PARTICLES & FIBERS DETECTION IN CZ PLASTIC CARTRIDGES AND SYRINGES FILLED WITH VISCOUS PRODUCT - A PRACTICAL CASE

MASSIMO FRASSON

General Manager - Brevetti C.E.A. S.p.A.

Workshop

Inspección y Revisión de Estériles

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Overview

This presentation will focus on syringe containers and some of the challenges with particle detection and cosmetic defect detection.

Amgen have worked closely with the Brevetti Team to identify the correct solutions to solve these challenges using more advanced machine vision technology.

Overview

Amgen use multiple machine vendors for AVI (automatic visual inspection) and our strategy remains the same . All our AVI partners offer us innovative solutions however this presentation is based on some novel solutions from Brevetti.

The Industry standard image of a AVI automatic Inspection system

This is how you should see a vision system

Illumination/filters

Spin/inversion

Lens/filters

Cameras

Sensing and Digitizing image Data

Interface

Frame Grabber

Image Processing and Analysis

Dedicated Vision Processor / Industrial PC

Display

HMI or operator input

Applications

Interface

Robot Controller

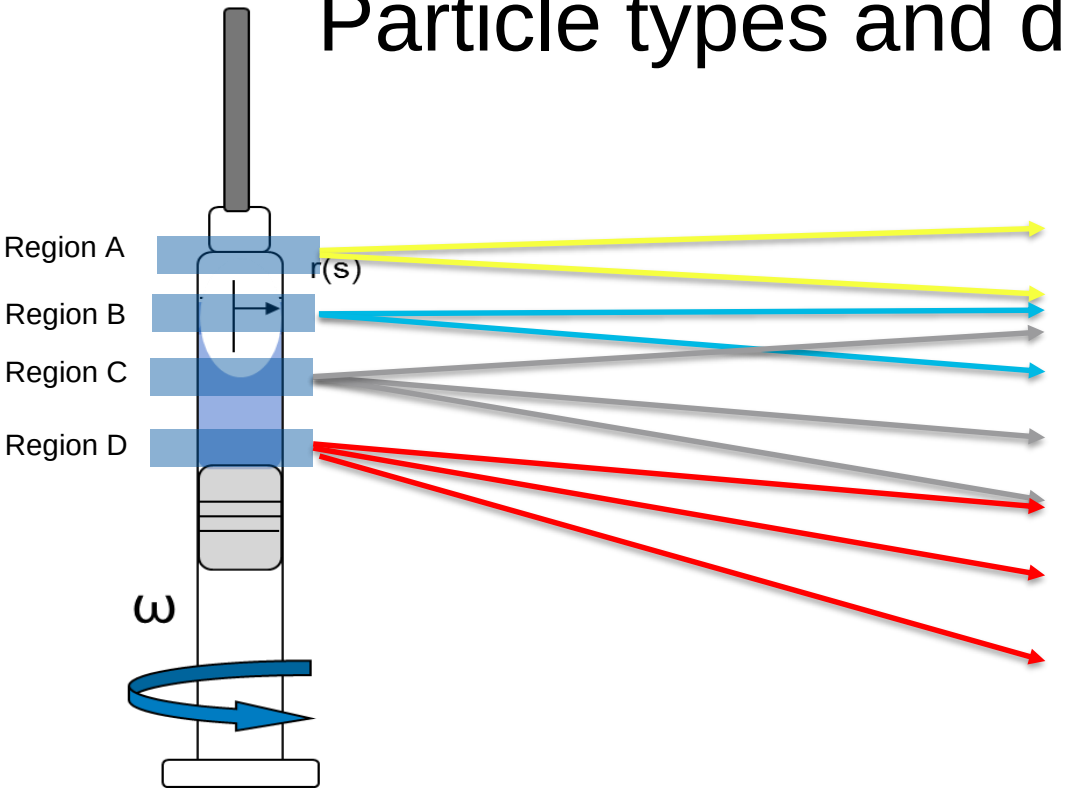
Tasks: Reject
Accept
Eject

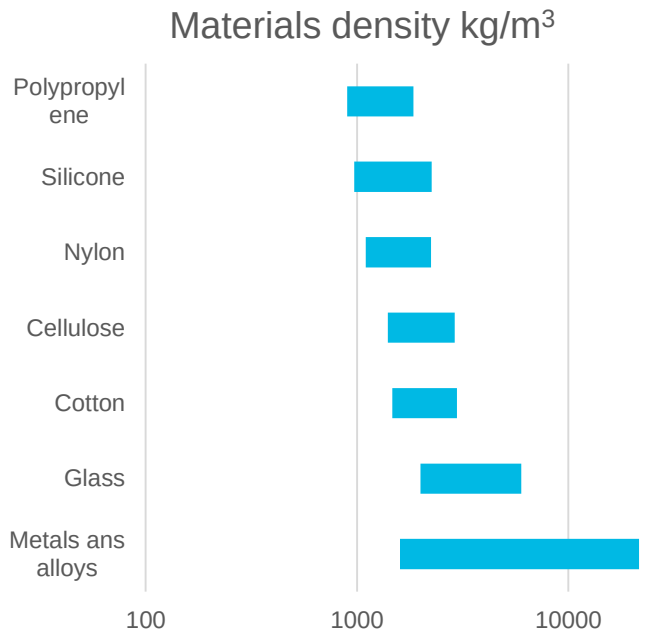
Automatic Inspection

What needs to be considered to perform an automatic particle inspection on viscous products in plastic container:

Particle types and detection strategy

Particle types and detection strategy

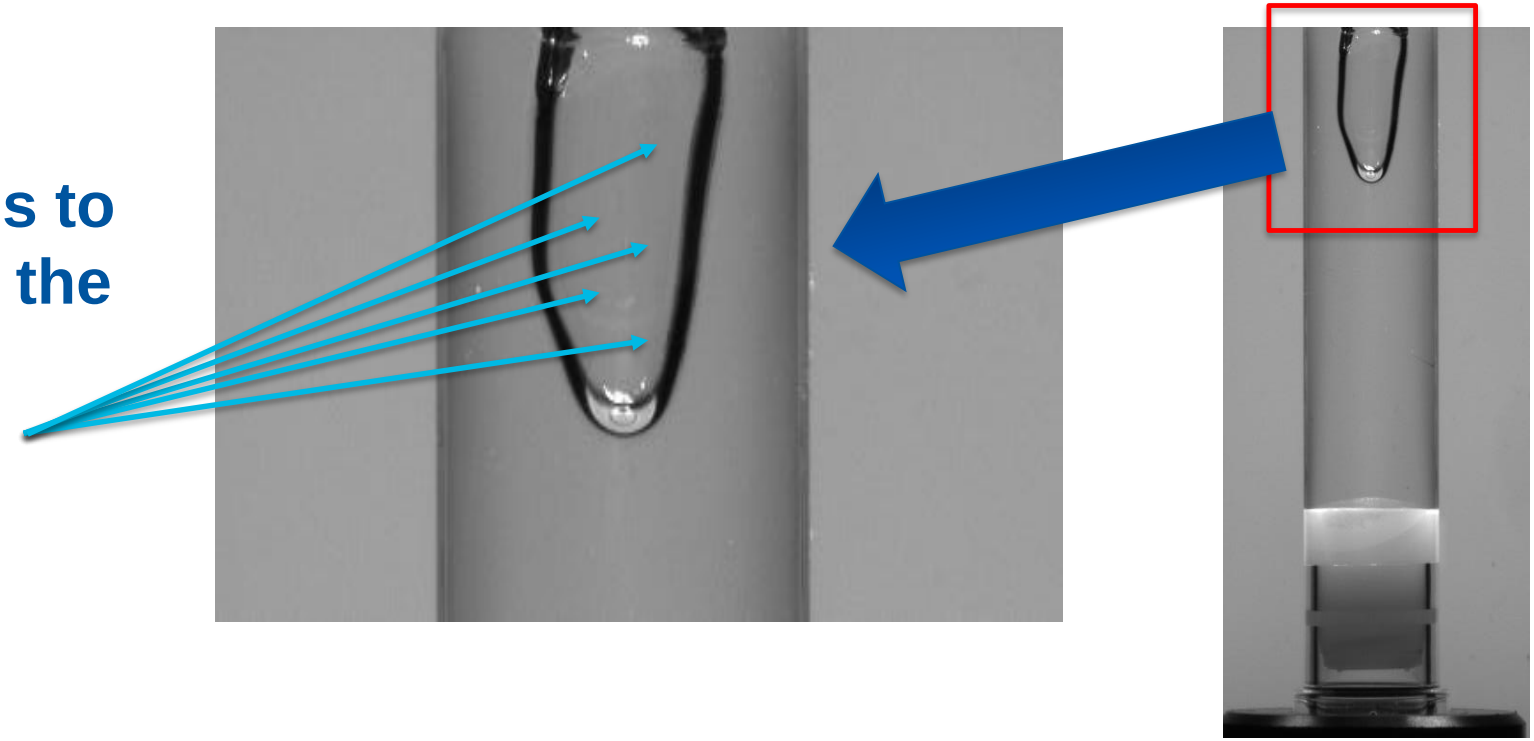




More detailed overview of how this was achieved will be explained in later slides

Algorithms to inspect in the meniscus

area?



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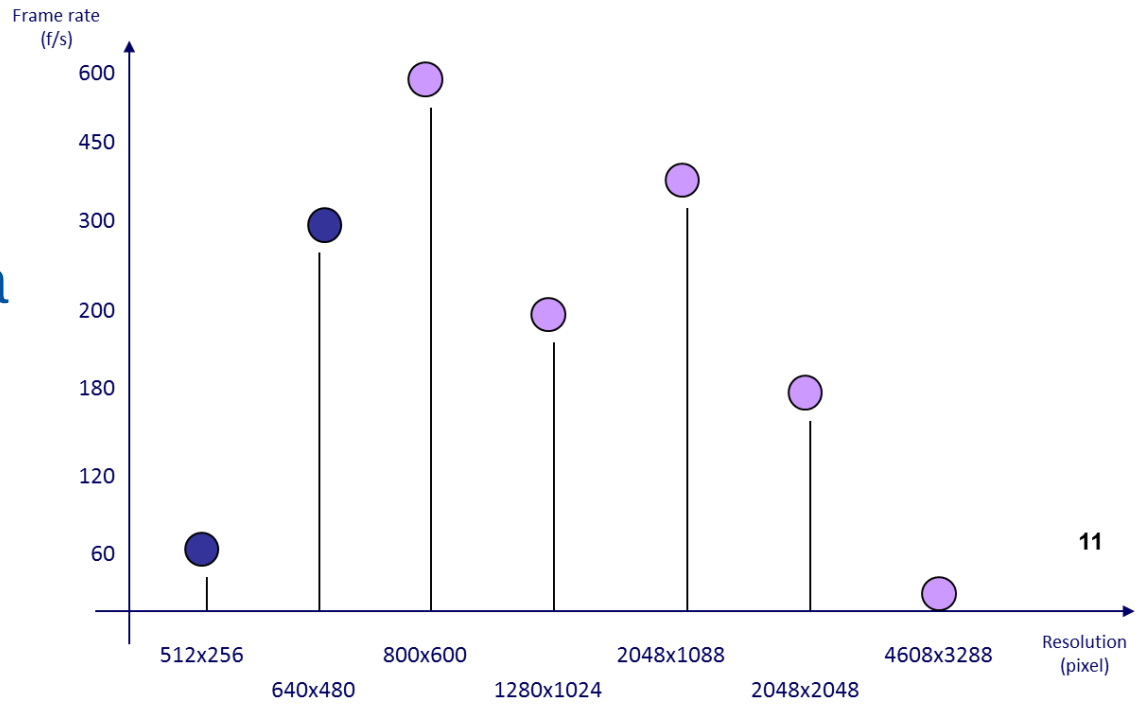
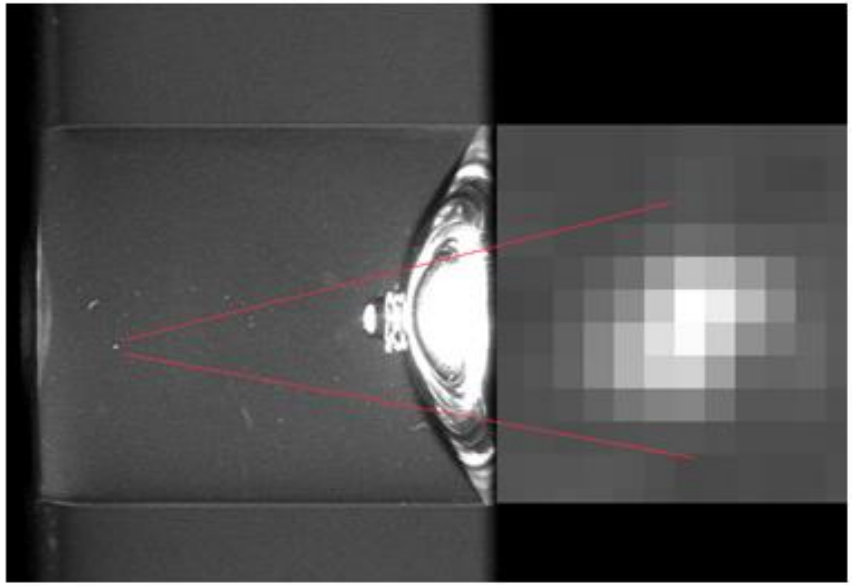
Are particles in our required detectable range with low contrast visible during the majority of the inspection cycle?

Cameras RESOLUTION and FRAME RATE are a key factor



How a particle look like

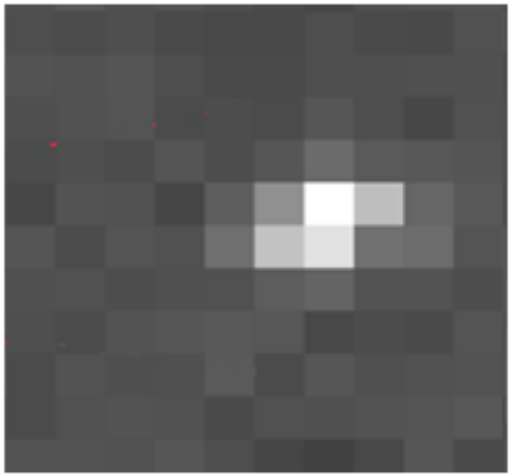
What does 100 µm particle look like with a 1200x926 resolution camera



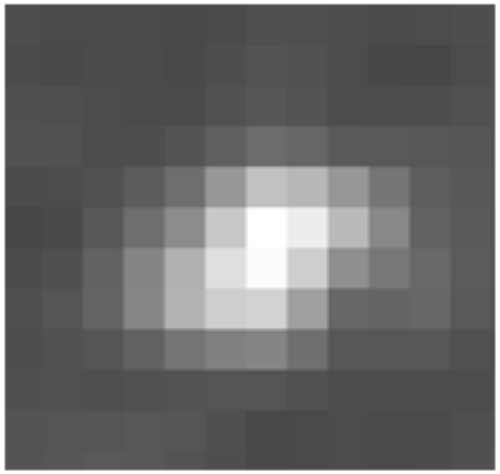
How a particle look like

Camera Resolution Factor x 4

100µm Particle



640x480 pixels



1200x926 pixels

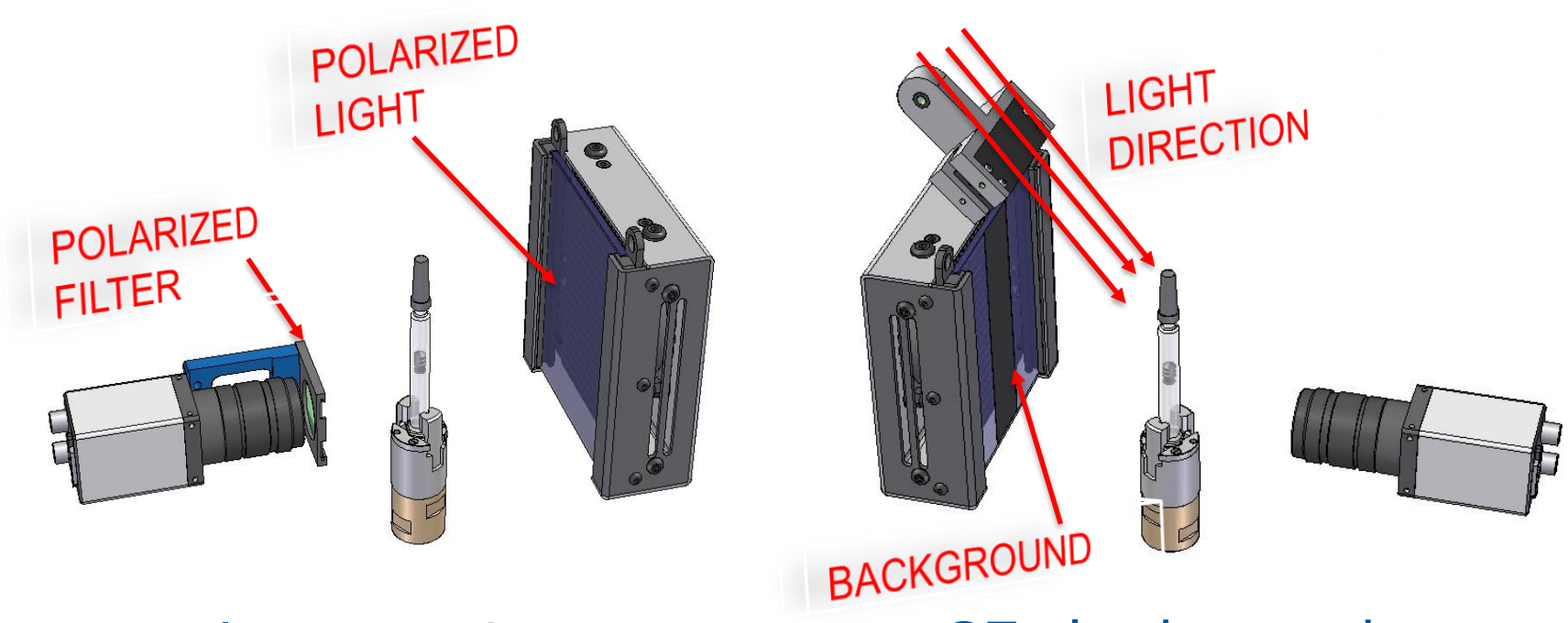
Practical case

The Brevetti Design Team proposed some new solutions to the Amgen AVI design teams which have shown to be extremely successful.

The Next part of the presentation will be a detailed overview of these solutions.

Practical case

Station configuration to detect fibers on plastic container Vs Glass container

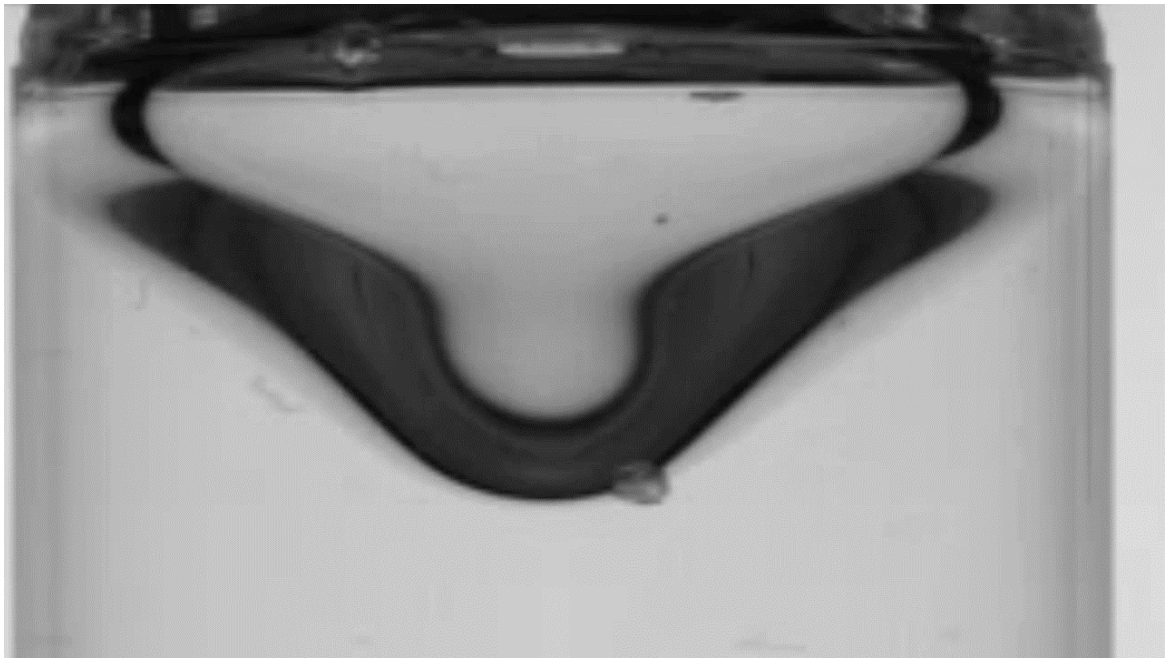


Glass container

CZ plastic container

Meniscus area

Algorithms to inspect in the meniscus area

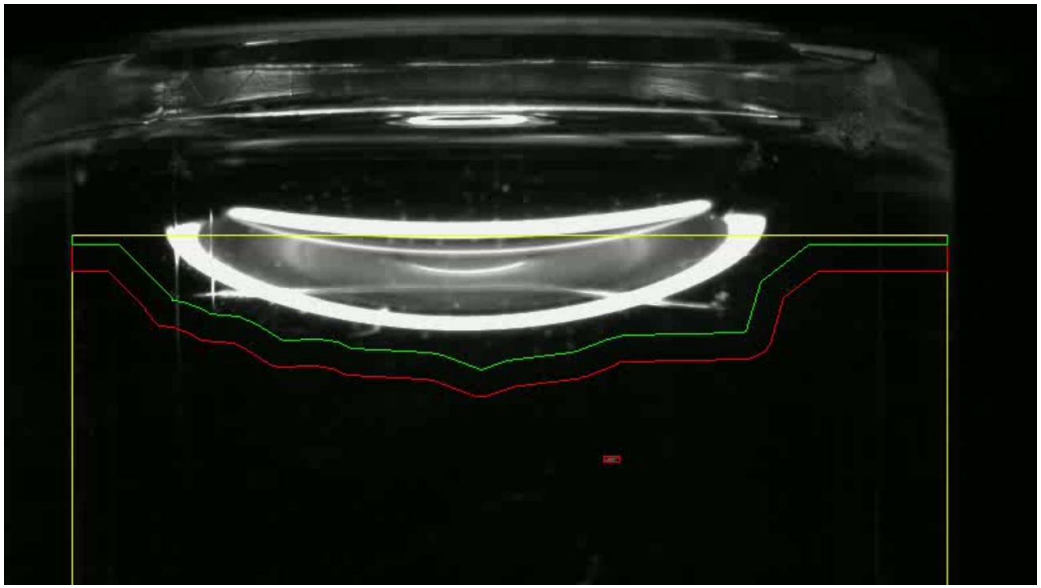


Close to the container wall area

Fibers very close to the container wall

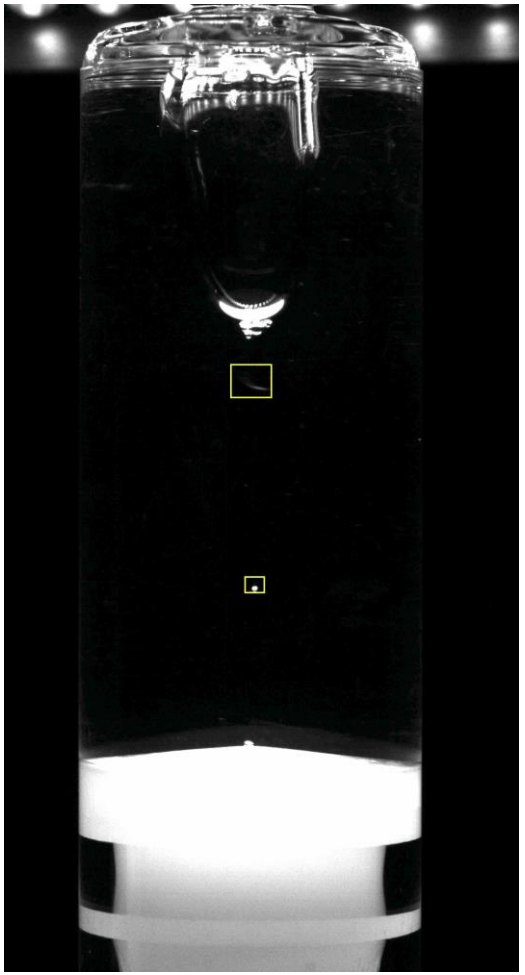
Some particles need extra time to move into solution

Some particles need time to move into solution and into the correct field of view



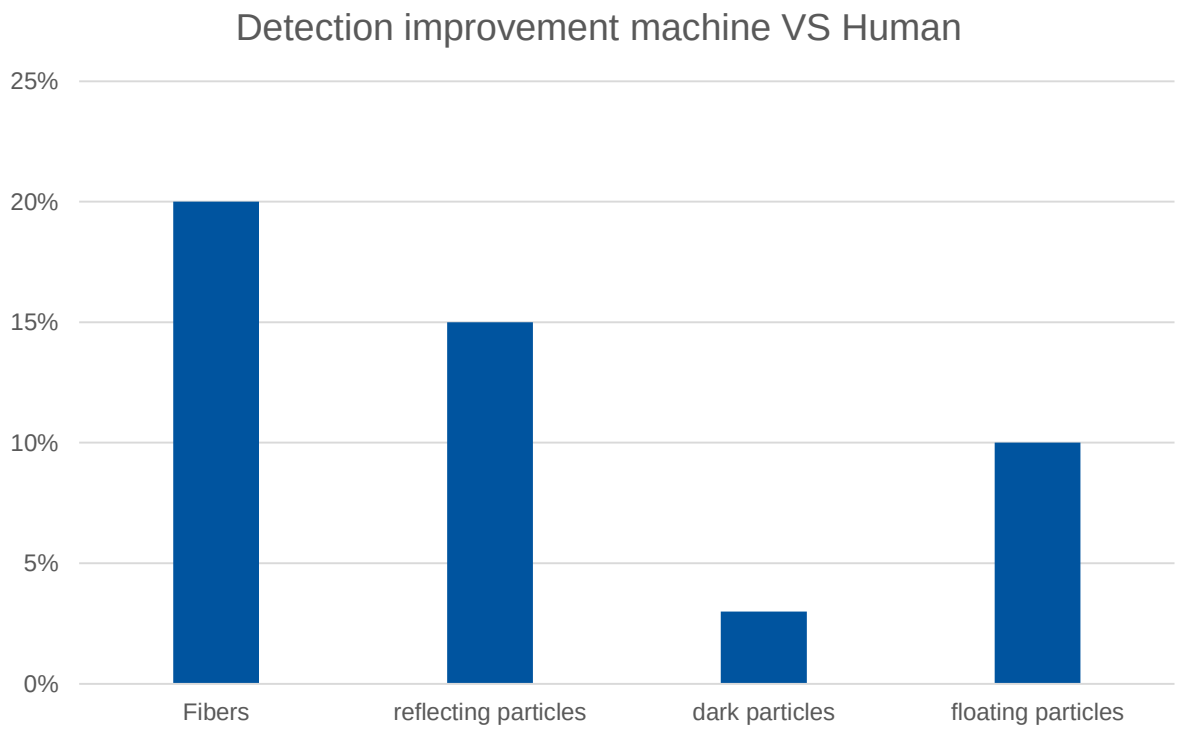
Particles and bubbles

Bubbles and particles: they may look the same but they move with different trajectory



Results

A complex combination of different features leads to a detection improvement



THANK YOU