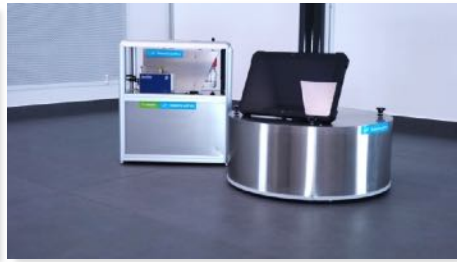




# RobotScanFlex



## Product Description

Supported by:



Federal Ministry  
for Economic Affairs  
and Energy

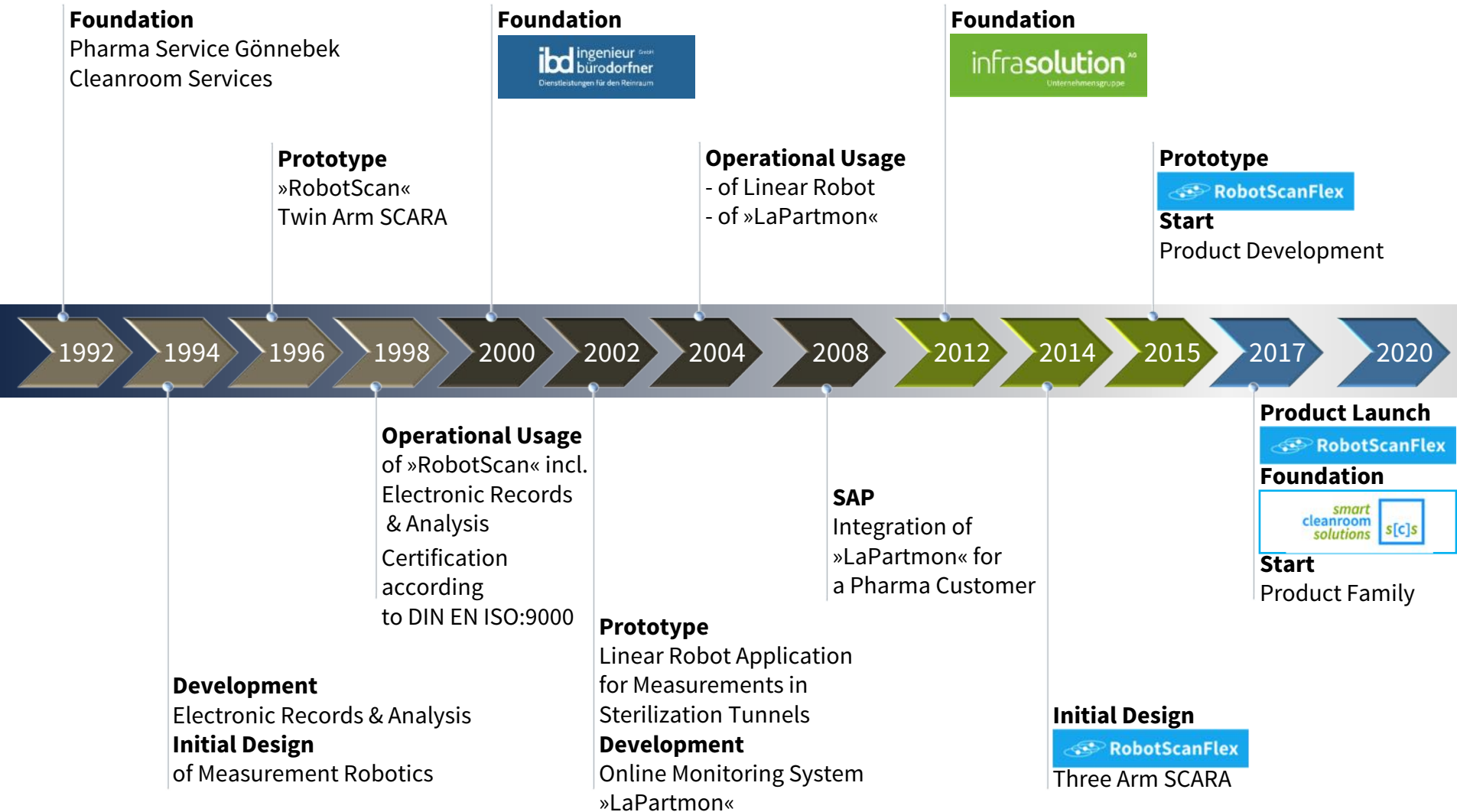
on the basis of a decision  
by the German Bundestag

# RobotScanFlex: Overview

- ❑ History
- ❑ State of Technology
- ❑ RobotScanFlex: System Overview
- ❑ Working Principle
- ❑ Software: ScanWare
- ❑ Electronic Records
- ❑ Software: PostProcessing
- ❑ Transport & Mobility
- ❑ Versatility
- ❑ Key Features

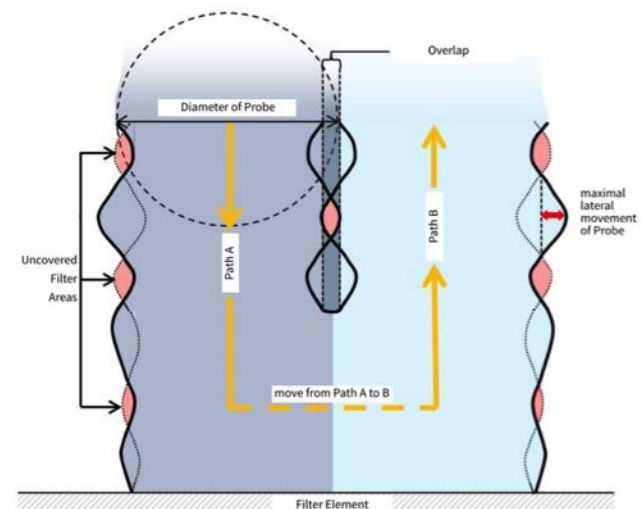
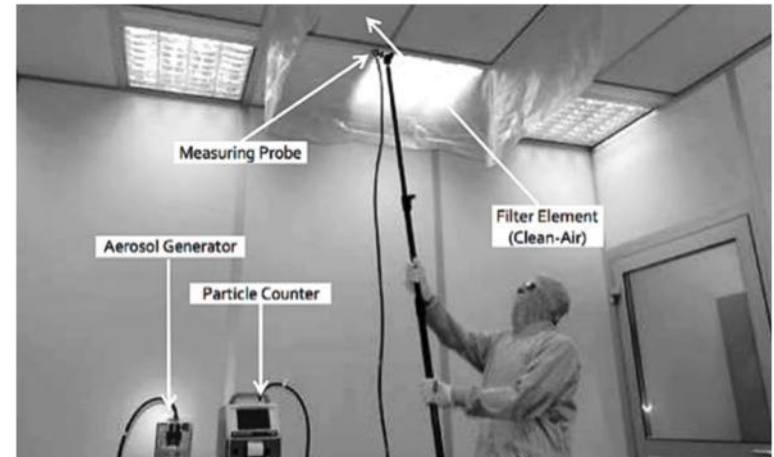


# Geschichte



# Filter Integrity Test: State of Technology

- ❑ Measurement Results depend on Technician
  - ❑ training and experience
  - ❑ condition and fatigue
  - ❑ non ergonomic work position
- ❑ Imprecise Movement of Measurement Probe
  - ❑ controlled distance to filter surface
  - ❑ capturing of entire filter surface not guaranteed due to lateral probe movement (cp. figure Kuhn et al.)
- ❑ Probe Velocity is subject to Fluctuations
- ❑ upstream Particle Concentration is only checked twice per Filter Element and could vary with time
- ❑ Protocol Generation according to acquired Measurement Results is usually very time consuming
  - ❑ paper based evaluation in general
  - ❑ some results are transferred manually from paper to electronic data
  - ❑ required “man-in-the-loop” processes is error prone



\*) according to Kuhn and Moschberger, 2013

# System Overview

- ❑ CBOX
  - ❑ Control Box
  - ❑ Automation PC with ScanWare
  - ❑ LAN/WLAN Connection
- ❑ TRIPOD
  - ❑ 4m working height
- ❑ SCARA
  - ❑ three arm SCARA
  - ❑  $\varnothing 3,7\text{m}$  working area
- ❑ RGM
  - ❑ Aerosol Generator
  - ❑ LAN/WLAN Connection
- ❑ Tablet
  - ❑ ScanWare Visualization
  - ❑ PostProcessing
  - ❑ LAN/WLAN Connection

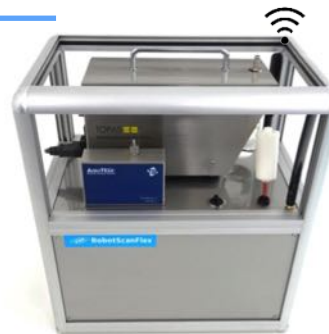
SCARA ❑  
*Robotic Manipulator*

Tablet ❑

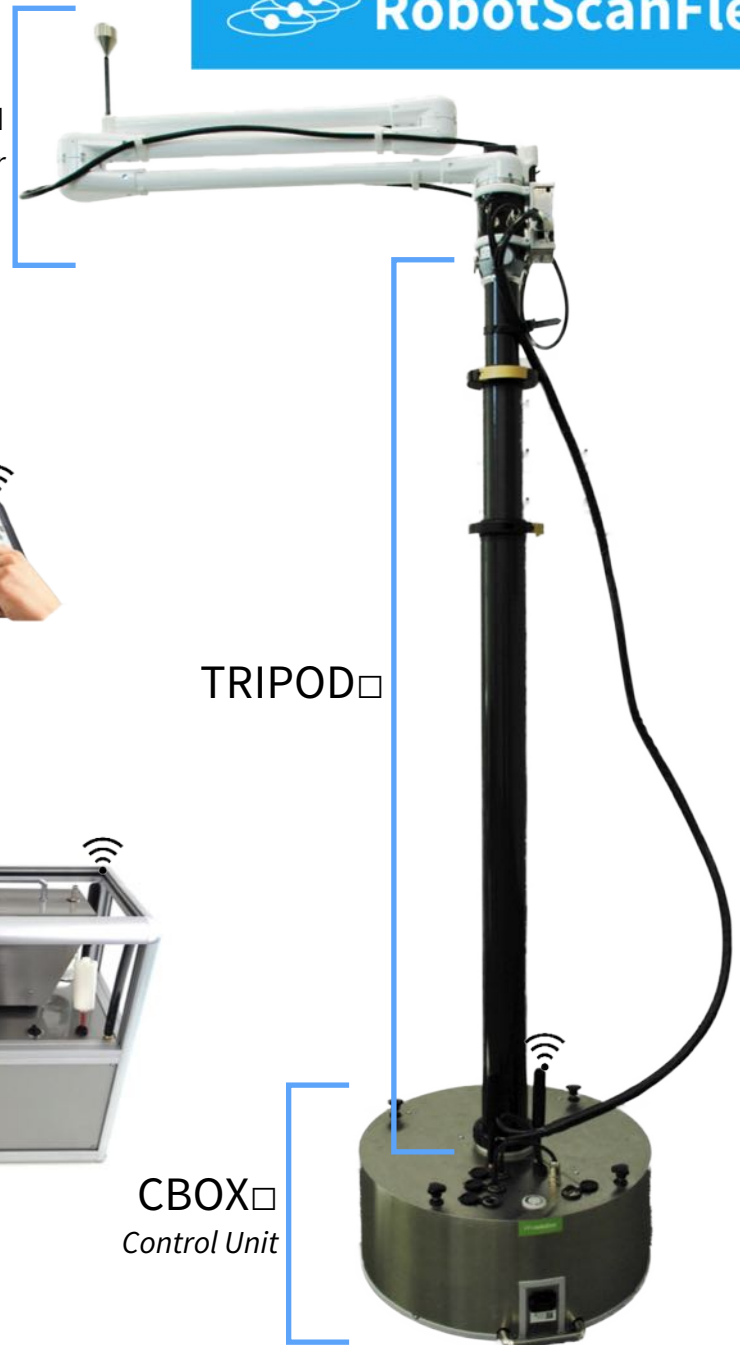


TRIPOD ❑

RGM ❑  
*Rawgasmodule*



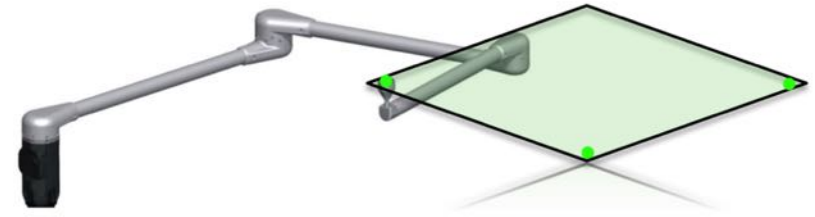
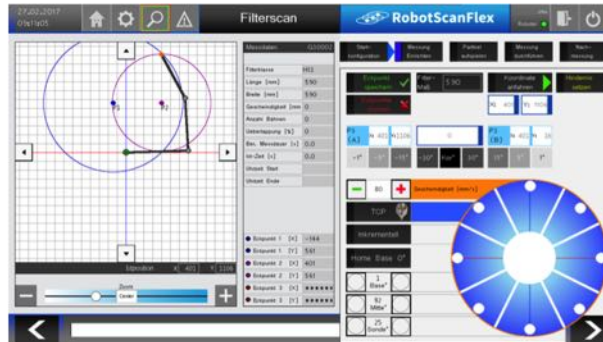
CBOX ❑  
*Control Unit*





# Working Principle

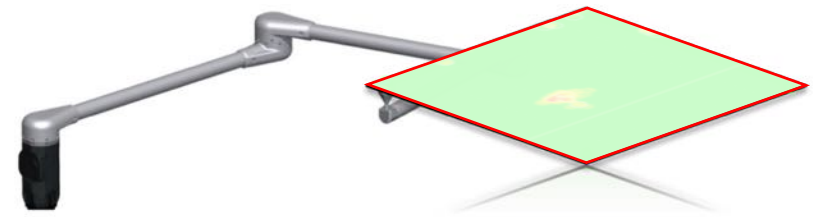
configure  
filter area ☐



perform  
automatic ☐  
measurement



obtain  
results ☐  
in real-time



# ScanWare

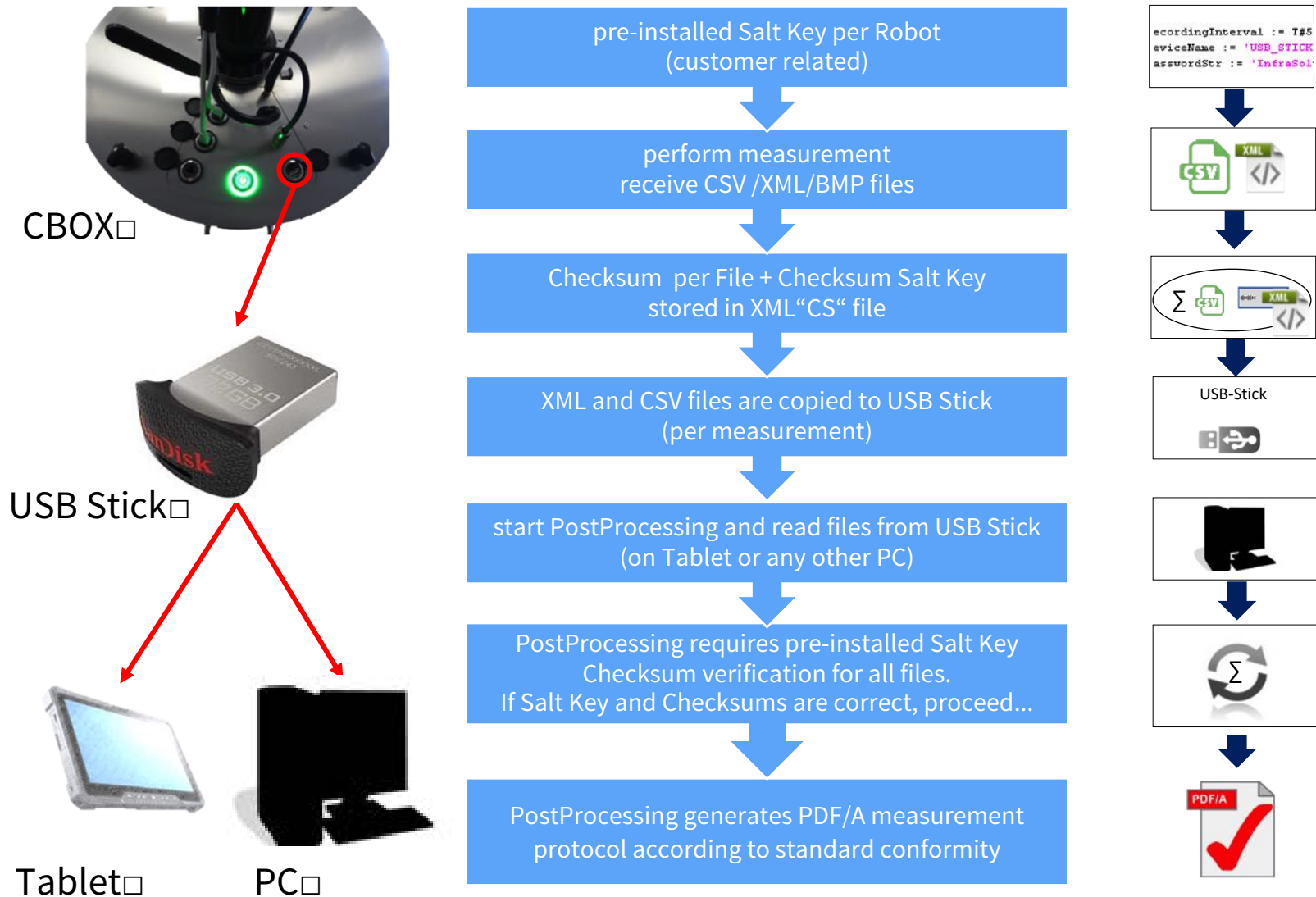


- Initialize Robot relative to Filter ☐
- Configuration of Scan Task ☐



- Continuous Task Supervision ☐
- Direct Evaluation ☐

# Electronic Records & Electronic Signatures





# PostProcessing



- List of all Measurement Results
- Selection of Filter Elements



- automatic PDF protocol generation
- incl. Overview, Heatmap and Certificates

# Transport & Mobility



# Versatility

- ❑ Laminar Flow
- ❑ Terminal Filter
- ❑ Safety Cabinet
- ❑ open/close RABS
- ❑ Isolator
- 
- ❑ Qualification
- ❑ Re-Qualification
- 
- ❑ Across Industry Sectors





# Summary – Key Features

- ❑ Automatic Measurement Process according to DIN EN ISO 14644-3
  - ❑ probe velocity
  - ❑ constant distance between probe and filter surface
  - ❑ precise capturing of entire filter surface
- ❑ Real-time 2D-Heatmap Generation
- ❑ Reproducible Results
- ❑ Automatic Leakage Verification
- ❑ Integrated Analysis and Evaluation
- ❑ Electronic on-the-fly protocol generation according to standard conformity
- ❑ Electronic Records according to FDA<sup>1</sup> and GMP<sup>2</sup> Requirements
- ❑ Increased Work Safety

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Unternehmensgruppe

