

OPTIMIZATION OF SANDBLASTING GUN

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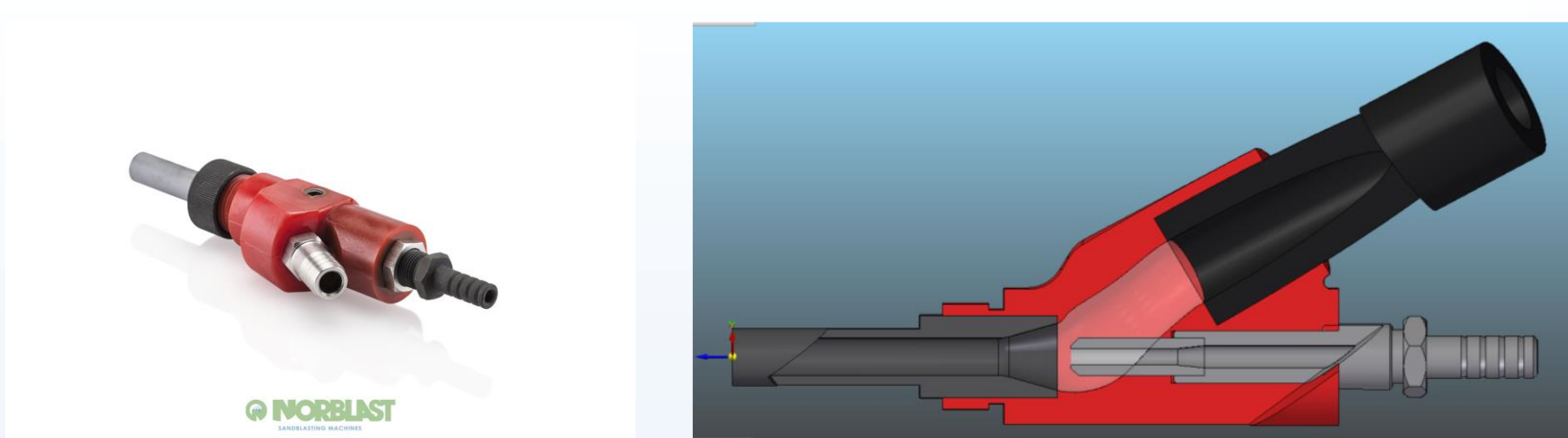
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ABSTRACT

The use of CFD and optimization cycles is becoming fundamental for saving time and design costs in every area where fluid dynamics is the main protagonist.

The purpose of this work is optimization of the blasting gun in order to increase output speed and media supply.



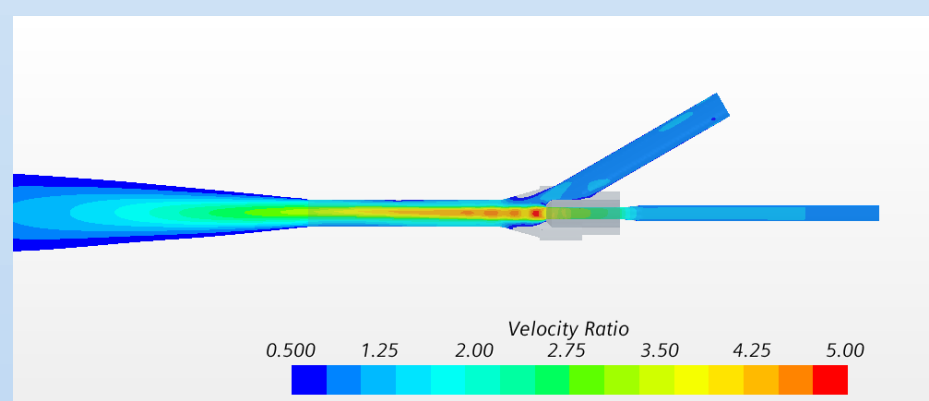
1. Goal

To obtain best compromise between output velocity and media supply and a map of improvement configurations to be chosen according to specific needs.

2. Strategy

A preliminary validation of numerical method of reference configuration by experimental test was performed with satisfying results.

First run the optimization cycle considering only the air flow and then check the best configurations with material injection by DEM strategy.

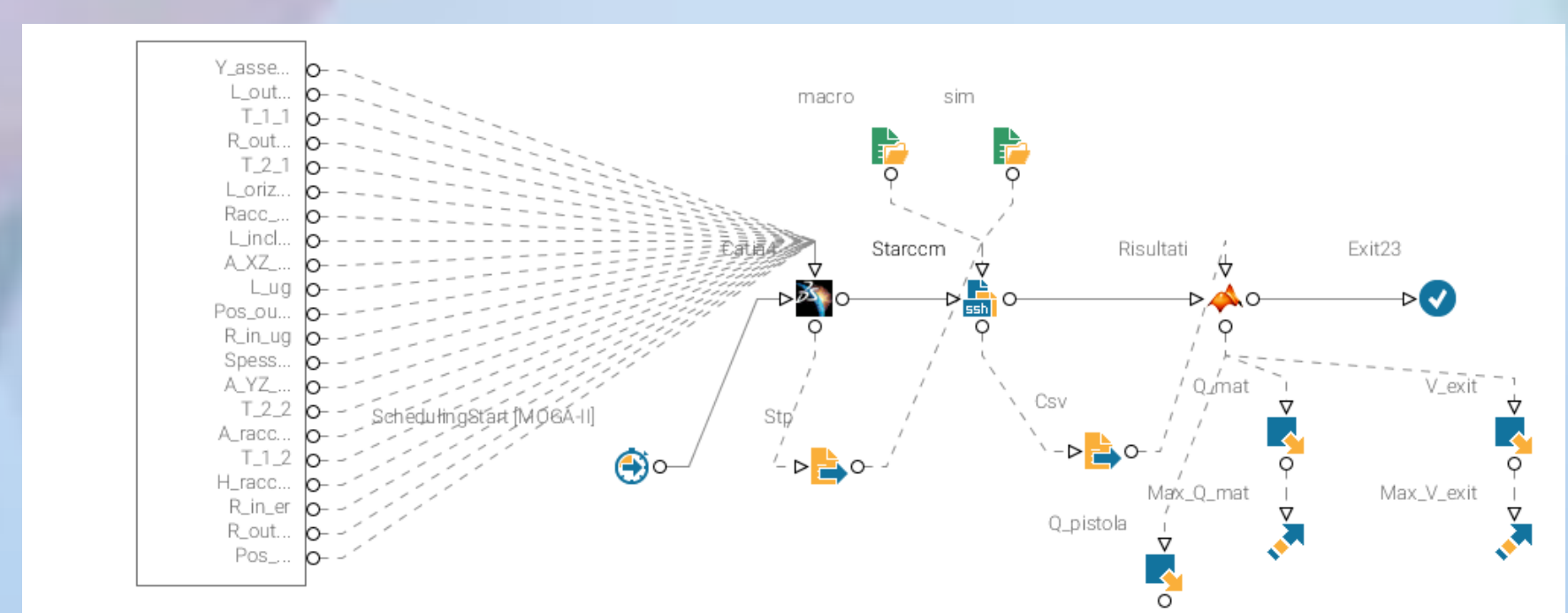


3. Optimization

In order to define the gun geometry 21 parameters are defined.

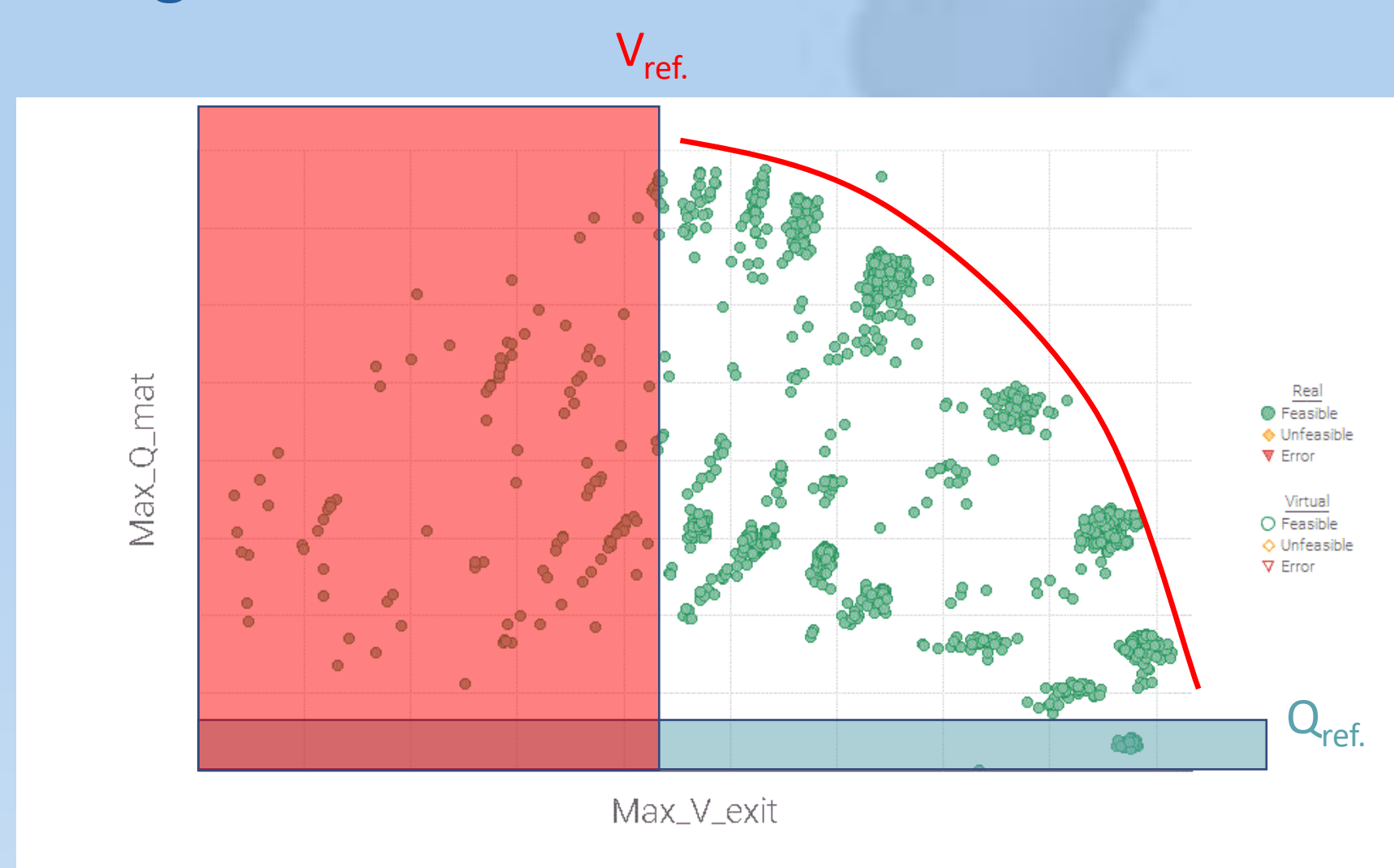
modeFRONTIER, Matlab, Catia_V5 and StarCCM+ are used to define strategy.

The objective was to maximize output velocity and mass flow rate of media supply tube.



4. Results

The optimization process produced 4364 geometries of which 1421 valid and 1274 improved respect to the reference configuration.



5. Verify

The reference one and the 3 best configuration (higher output velocity, higher sand supply, best compromise between two optimization parameters) are checked by DEM simulation of complete geometry to verify the optimization process.

