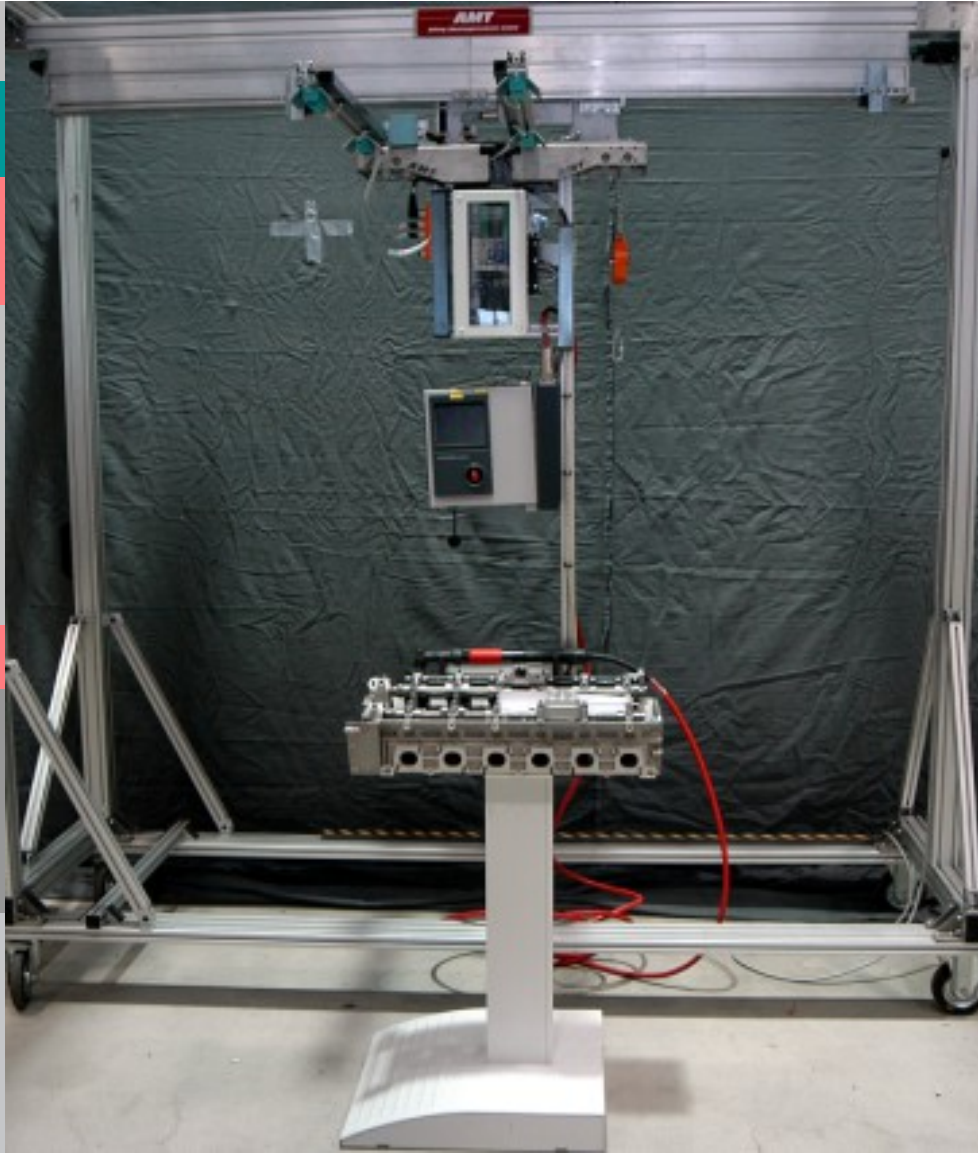


# Process security systems on manually assembly operations with Ultrasonic-Triangulation



# Position recognition with ultrasonic triangulation



RailNet-Railsystem

Ultraschall-Receivers

Ultraschall-Controller

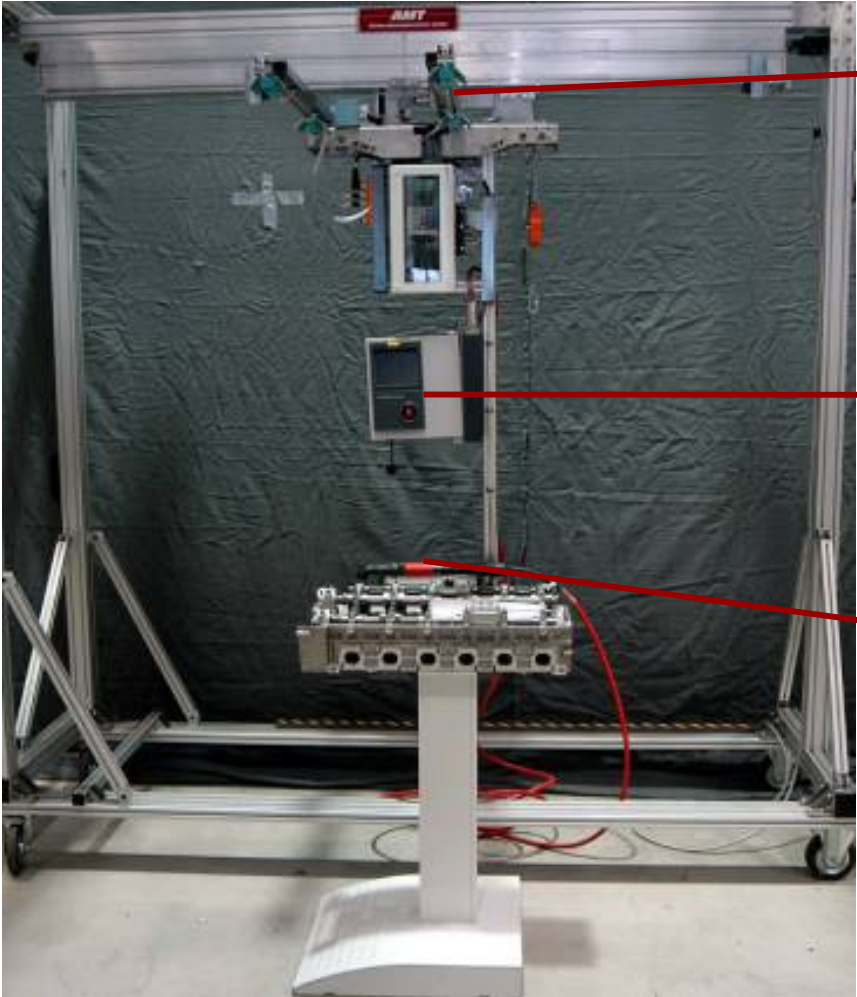
Controller SMX30  
with 6,5" / 10,4" visualisation

Tool with Ultrasonic transmitter

Workpiece i.e. cylinderhead

Assembly station – workpiece  
pattern

# Position recognition with ultrasonic triangulation

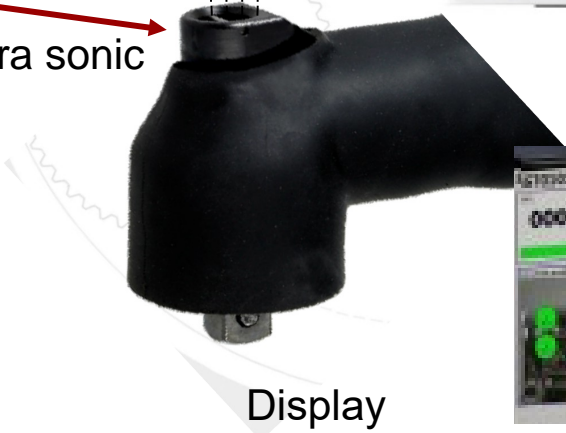


Receiver



Controller

Transmitter  
Ultra sonic



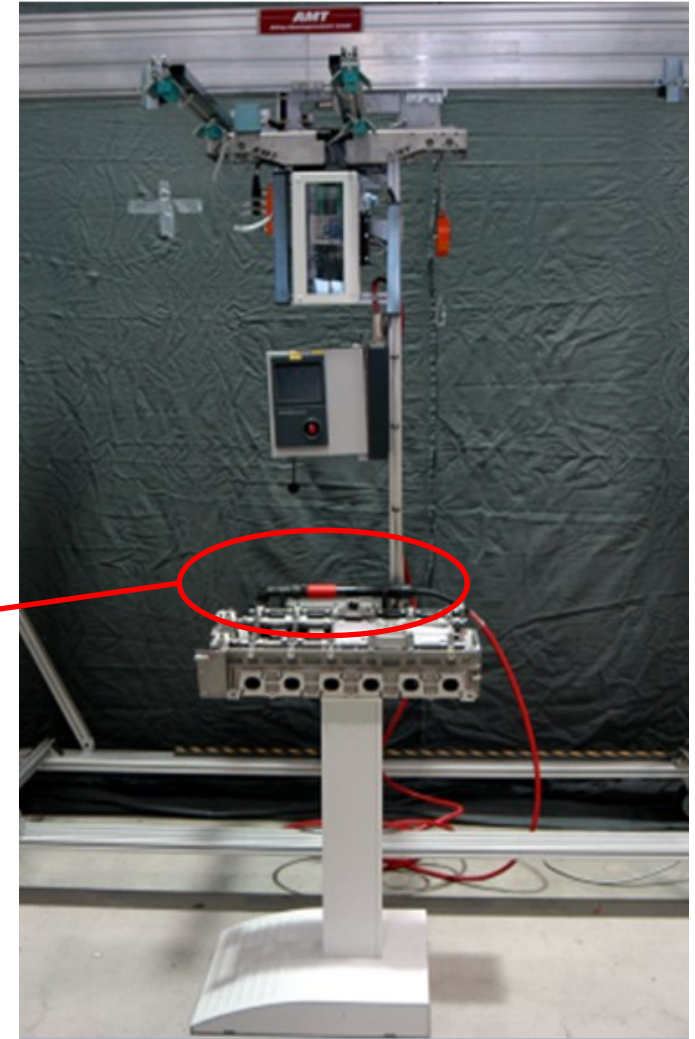
Display



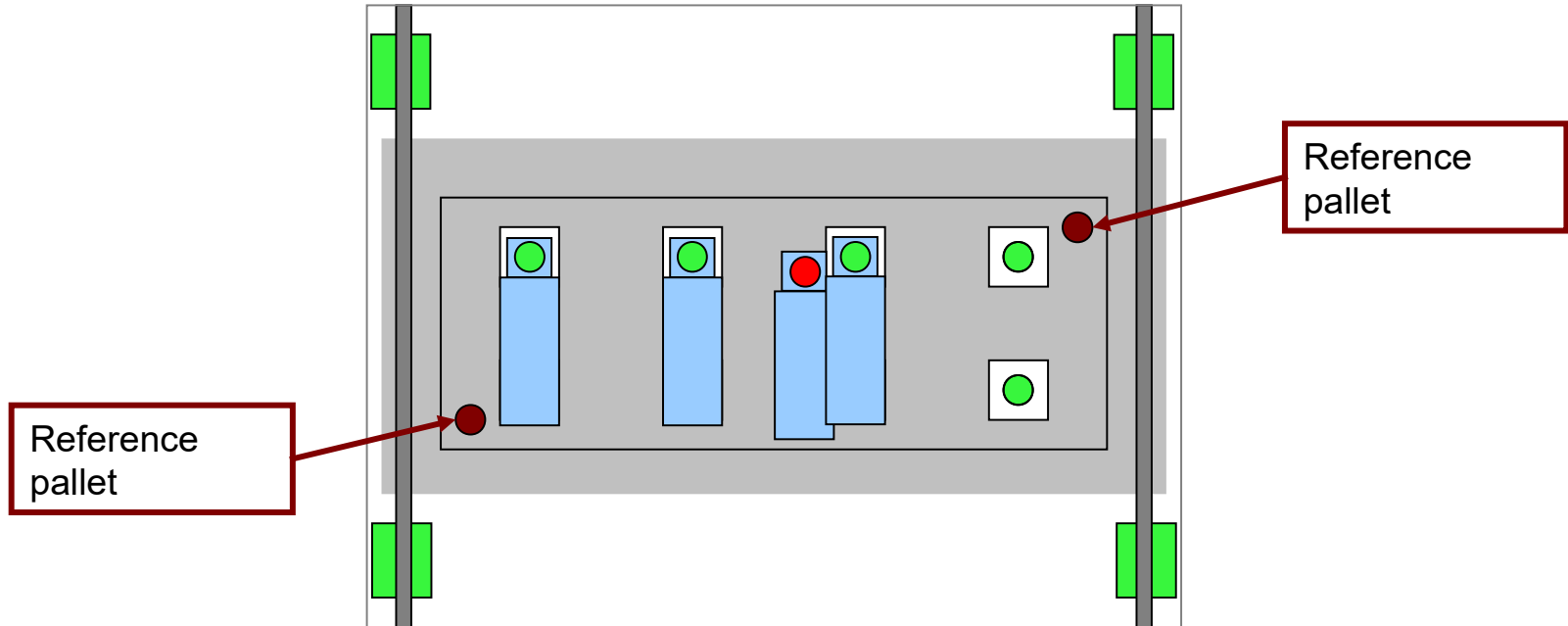
# Position recognition with ultrasonic triangulation

Position localization system (ultrasonic) able to control the correct sequence of tightening

The system needs to know the location of the points of screwing and the correct working sequence



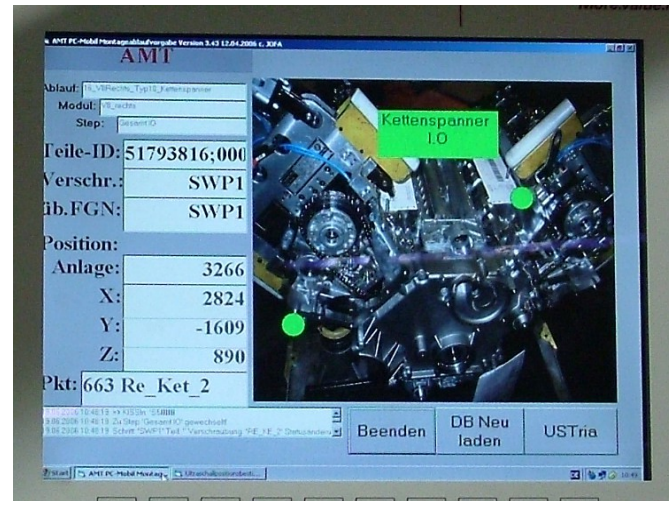
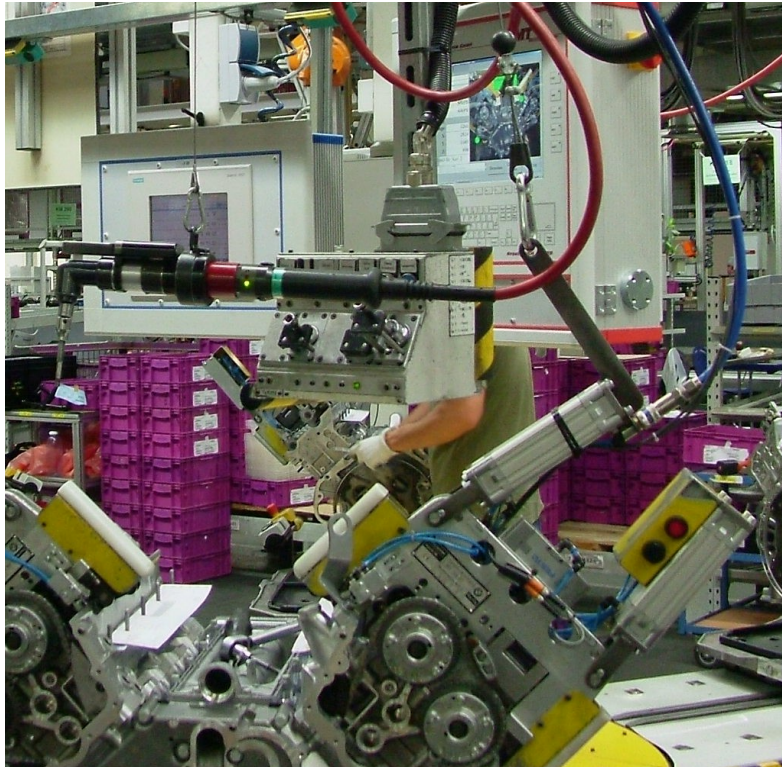
## Non Continuously Moving Line or fixed on pallet



- cycle start operator have to position the tool in the corresponding field to perform any sequence
- If the tool is in the indicated area by the system the tool will be enabled refer ok (green) and the tightening process can started
- If the tool is not in the indicated area the tool will not be enabled and the operator can not make any tightening and the attempt will be identified nok (red). This will happen also in the case of an attempt to tighten an already tightened screw
- Once the operator have completed the sequence he can continue the equipment is ready for the next position

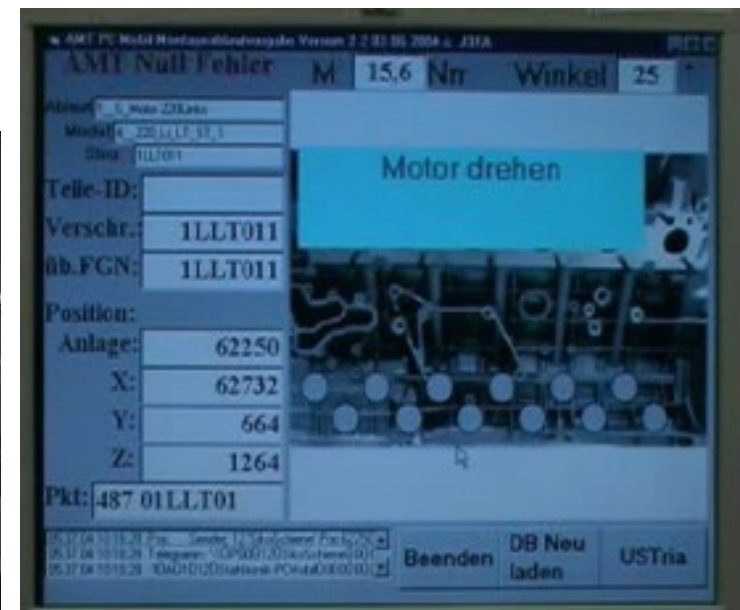
# Tightening positions recognition and – visualisation with Ultrasonic triangulation

BMW Munich –Engine assembly line



# Work station monitoring and tightening position recognition with UST und RailNet

Daimler Berlin – Engine assembly line „Maybach“



# Ultrasonic triangulation in the gearbox assembly





# Work station monitoring and tightening position recognition with UST und RailNet

