



Digitized quality assurance of welded structures towards industry 4.0

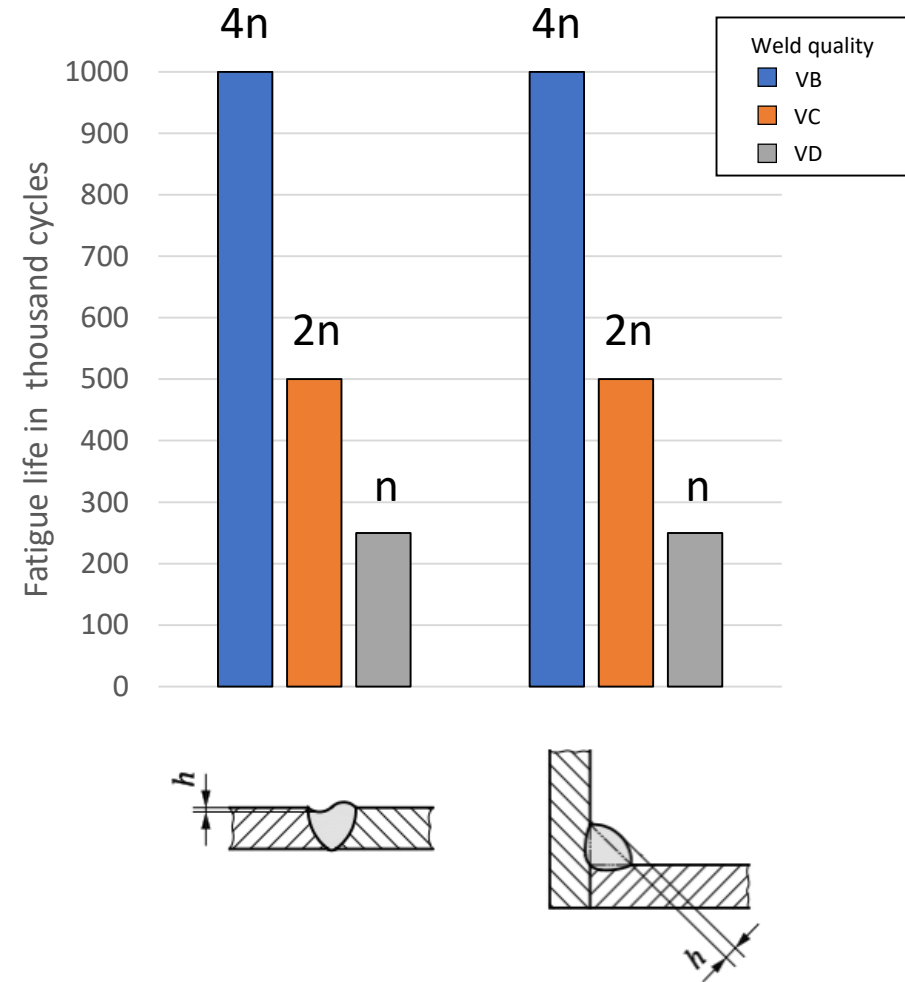
Martin Engman

Quality Assurance 2018 ?



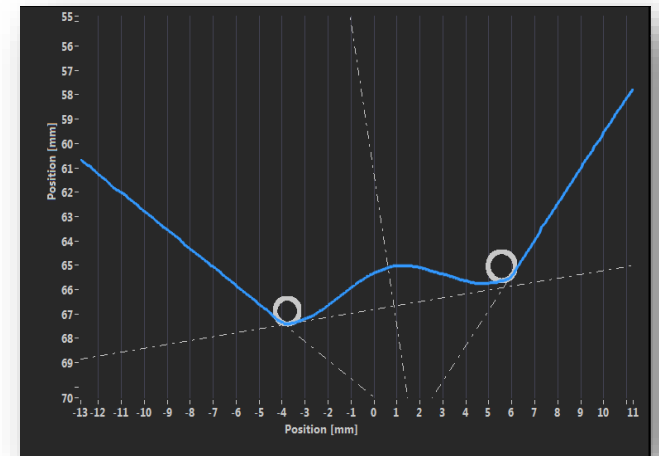
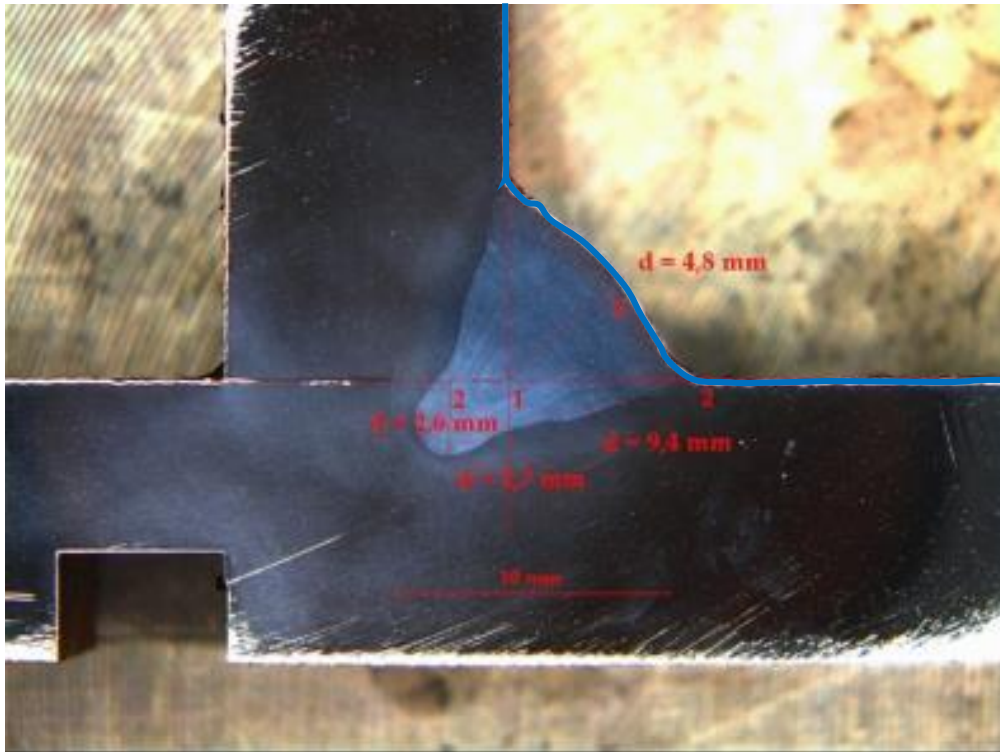
Quality Control – How ?

ISO 5817 Annex C (Volvo Group STD 181-0004)

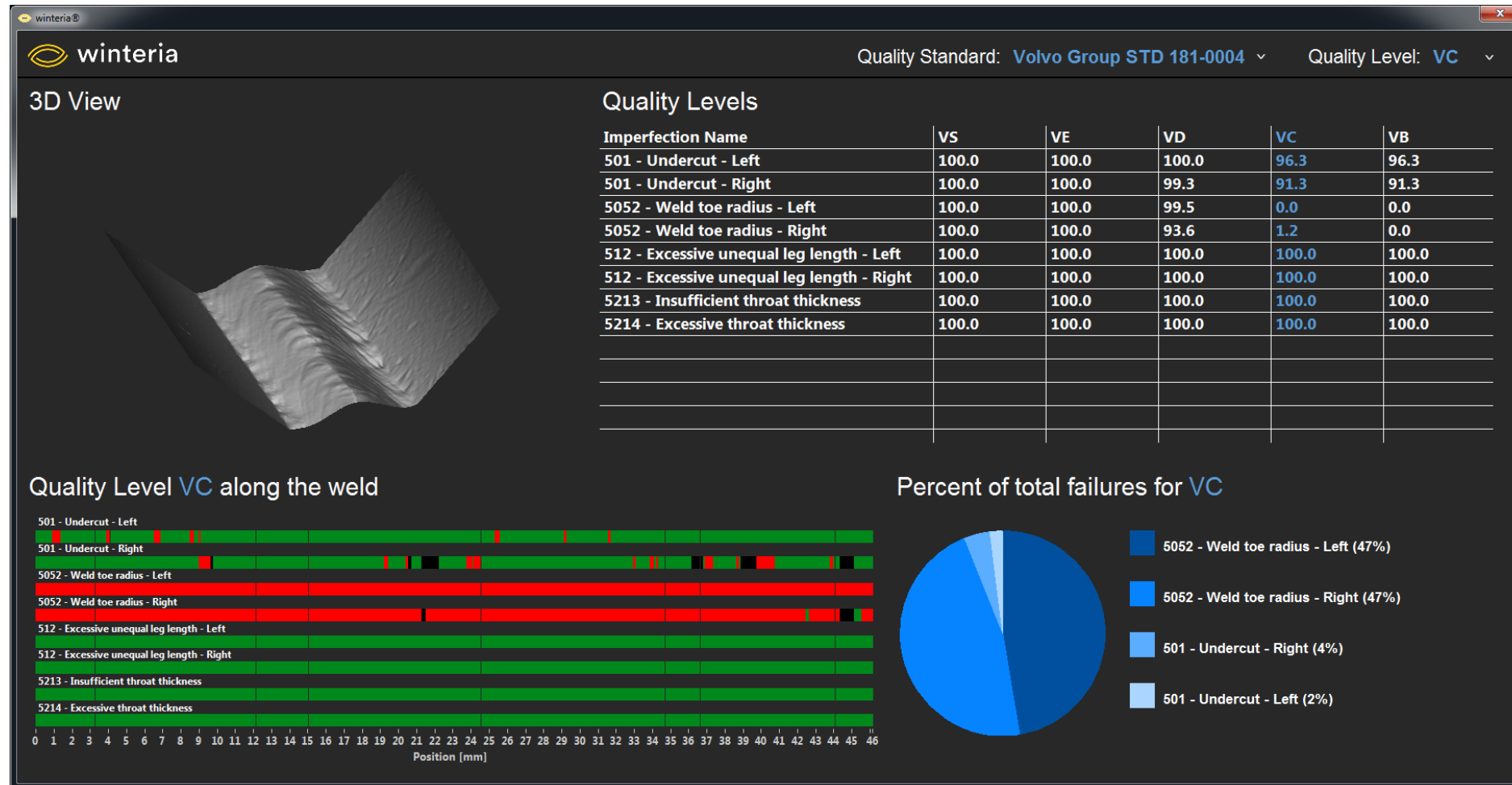


ISO 6520

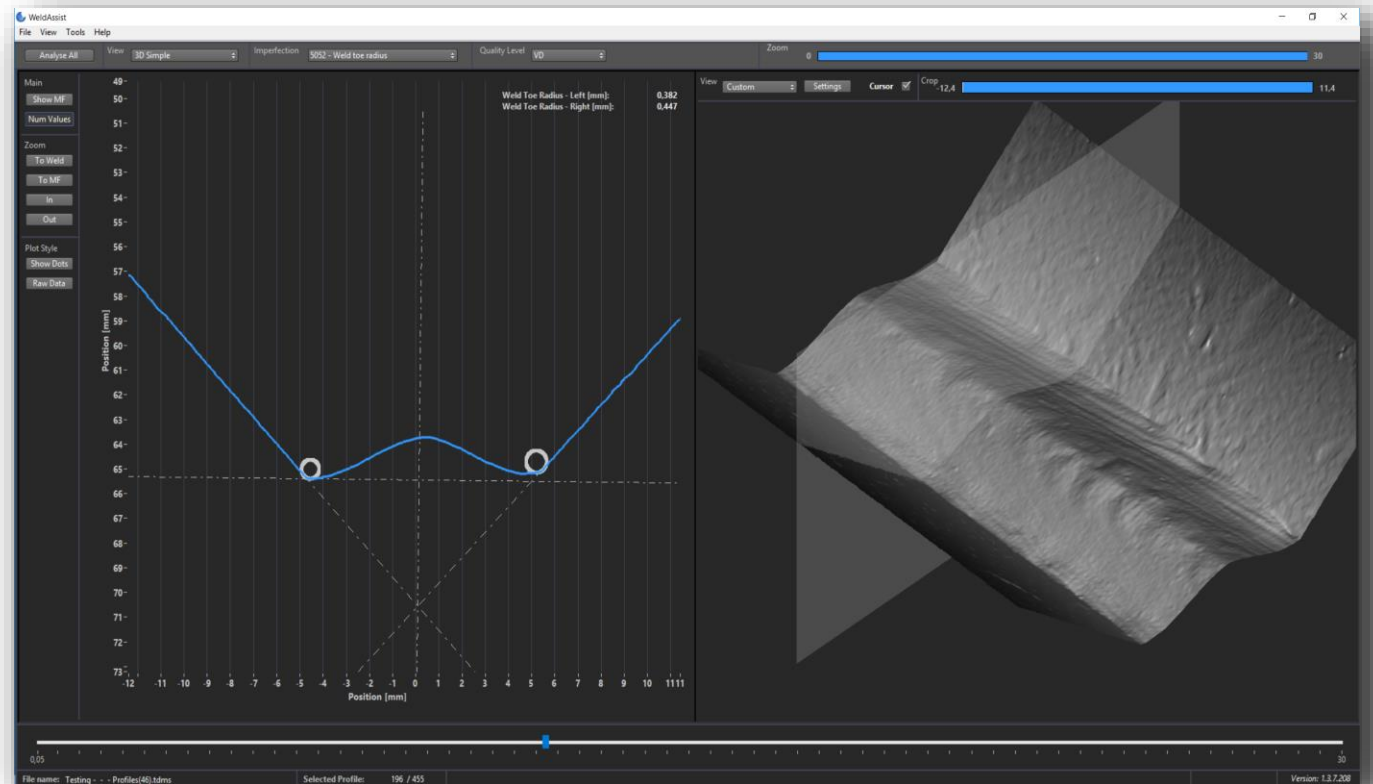
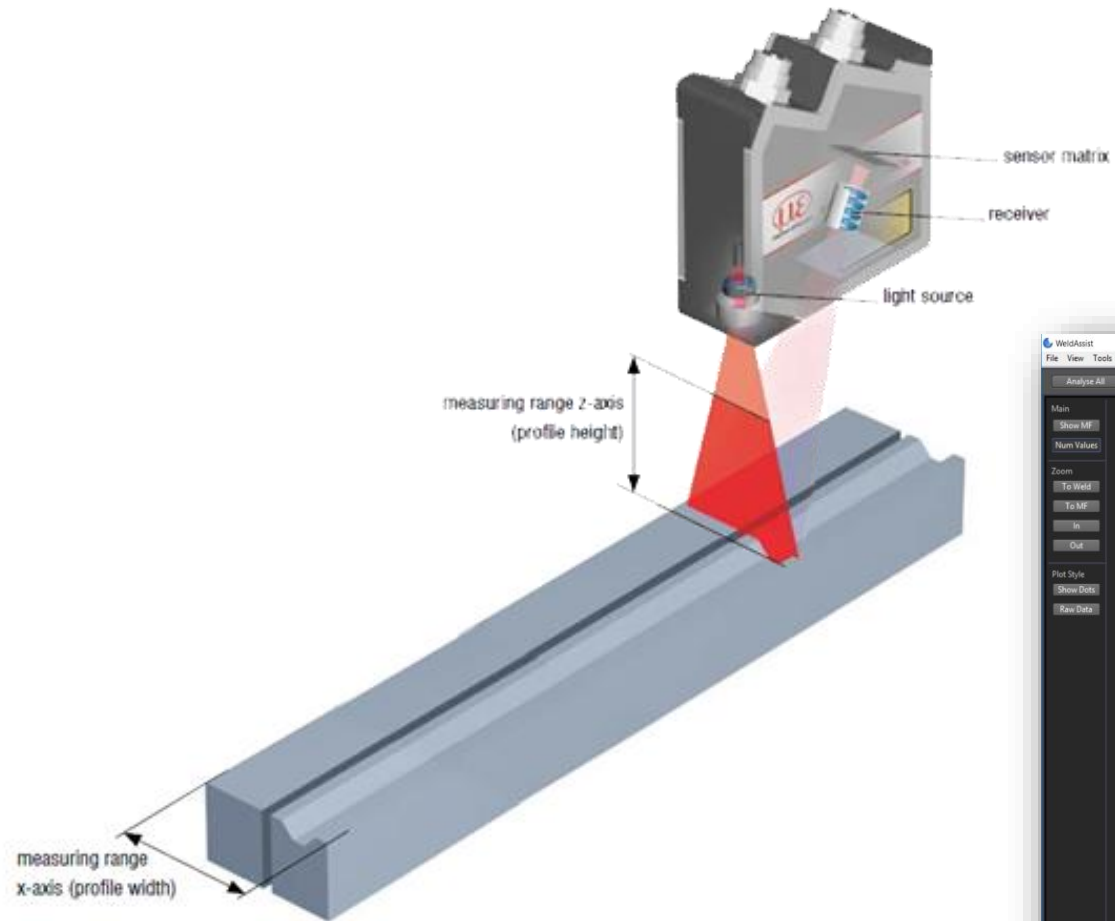
Objective measurements



Relevant data for the operator / engineer



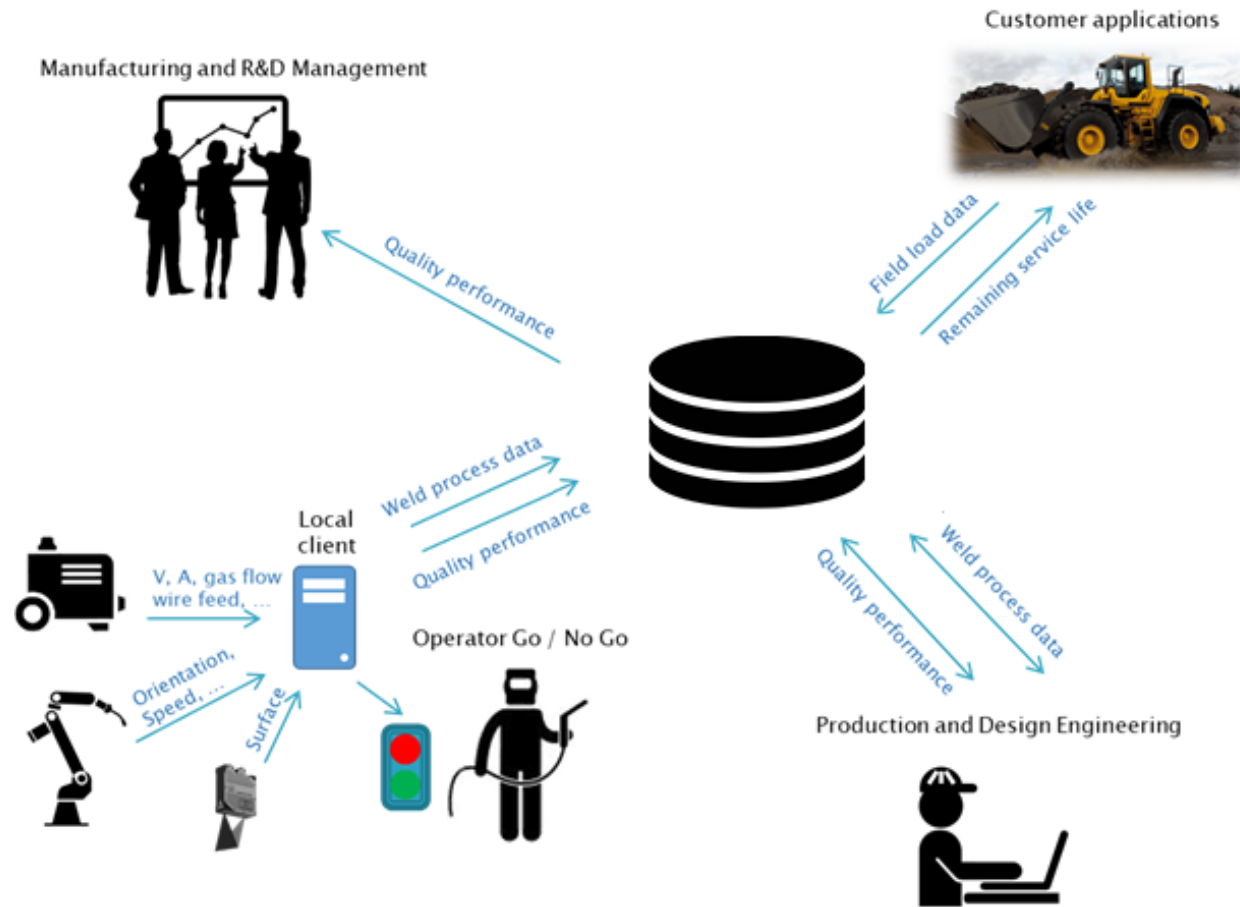
Continuous measurements



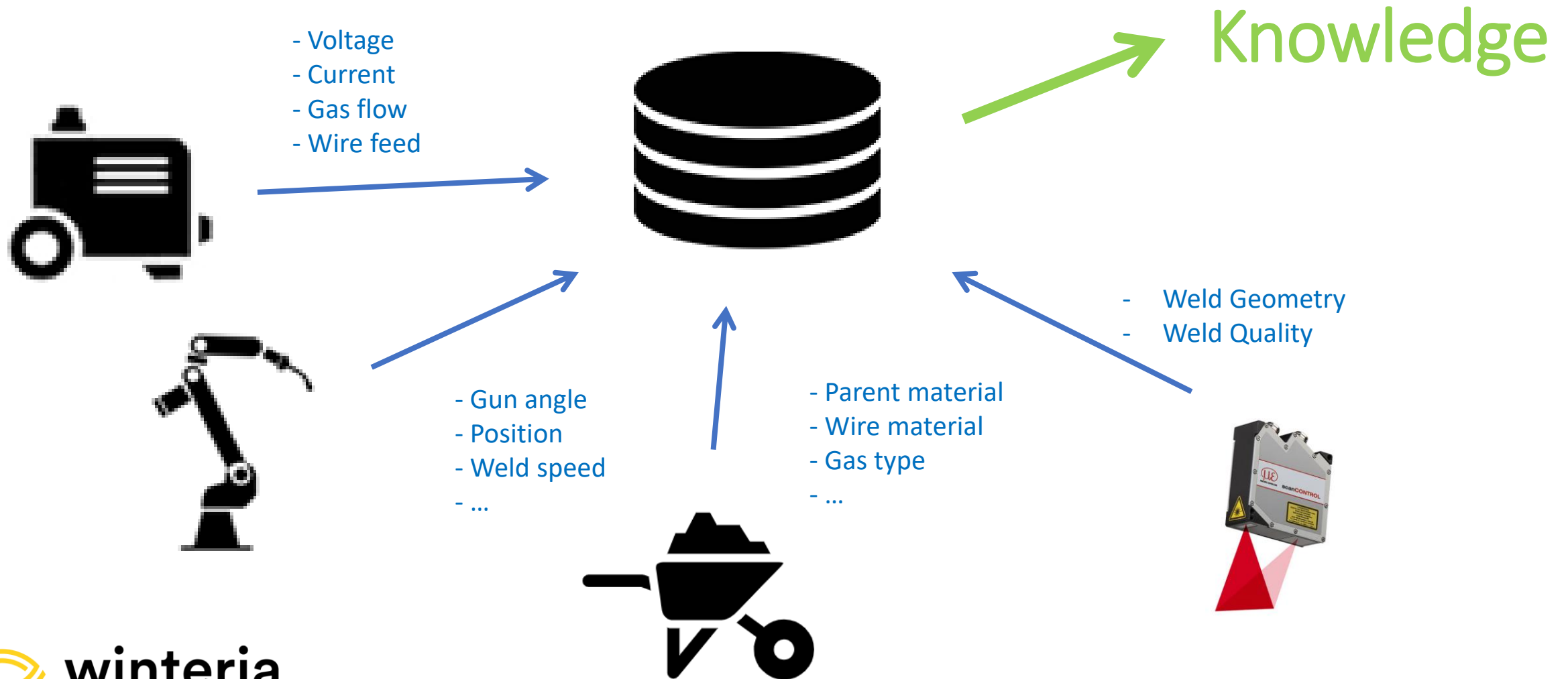
Statistical tools



Connectivity with cloud solution

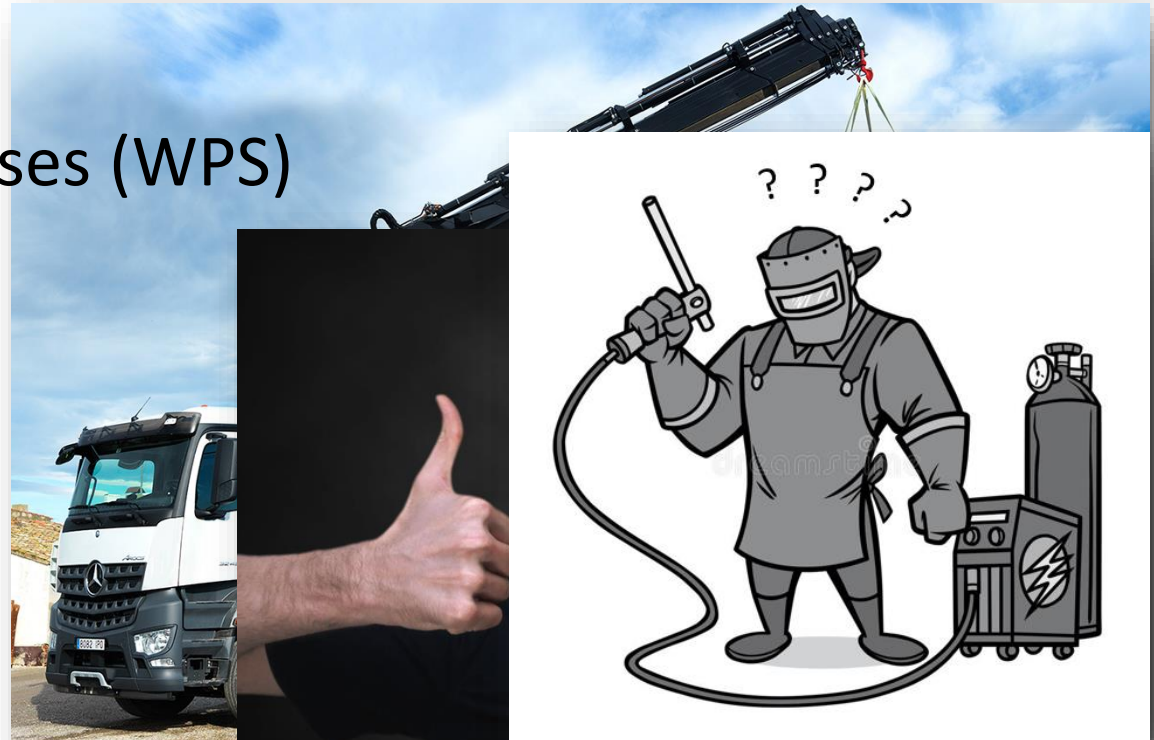


Recipe for quality

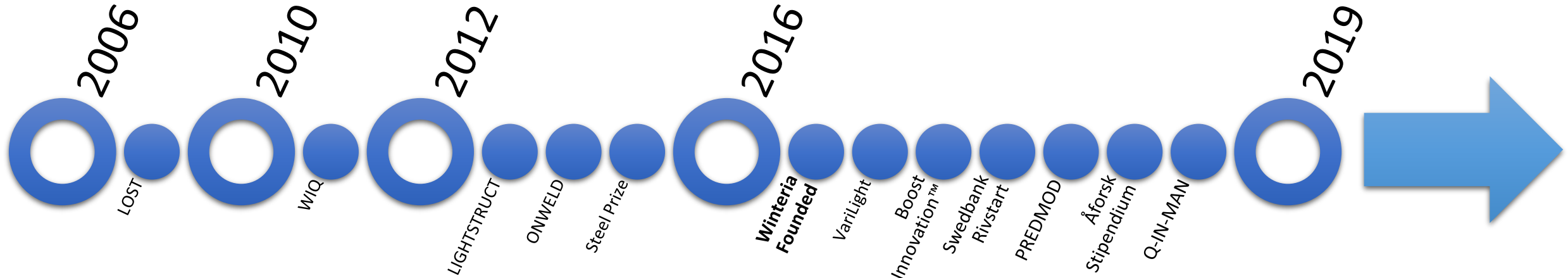


Value for the users

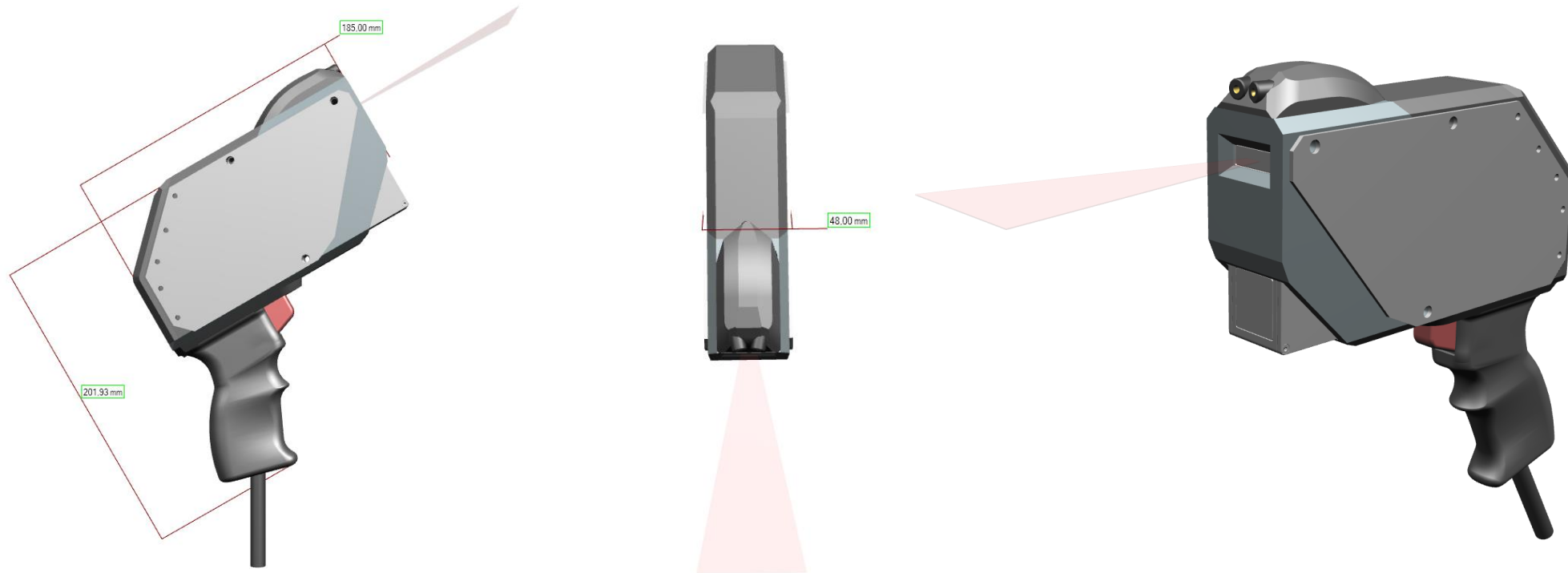
- Reduce disposal, reprocessing and field retrieval
- Process optimization
 - Reducera svetstjockleken (A-måttet) 10 % → Reducera totala kostnaden för svetsprocessen 20%
 - Viktreducering
- Development of welding processes (WPS)
 - Reducera utvecklingstid



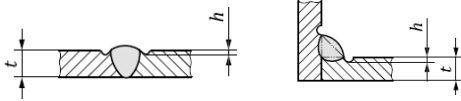
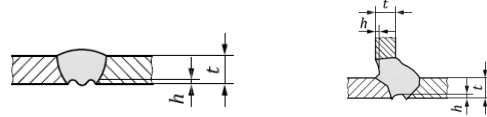
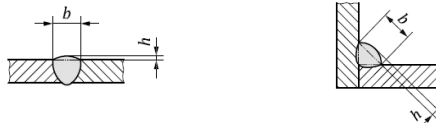
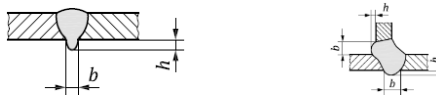
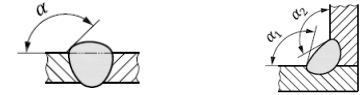
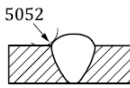
The Winteria system is the result of long term research collaboration



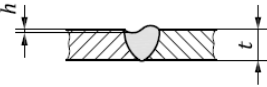
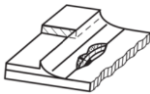
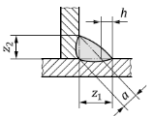
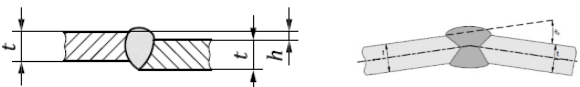
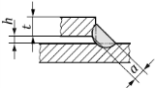
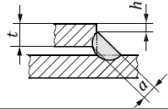
Handheld device – spring 2019



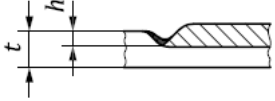
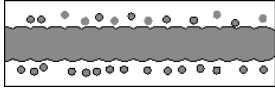
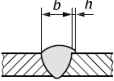
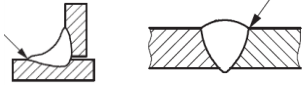
Features implemented in Winteria (1/2)

Designation ISO 6520-1	Description	Drawings	Comments
5011 / 5012	Undercut		
5013 / 515	Shrinkage groove / Root concavity		Possible if the rear side of the weld is accessible
502 / 503	Excess weld metal / convexity		
504	Excess penetration		Possible if the rear side of the weld is accessible
505	Incorrect weld toe angle		
5052	Incorrect weld toe radius		Winteria is the ONLY system which can measure this geometrical feature

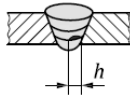
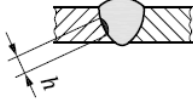
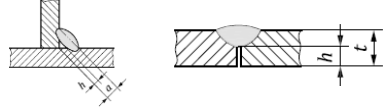
Features implemented in Winteria (2/2)

Designation ISO 6520-1	Description	Drawings	Comments
509 / 511	Sagging / incompletely filled groove		
510	Burn through		
512	Excessive unequal leg length		
5213 / 5214	Insufficient / excessive throath thickness		
507 5071 / 5072	Linear and angular misalignment between plates		
N/A	Incorrect root gap for fillet weld in overlap joints		
N/A	Plate edge visibility		

Backlog

Designation ISO 6520-1	Description	Drawings	Possible with winteria?
100 / 104	Crack and crater crack	Surface cracks	YES
2017	Surfaces pores		YES
2025	End crater pipe		YES
602	Spatter		YES
506	Overlap / Coldlap		Maybe
401	Lack of fusion in weld toe		Maybe

Features not possible with Winteria system

Designation ISO 6520-1	Description	Drawings
300 - 304	Inclusions	
4011 / 4012 / 4013 /	Lack of fusion	
402 / 4021	Incomplete penetration	

Team



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Thank you !

