COLLECTION & USER RESEARCH

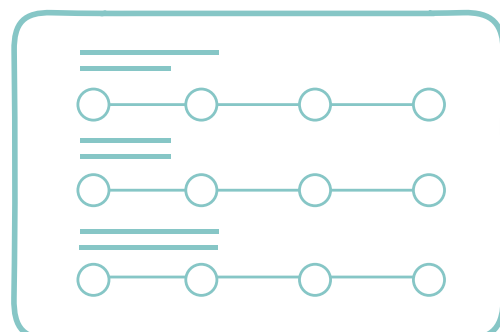
ETHICS APPROVAL

- Interview to key stakeholders



30 OPERATORS

- Diary study (2 weeks)



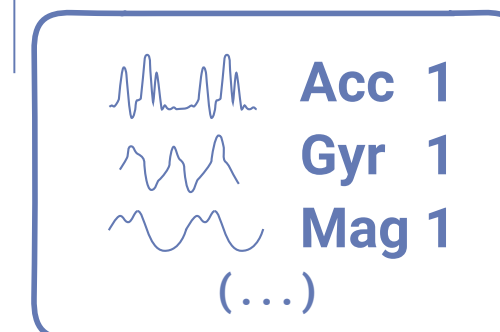
- N° of work cycles
- Average production rate
- Similarity w/ standard method
- N° of unplanned stops



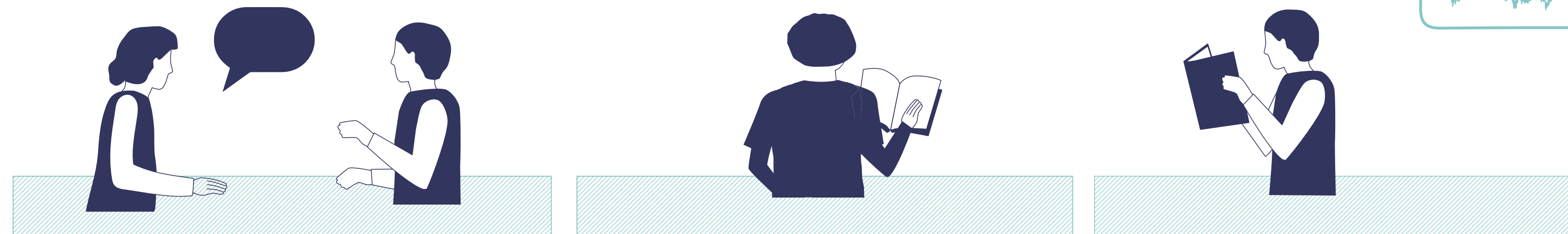
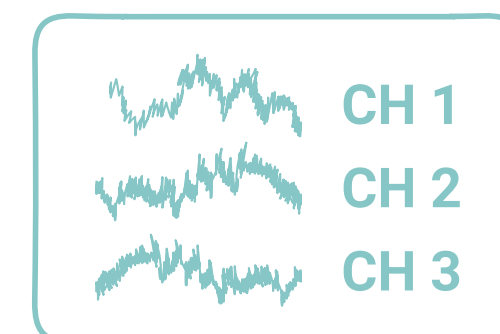
- Normal sinus recovery time after stress



- Ergonomic risk exposure (EAWS, RULA, etc.)
- Fatigue

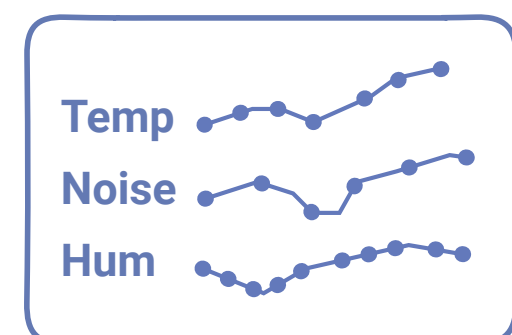


- Perceived workload



CO-DESIGN

- Environmental data



- Semi-structured interviews & prompting with diary data visualizations



- Systematic observations



- Open observations & log of verbalizations

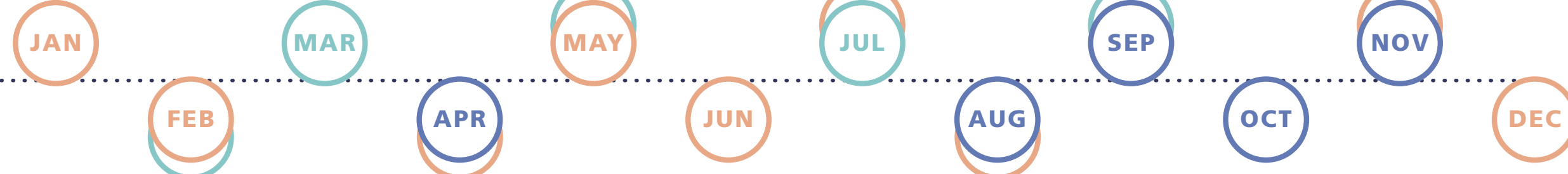


- Dashboard for decision makers

- Data visualization for operators

- Wearable for automatic inertial data collection & self-reporting

100 OPERATORS



FIELD TRIALS 12 MONTHS

- ▲ Reduced absenteeism
- ▲ Reduced musculoskeletal disorders
- ▲ Evidence for mental wellbeing at work
- ▲ Technology for commercialization

IMPACT