

Boosting LiDAR performance through better stray light control using Vantablack coatings

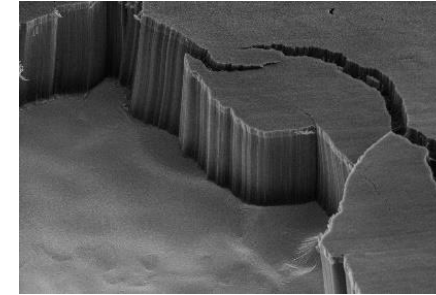
EPIC Meeting on LIDAR Technologies for Automotive 2019

Vantablack®

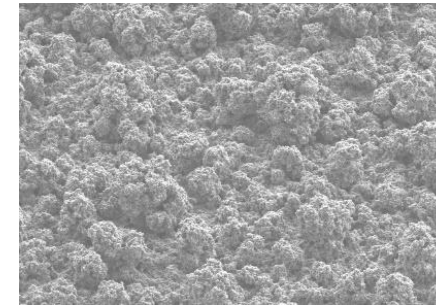
**World's leading range of super-black coatings
created using advanced nanotechnology**

How Vantablack works

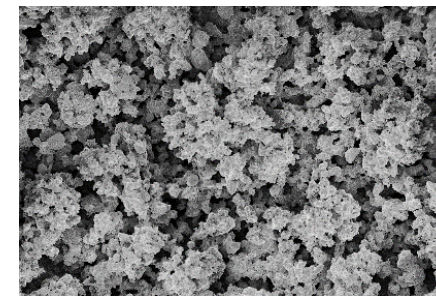
- Low-density microstructure with ultra-low reflectance across wide spectral range
- Multiple absorbing elements and optical cavities
- Open structure with micro surface roughness maintains low reflectance viewed from virtually any angle
- Multiple “point” attachments provide extreme thermal and mechanical resilience
- Post etched for optimal performance



Vantablack



Vantablack S-VIS / S-IR



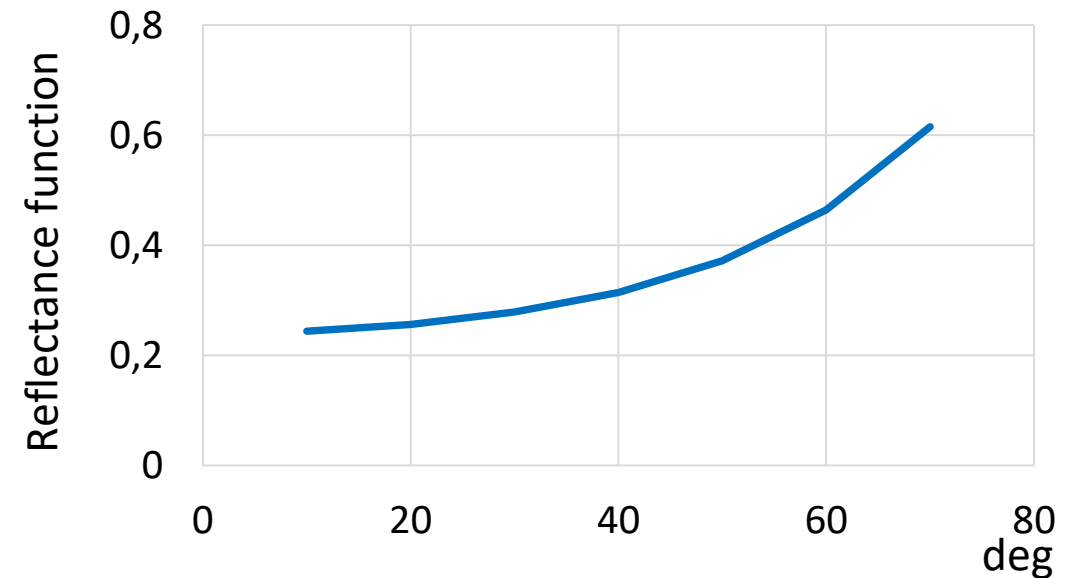
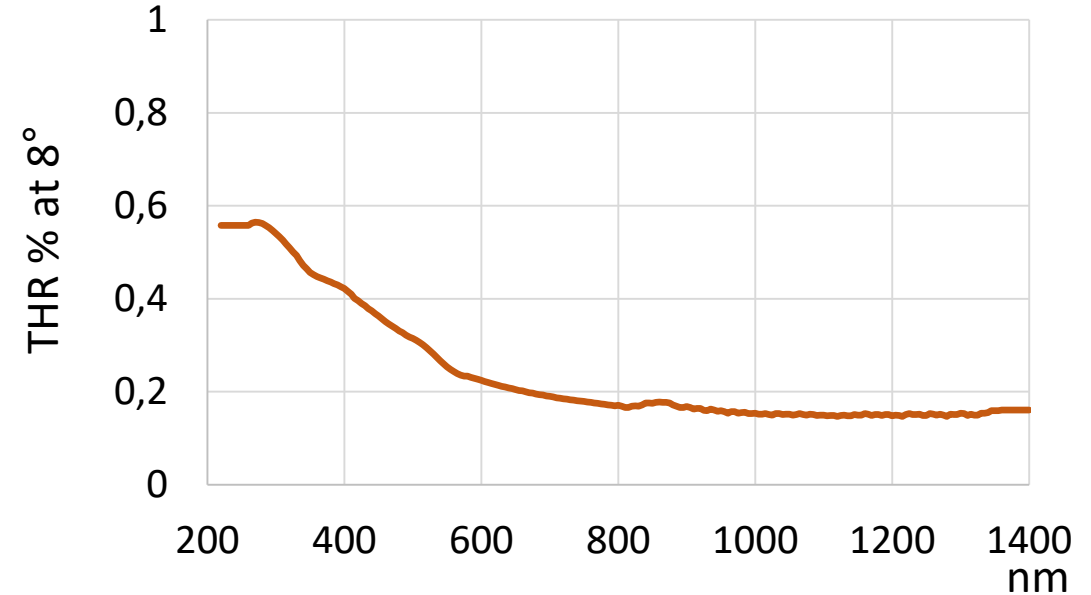
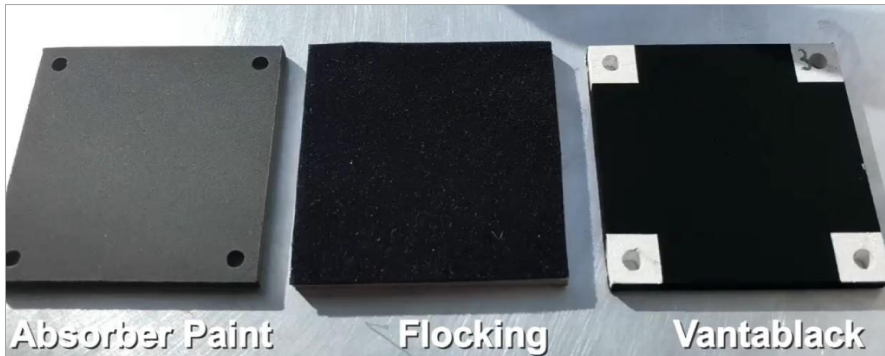
Vantablack VBx

Vantablack's microstructure at high magnification



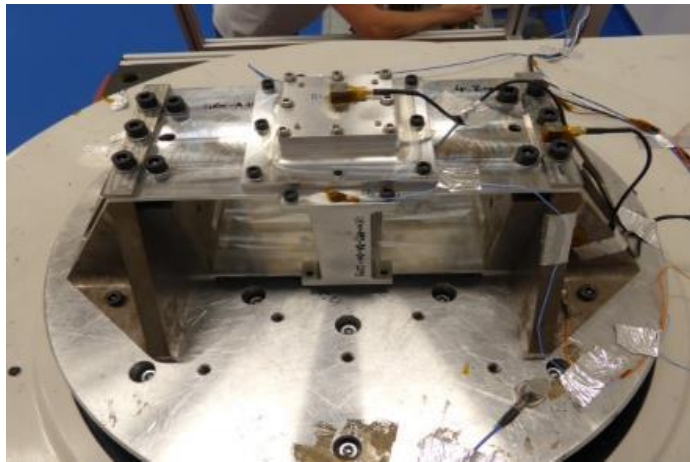
Ultra-low Reflectance

- Uniquely combines ultra-low BRDF and specular reflectance characteristics
- Featureless characteristic across spectrum from UV – FIR and beyond
- Suppresses stray light – minimum optical baffling
- Retrofit solution

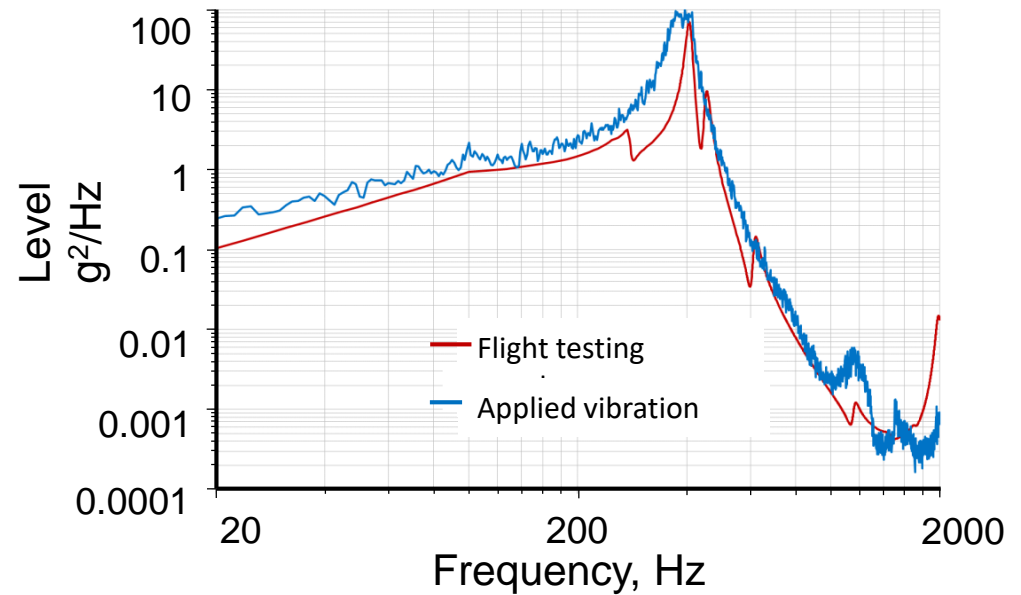
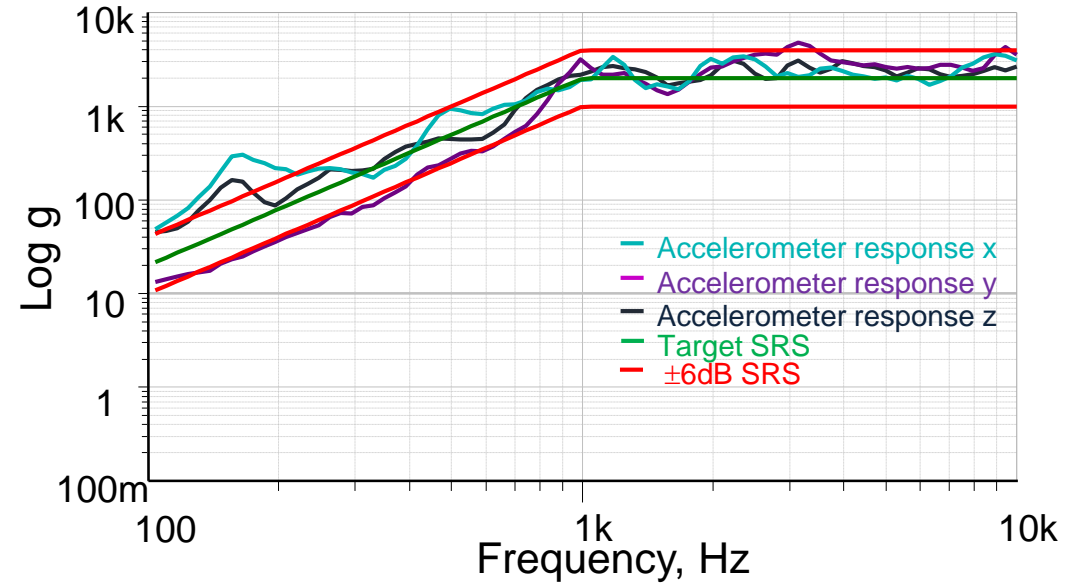


Mechanical Stability

- Excellent shock and vibration resistance
- No particle fallout
- Compatible with commonly-used plastics / metallic substrates

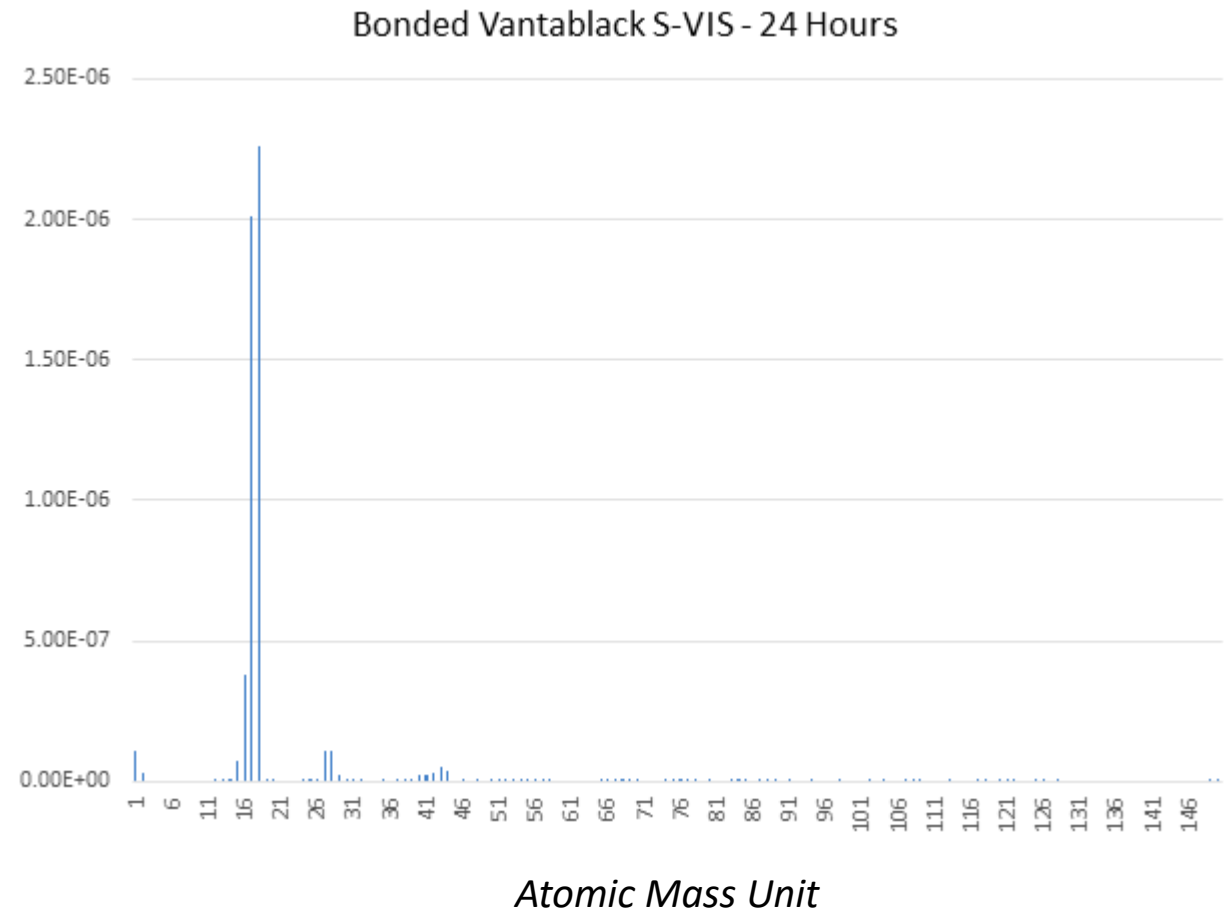
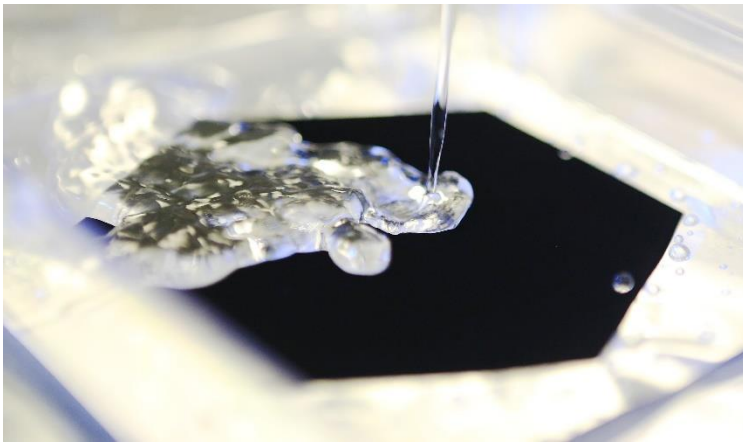


Resonant Jig with sealed capture fixture



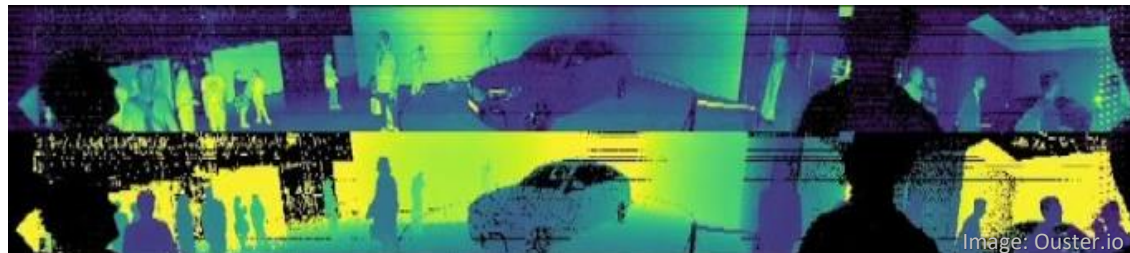
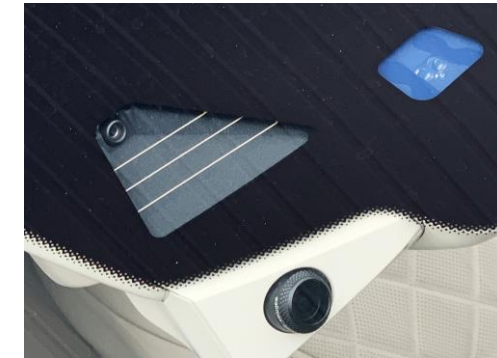
Environmental Stability

- Stable in extreme environments
 - achieved space heritage
 - withstands extremes of temperature
- Does not contribute to fogging (SAE 1756J, ASTM 595, ECSS)
- Super-hydrophobic



Vantablack Automotive Applications

- Head Up Display
- Camera Lens
- Camera Glare Shield
- Headlamp
- Tail Light
- LiDAR Sensor



Blickfeld Solid State MEMS LiDAR

Achievable Key Performance Metrics

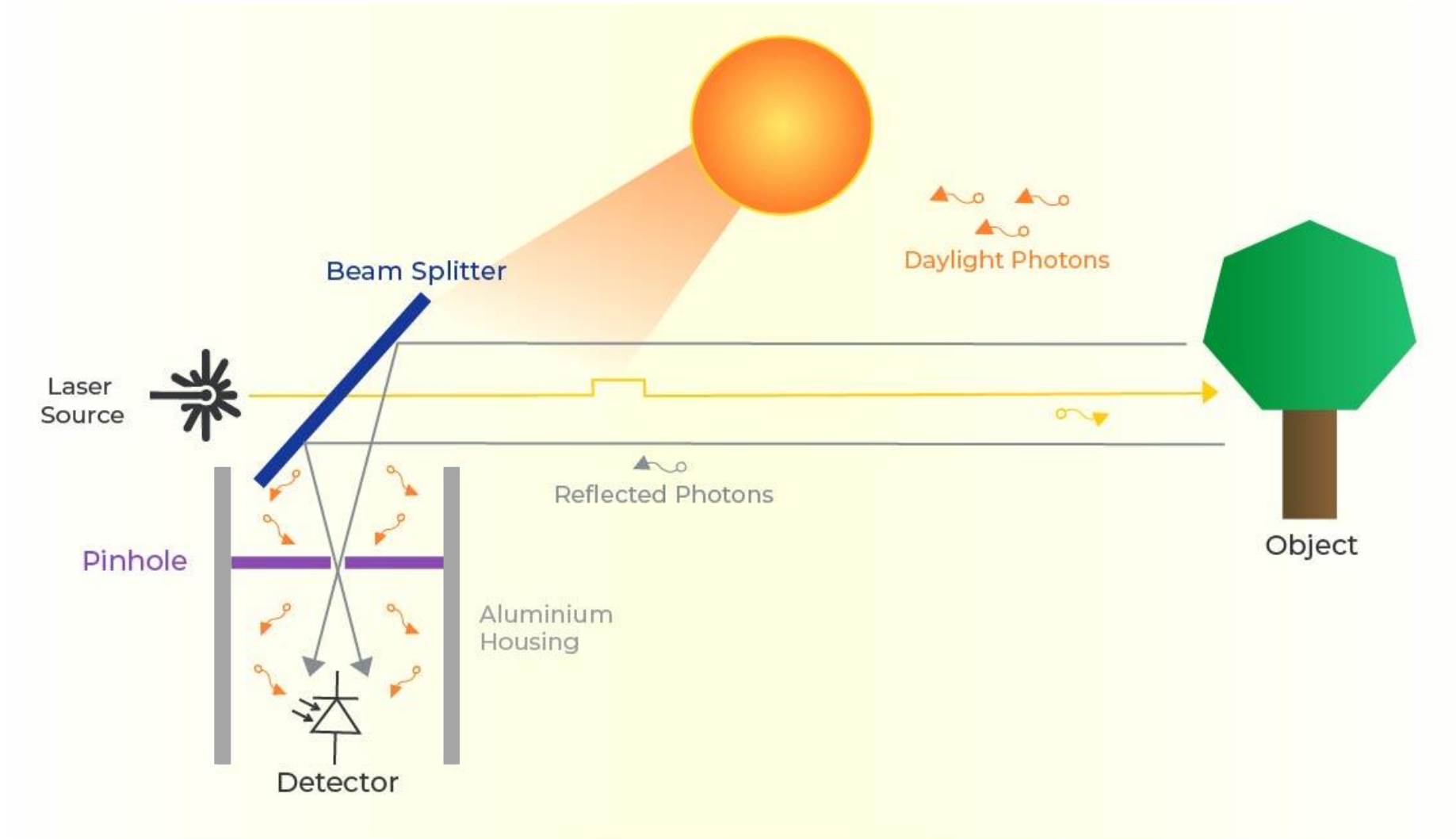
Field of view	120° x 30°
Detection range	> 200 m range
Scan lines	8 – 200
Frame rate	4 – 100 Hz
Resolution	0,1°
Data Points	> 1,000,000/s

Blickfeld
LiDAR / scan your world

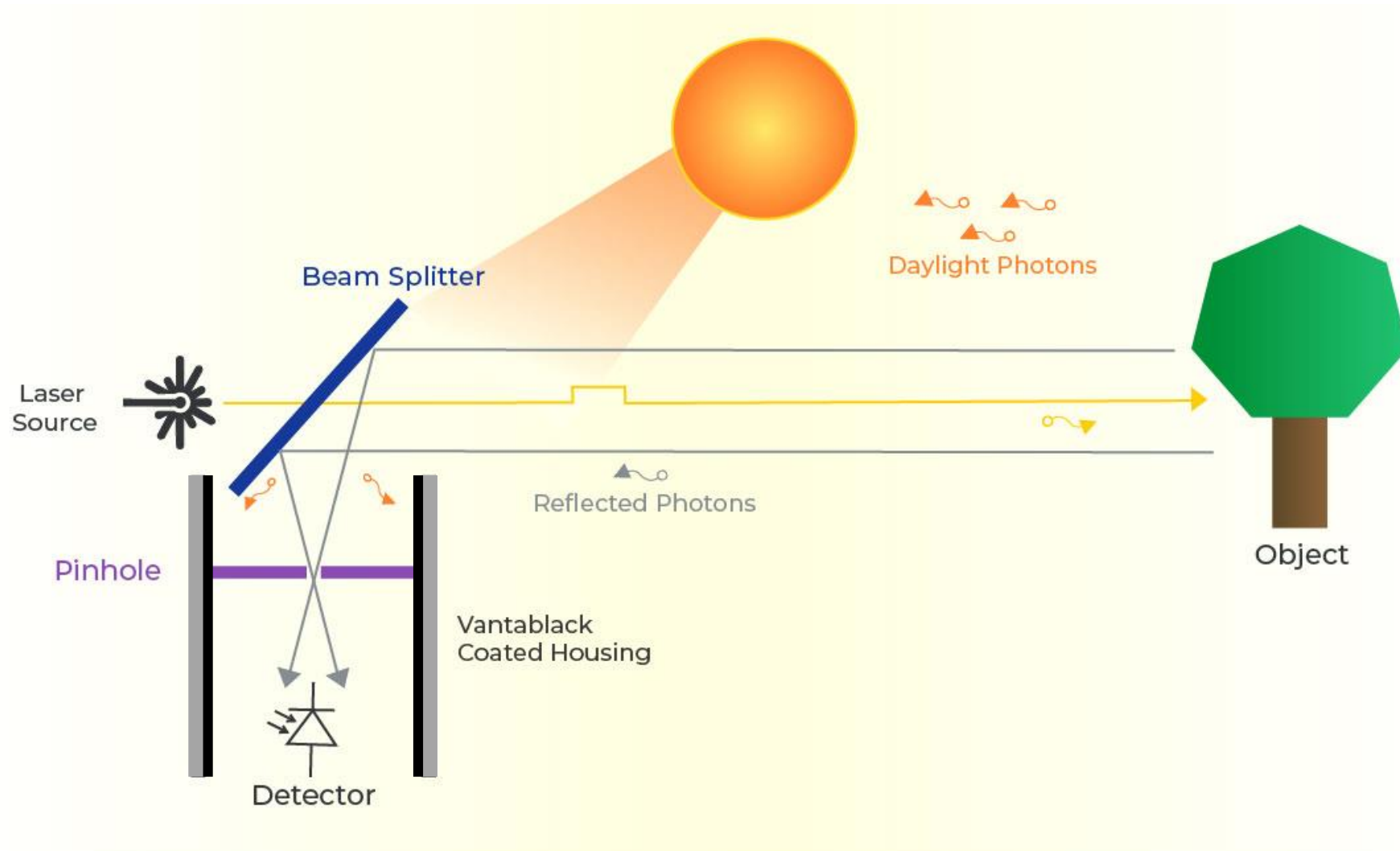


Blickfeld Cube

Blickfeld Approach – Daylight Suppression by Spatial Filtering

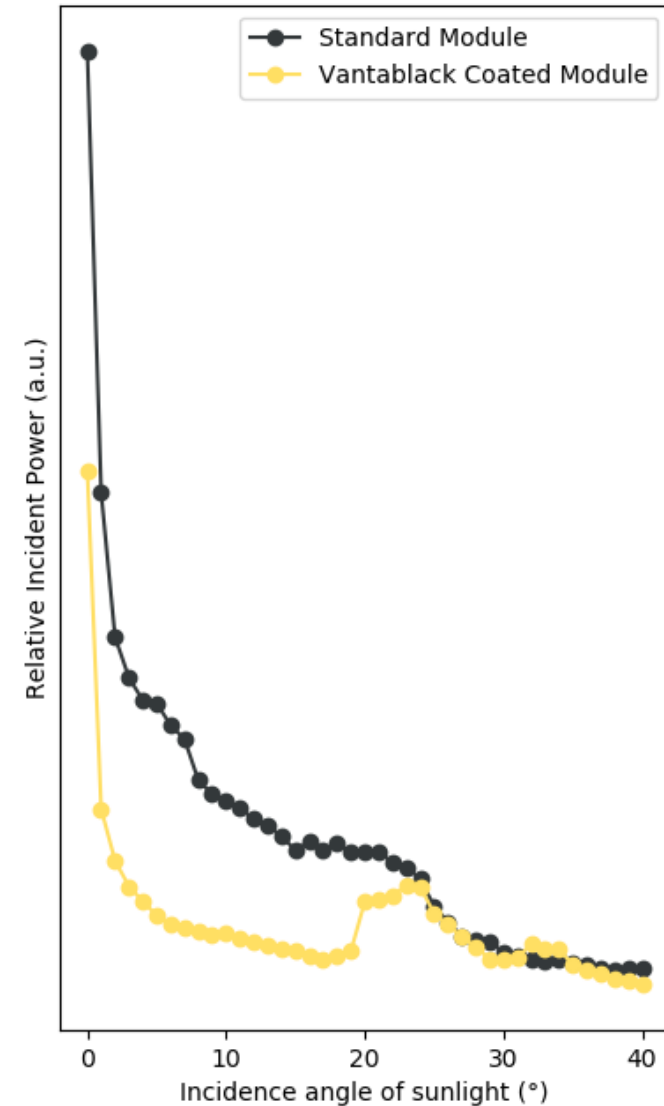


Blickfeld Approach – Daylight Suppression with Vantablack

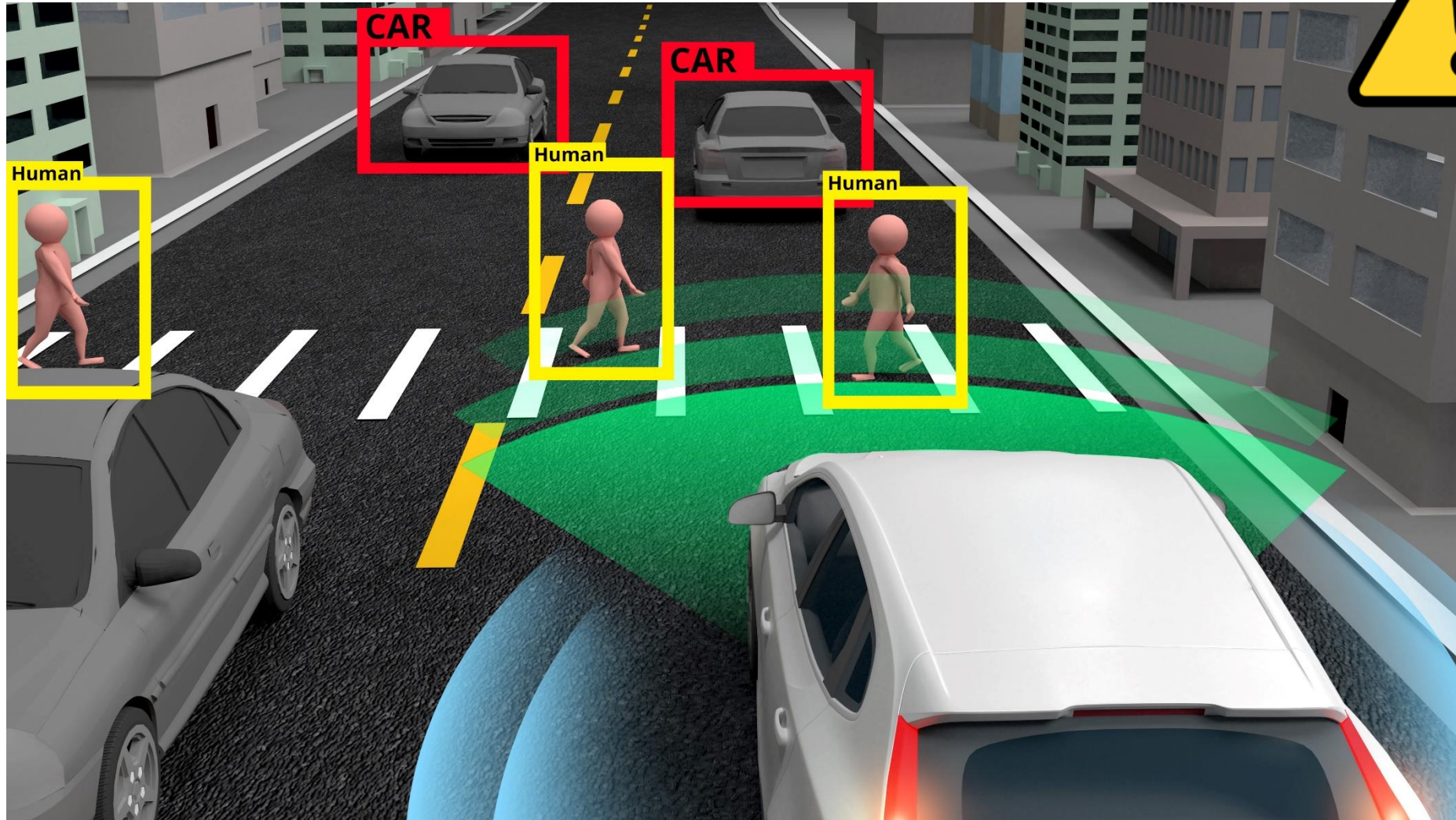


Blickfeld Approach – Vantablack vs. Standard Module

- Improved straylight suppression in a wide angular space in the Vantablack coated detector housing
- This results in an improved LiDAR performance under daylight conditions
- Higher S/N ratio leads to increased detection range and better recognition of low reflective objects

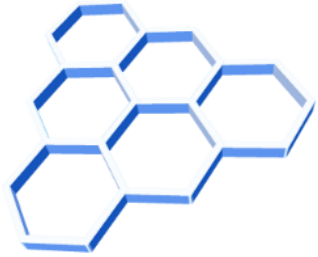


Blickfeld Approach – Safer System



What's hidden?





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