

## Introduction

- To unlock the potential of ultrafast pulsed laser sources NST released the first polygon scanner system into the market space
- Polygon scanner technology is introduced to speed up laser processing and reduce processing cost
- Product solution exists of
  - Polygon scanner for speed
  - Wide field full telecentric mirror f-theta optics (single system up to 300 mm)
  - Best in class synchronisation for highest precision
- Located in Belgium, associated with SCANLAB



## High Throughput Laser Structuring

- To apply nanotextures, inspired by nature, a consortium was assembled to develop high throughput low cost production solution
- Objective LAMPAS: how to reduce the m<sup>2</sup> processing cost to use nanotextures in day to day applications to e.g. save fuel consumption (anti-icing airwings) or self-cleaning surface to use less environmental unfriendly detergents



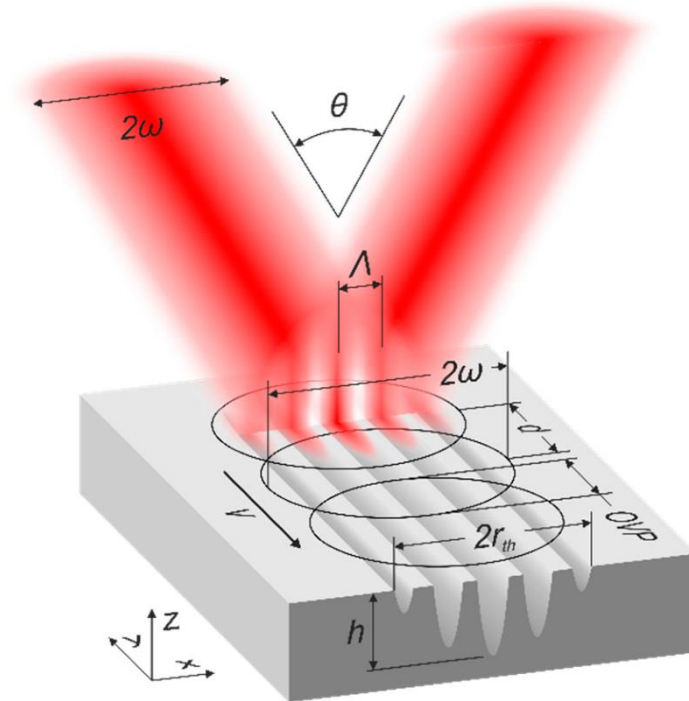
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825132. It is an initiative of the Photonics Public Private Partnership ([www.photonics21.org](http://www.photonics21.org)). The presented results reflect only the author's view. The EU is not responsible for any use that may be made of the information it contains.



PHOTONICS PUBLIC PRIVATE PARTNERSHIP

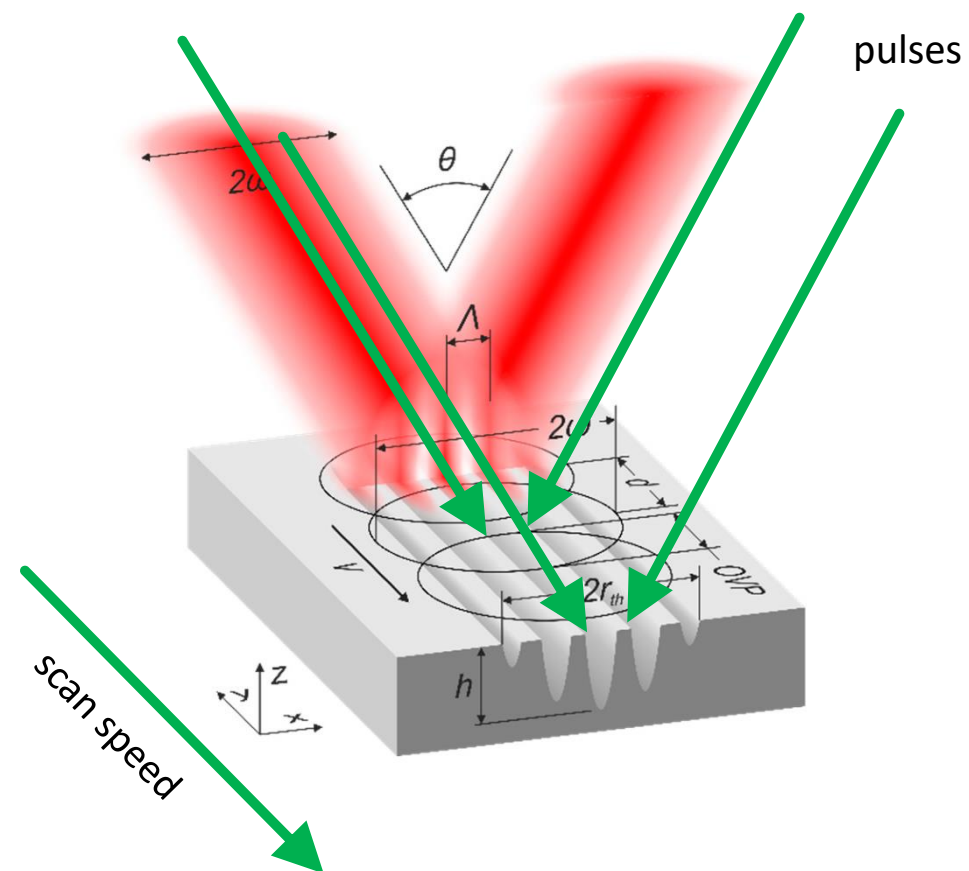
## The Basics

- Breakdown of the application laser surface texturing
  - process (Direct Laser Interference Patterning)
  - ultrafast pulsed laser source
  - scanner system
  - motion control



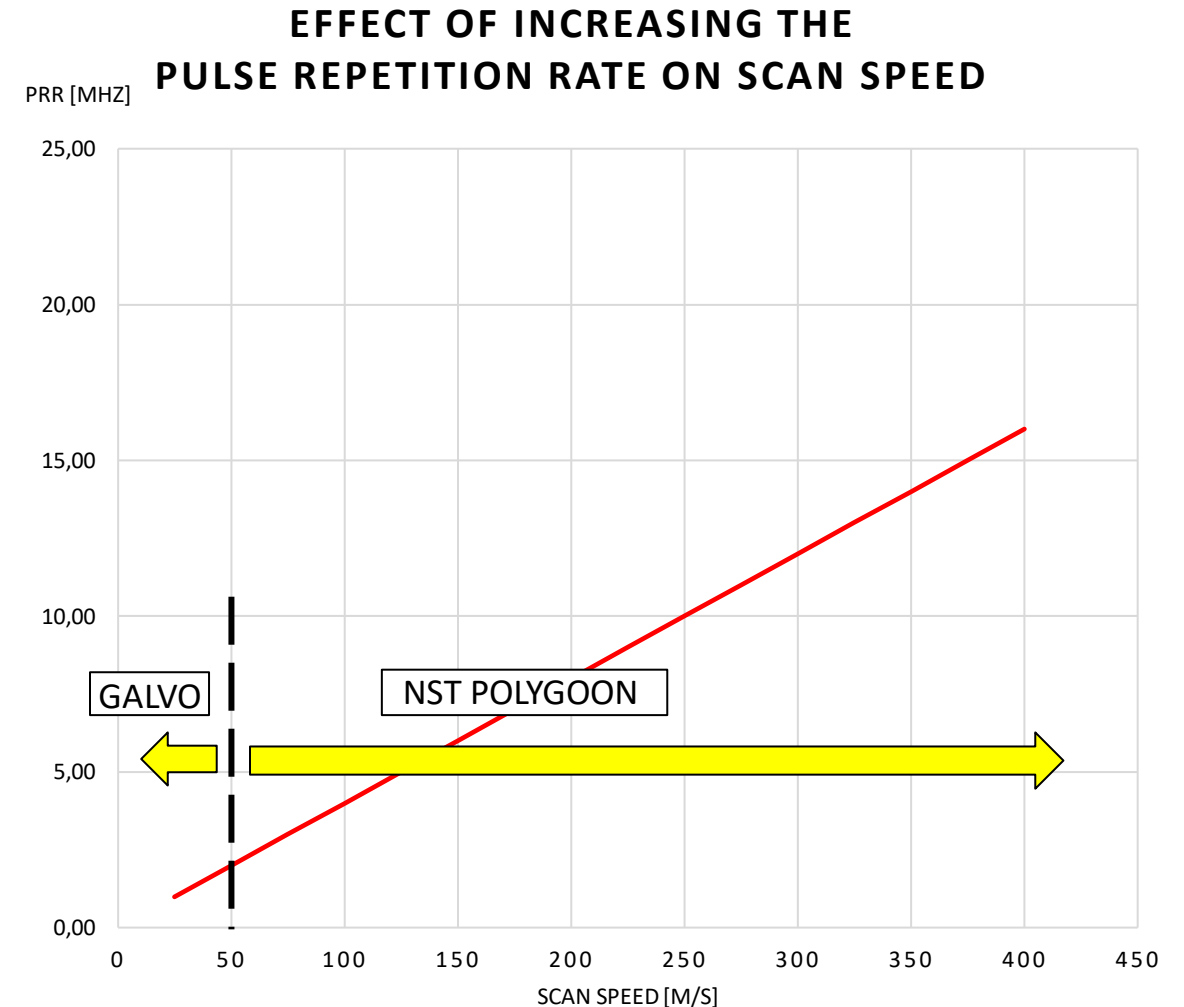
## The Basics

- Breakdown of the application laser surface texturing
  - process (Direct Laser Interference Patterning)
  - ultrafast pulsed laser source
  - scanner system
  - motion control
  
- How to reduce the  $m^2$  processing cost of a laser-based process
  - Increase scan speed
  - Increase pulse frequency (PRR)



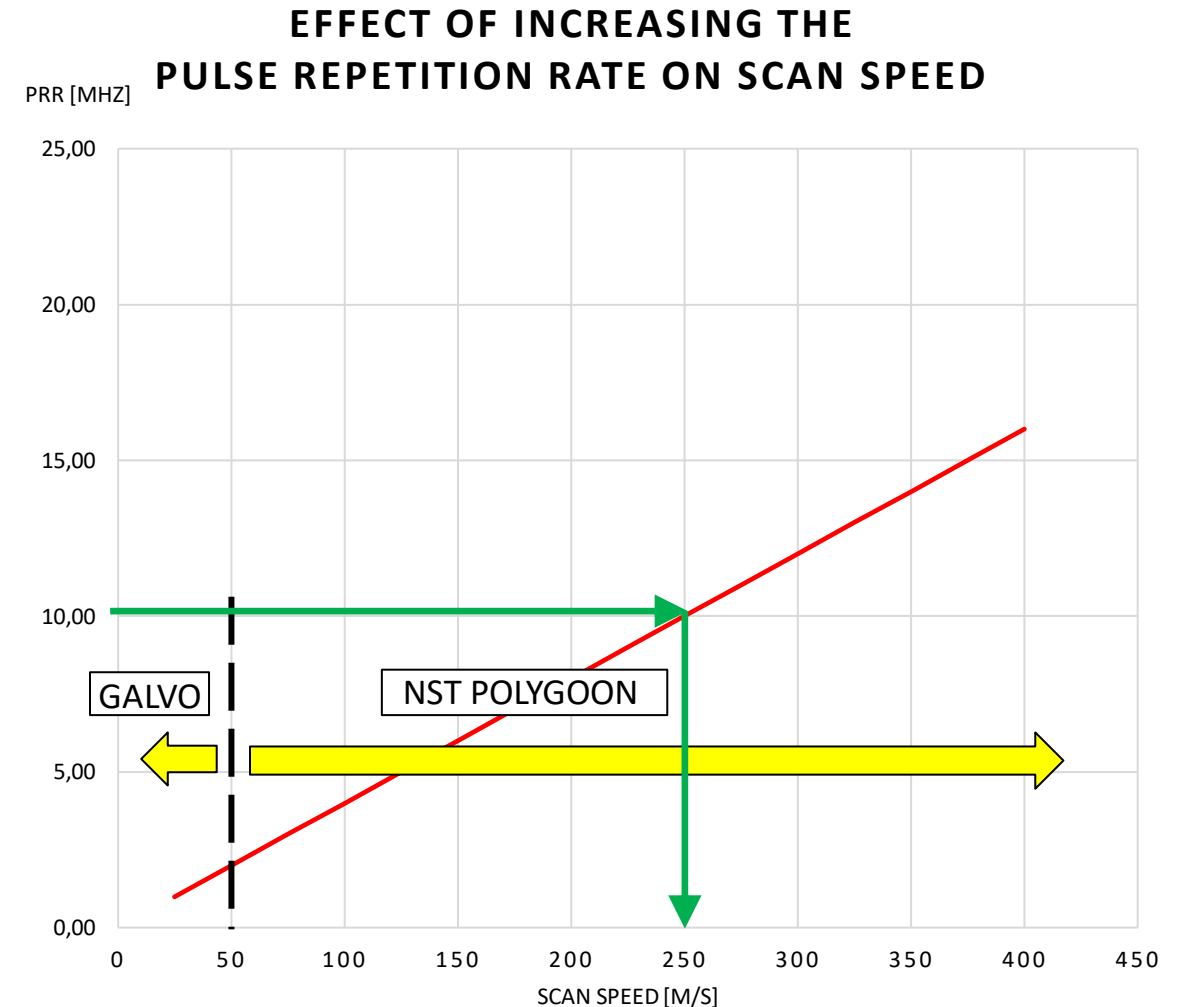
## The Basics

- Breakdown of the application laser surface texturing
  - process (Direct Laser Interference Patterning)
  - ultrafast pulsed laser source
  - scanner system
  - motion control
  
- How to reduce the m<sup>2</sup> processing cost of a laser-based process
  - Increase scan speed
  - Increase pulse frequency (PRR)



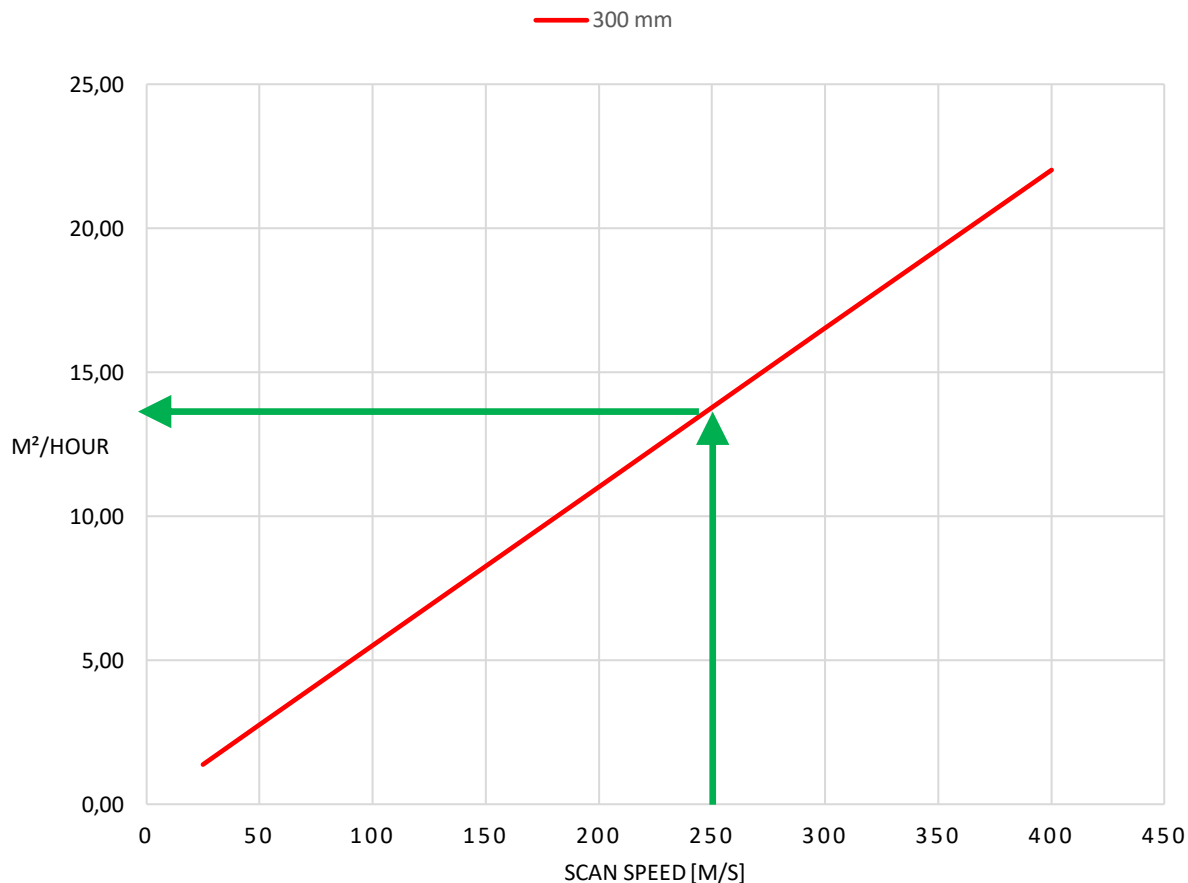
## The Basics

- Breakdown of the application laser surface texturing
  - process (Direct Laser Interference Patterning)
  - ultrafast pulsed laser source
  - scanner system
  - motion control
  
- How to reduce the  $m^2$  processing cost of a laser-based process
  - Increase scan speed
  - Increase pulse frequency (PRR)
  
- Laser pulse frequency LAMPAS: 10 MHz
  
- Possible scan speed 250 m/s

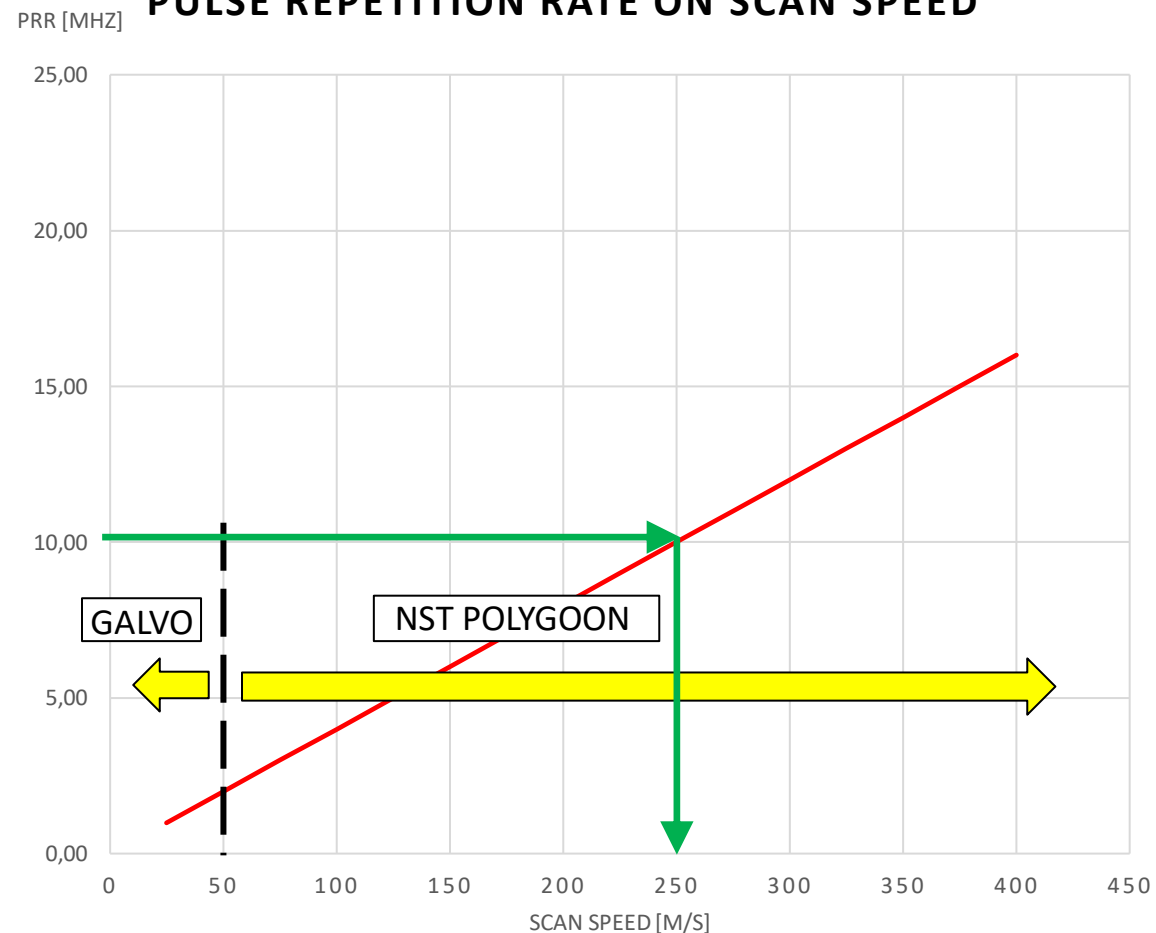


# The Basics

## SQUARE M<sup>2</sup> THROUGHPUT NST POLYGON FULL TELECENTRIC SCAN WIDTH

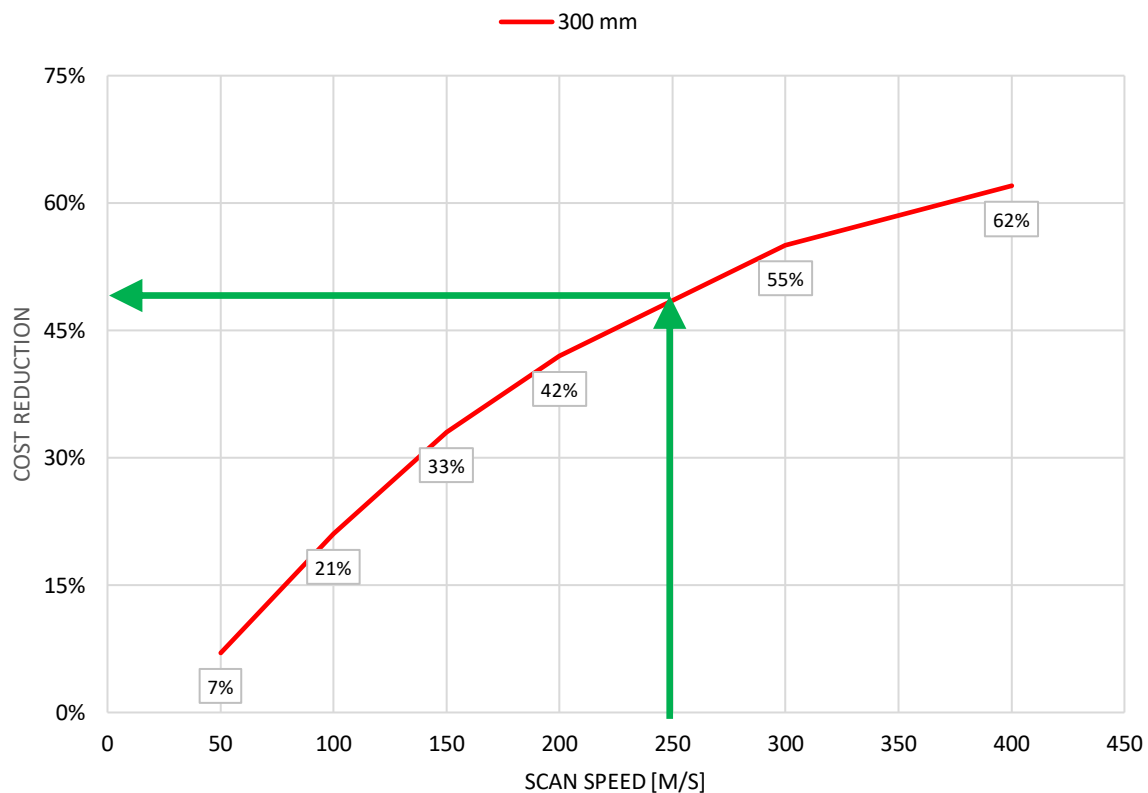


## EFFECT OF INCREASING THE PULSE REPETITION RATE ON SCAN SPEED

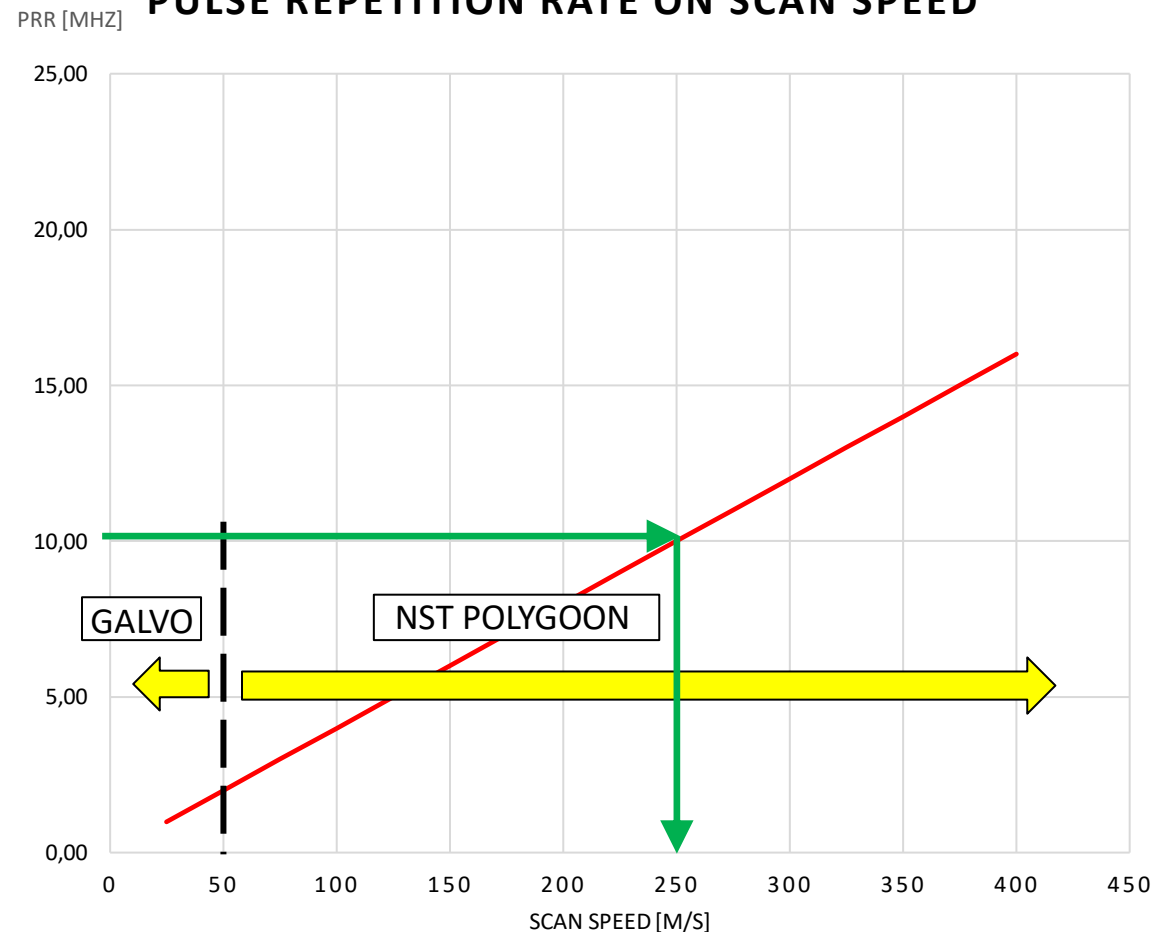


# The Basics

## SQUARE METER LASER PROCESSING COST REDUCTION NST POLYGON MIRROR COMPARED TO FULL TELECENTRIC GALVO



## EFFECT OF INCREASING THE PULSE REPETITION RATE ON SCAN SPEED





## To conclude

- Increase throughput by
  - Pulse Repetition Rate (and laser power)
  - Scanning speed
  - For large large areas Multiplexing or stitching

Thank you for your time and interest

Questions ?

