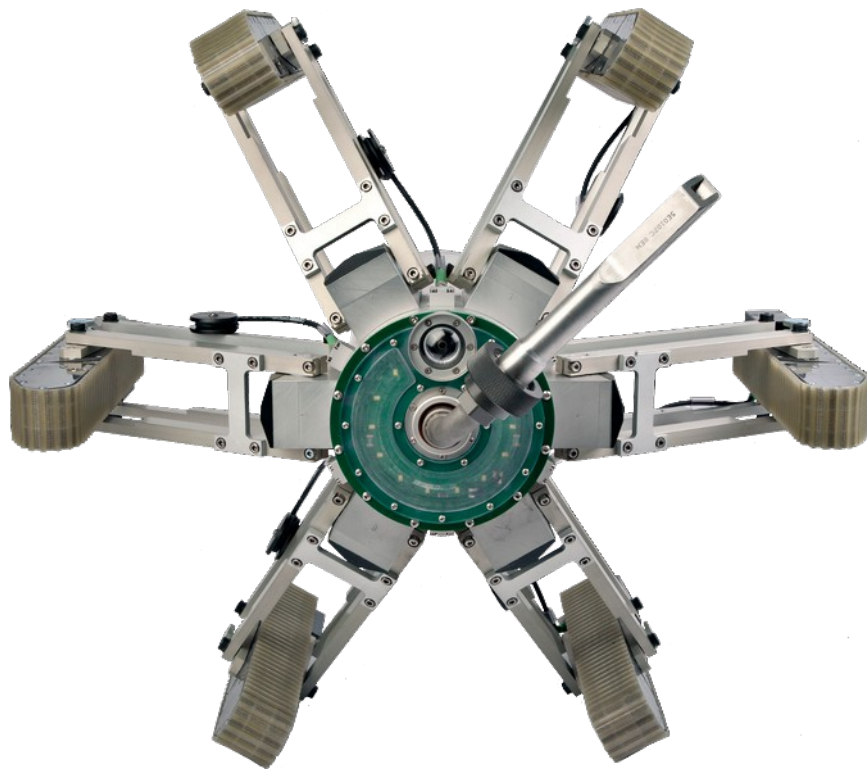


NEOVISION

Industrial Vision Systems

JETTY

BY NEOVISION



**High Level Inspection
Deep Cleaning of Air Ducts**

Foreword

The question to us at Neovision was "Can you develop a solution for cleaning ducts using the dry ice blasting method". A straightforward question with no easy answer and the sort of challenge that we could apply our design, innovation and significant technological insight to craft a solution. The project required a lot of research to adapt our substantial experience in machine vision, industrial automation, robotics and special purpose built machinery to achieve the end result, Jetty.

We created the prototype that had many new and previously unseen technologies and solutions that work to produce the ideal solution to overcome the challenges of cleaning ducts and protected it by patent. The patent listing sixteen solutions to individual problem that needed to be solved outlines the way that Jetty is perfectly designed to purpose. Jetty is fully developed and has been subjected to the worst contamination in the harshest of environment proving it can clean in small spaces where it is impossible, unpleasant or indeed dangerous for human beings. People should not be exposed to the rigours or risks now as we can all breathe easy, Jetty is here to do the job.

Thank you for taking the time to investigate Jetty which is now stronger, able to travel through smaller ducting with a brand new control panel line up and further improvements, some more visible than others. Every thing has been done to improve its performance with the clear mission to make our customer even happier.

At Neovision we offer solutions,

Petr Palatka
Managing Director



As recommended by



Linde Gas a. s.

Features:

- Harness the power and properties of Dry Ice blasting technology
- Robust and sturdy construction for the harshest of environments
- Suitable for all duct shapes, horizontal, vertical ascent & decent
- Full control and safety provided by comprehensive remote panel
- High quality HD real time video inspection, recording & playback
- Adjustable nozzle rotation with programmable rotation planning
- Three to six individual micro processor controlled traction units
- Compelling results without detergents or toxic chemical agents

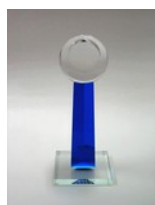
Benefits:

- Clean effectively in areas previously uncleaned by contractors
- Environmentally-friendly, efficient, effective with no new CO₂
- Cleaning and bacteriological removal to the highest standard
- Address air quality issues in line with EU Standard CEN 15780
- Reduce energy inefficiency and address fire safety in ducting
- Reduce cleaning time & eliminates secondary waste streams
- Reduce facility downtime and laborious ducting dis-assembly
- Dramatic savings in man hours & expensive toxic chemicals
- Monitor & record inspection & cleaning for client satisfaction

Multiple award winning solution



Gold Medal International Engineering Fair in Brno, 2011



Grand Prix For Waste & cleaning Trade Fair, 2011



Innovation of the year 2011 held by AIE CR



Special Prize awarded by the Technology Agency, 2010

Robot Specification

The Jetty robot is a uniquely designed belt robot. It cleans and inspects air-conditioning ducts, kitchen and industrial air vents, air-conditioning vents or any spaces where cleaning is strenuous or impossible without dismantling. The latest generation's design takes advantage of the experience gained from the earlier models. It stands out by virtue of its improved utility, greater resistance, higher efficiency and easier handling.

High Efficiency

The robot's construction allows the use of dry ice blast cleaning technology. Using dry ice blasting enables the removal of heavy soiling from ducts ecologically without the application of solvent based technologies. The robot's robust design allows the use of highly efficient nozzles. Thanks to its six leg trig, the robot can prop itself against the duct and ensure stability during nozzle rotation and this helps to centre the robot in the duct for maximum efficiency.

The rotation velocity of the nozzle and the velocity of the robot's locomotion can be adjusted according to the extent of contamination. The cleaning medium is sprayed from the nozzle at -78°C . It quickly supercools the surface and causes so-called thermal shock. As a result, the contamination is released due to the differences in the tension between the contamination and the underlying surface.

Duct Shapes

Jetty is able to pass through and clean circular, rectangular or square-shaped ducts and due to its design it can not only be used in horizontal ducting, but it can also pass through vertical or sloping ducting. The robot can also pass through S-shaped ducting and various turns.

Controlling the Robot

The robot has been designed as a modular, easy-to-assemble system. Once the switchboard, the control panel and other necessary components have been unpacked, the entire system can be assembled quickly and easily.

The operator controls the robot from a safe location using a control panel. The duct ahead of the robot is scanned by a camera and the operator can observe it on the monitor. The operator can easily position the robot as needed by manipulating the control panel. Moreover, the operator can directly monitor the duct cleaning process and see the results immediately.

The control panel enables video recordings to be saved so the situation before and after cleaning can be assessed and customers can see the difference for themselves.



Control Panel

Technical Parameters

| | |
|--|--|
| Minimum duct diameter | 360 mm |
| Maximum duct diameter (standard configuration) | 710 mm |
| Maximum duct diameter (with added extensions) | 1300 mm |
| Maximum locomotion speed | 70 mm/s |
| Robot service weight (excluding the supply hose and cable) | 35 kg |
| Dry ice hose length (max.) | 50 m |
| Switchboard power supply | 100-240 VAC |
| Duct shapes | Circular, rectangular, S-shaped and vertical |
| Industrial colour digital camera resolution | 1280×960 pixels |
| Total angle of video coverage | 178 degrees |
| Live video view frame speed | 30 fps |
| Recorded video view frame speed | 10 fps |
| Large LCD control panel monitor | 17" screen / 1280×1024 pixels |
| Control panel suitcase dirt & water resistance | IP 68 |

Software features overview

- Custom built full screen software application
- Plan and apply programmable robot movements
- Notification of all important events during the cleaning
- Save plan and apply movements and use them to complete similar tasks
- On screen display of speed, load on track, turn angle, elevation and distance travelled

Cleaning Process

The cleaning process is simple to set up. Once you unpack Jetty and set the required configuration including nozzle and extensions, you connect it to the compressor, dry ice blasting machine and control panel. It will be necessary to set up the airflow and arrange collection point or points.

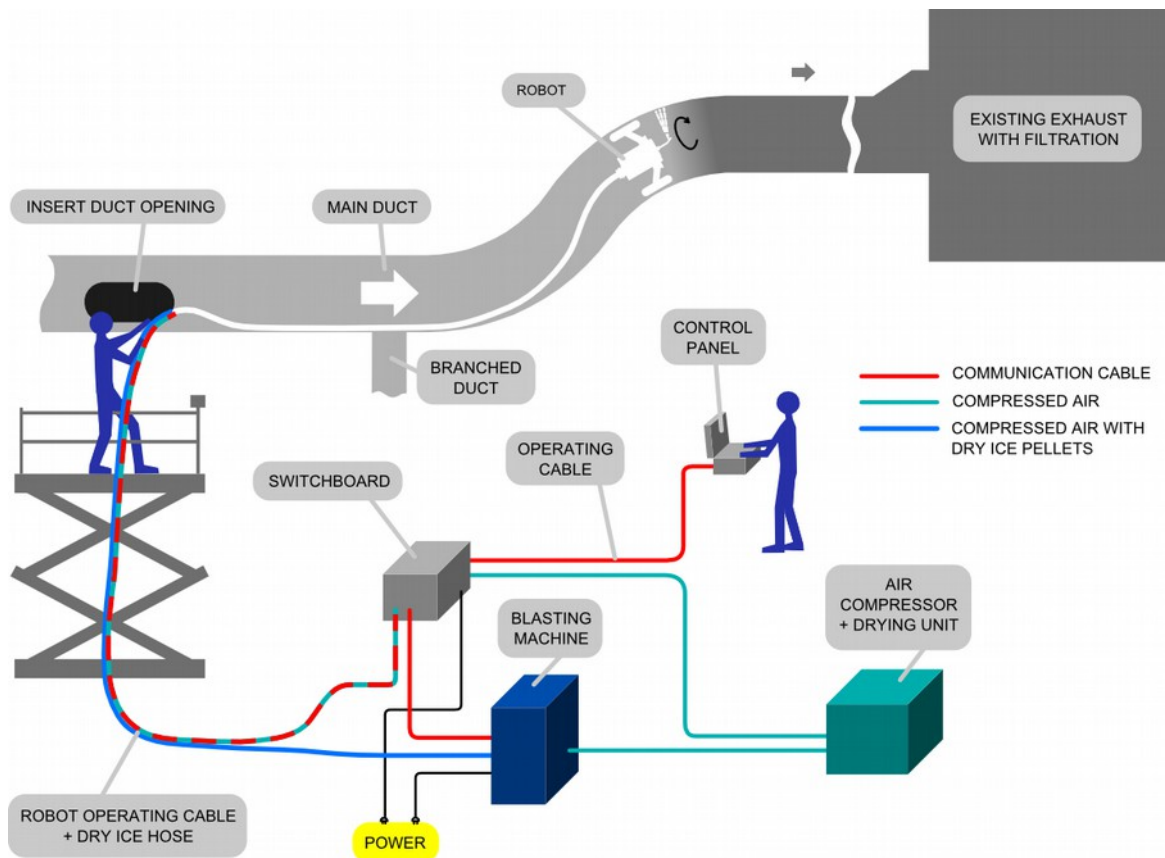
Jetty is then inserted into the duct using an inspection window or duct cap after removing the cap. In the interest of safety it is necessary to ensure good access to the ducts so there should be provision for a mobile platform, scaffold or footbridge where required.

Supply of the Cleaning Medium

To create the dry ice flow through Jetty you will require a dry ice blasting machine and a compressor. There is a blast hose connector at the rear of Jetty that will accommodate easy connection to a wide range of single hose blasting machines possibly using a size reduction adaptor.

Aspiration of Contaminants

All contaminants and residues blasted from the ducting walls should be removed during the cleaning process, preferably by the aspiration unit within the system. This will allow you to use the properties of the air system to avoid secondary clean-up. It is necessary to supply air flow to support this on occasion.



Whole Cleaning System

Jetty Cleaning System



Cleaning Robot
(basic setting for round ducts)

+



Control Panel

+



Switchboard

+

essential accessories
(robot-switchboard controlling cable,
panel-switchboard controlling cable, etc.)

+



Blasting Machine
(with hose and controlling cable)

+



Compressor
(with a least 2 hoses)

Dry Ice Blasting

Dry ice blasting is in some ways similar to sand blasting, plastic bead blasting, or soda blasting where a medium is accelerated in a pressurized air stream to impact a surface to be cleaned or prepared. However there are no similarities in the outcomes and results, dry ice is gentle offering excellent results without abrasion, here's the science.

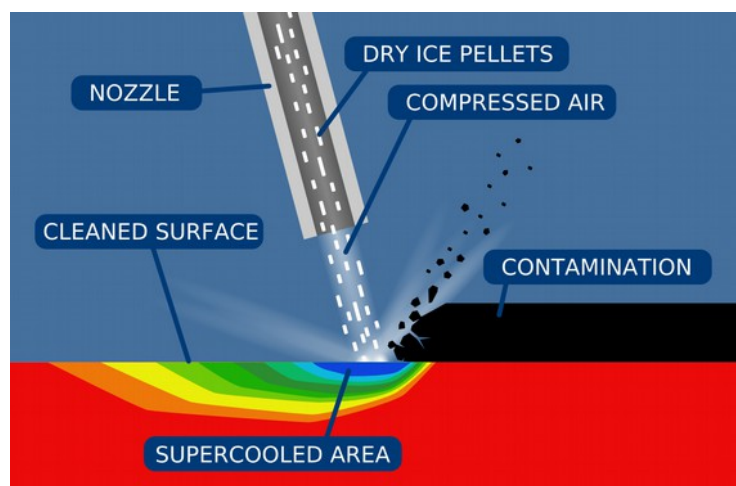
Instead of using hard abrasive media to impact and damage a surface, the dry ice blasting method uses soft solid frozen carbon dioxide (CO₂), accelerated to high velocity which collides with the target surface. Harnessing the power of the kinetic energy and the rapid change of state this causes so called thermal shock propelling the undesirable contamination off the underlying target surface.



Dry Ice Pellets

Dry ice blasting has many unique and superior benefits over traditional blasting media.

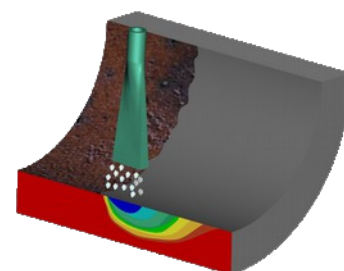
- It is a non abrasive, non flammable non conductive and non toxic cleaning method.
- It is environmentally friendly with no secondary contaminants such as solvents or grit media.
- It offers the opportunity to clean most items in place without time-consuming dis-assembly.
- It can be used without damaging active electrical or mechanical parts or creating fire hazards.
- It can be used to remove a wide range residues, release agents, contaminants, paints, oils, rubber and films.
- It can be as gentle, lifting smoke damage from the pages books or as aggressive as removing weld slag from tooling.
- It can be used for a multitude of general and specialized applications throughout domestic and commercial cleaning sectors.



Dry Ice Cleaning Principle

Dry ice blasting uses compressed air to accelerate frozen carbon dioxide (CO₂) pellets to a high velocity. A compressed air supply of approximately 6 Bar (80 PSI/50 scfm) can be used in this process. Dry ice pellets can be made on-site or supplied. We recommend that pellets are made from food grade carbon dioxide that has been specifically approved by the FDA, the EPA and the USDA.

Carbon dioxide in all states is a non poisonous, dry ice is recycled carbon dioxide which is both inexpensive and easily stored at work sites.



Dry Ice Duct Cleaning

Examples

Contamination before cleaning



Heavy dust from rubber industry

Immaculate after cleaning



All removed very quickly



Plastics and polymers



Same result for rectangular ducts



Furnace ash with resistant layer of tar



Stubborn but removed

Our service & support

We have a pool of experts who are ready to offer advice and assistance in any situation ranging from basic robot operation through to more challenging troubleshooting and maintenance. We can resolve issues with a ready supply of parts available for fast shipment and this forms an integral part of our warranty and continues into the post warranty period.

There are design features which will often allow Jetty to continue to work while we organise your solution and dispatch the required part. We are happy to locate a Jetty Robot for one off inspection and cleaning applications and will put you in contact with the contractor to complete your request.

Training

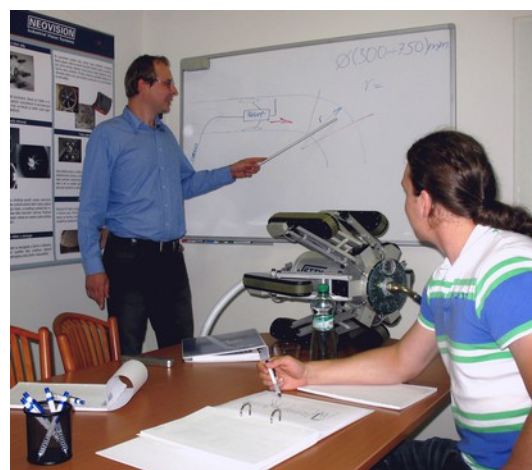
There is a comprehensive training to instruct the trainee on all aspects of Jetty use. The course which will offer complete tuition on driving and planning when conducting inspection or cleaning with Jetty.

You will be taught full utilization of the robot including tips a tricks as well as maintenance routines, recommendations and best practice for incident free operation of the Jetty Robot system. The course will deliver the benefit of our experience and that of our existing contract cleaners and will highlight the essentials for planning and executing the perfect cleanings.

Support

Our support specialists are on hand to work with any issue that you may require assistance with. Experienced in the use of Jetty with the benefit of our knowledge base our representative will look for the best solution and see that it is implemented.

Support specialists additionally work closely with our research and development team on system improvements for the optimal, efficient performance of Jetty and to tailor the system to the customer's individual needs upon request.

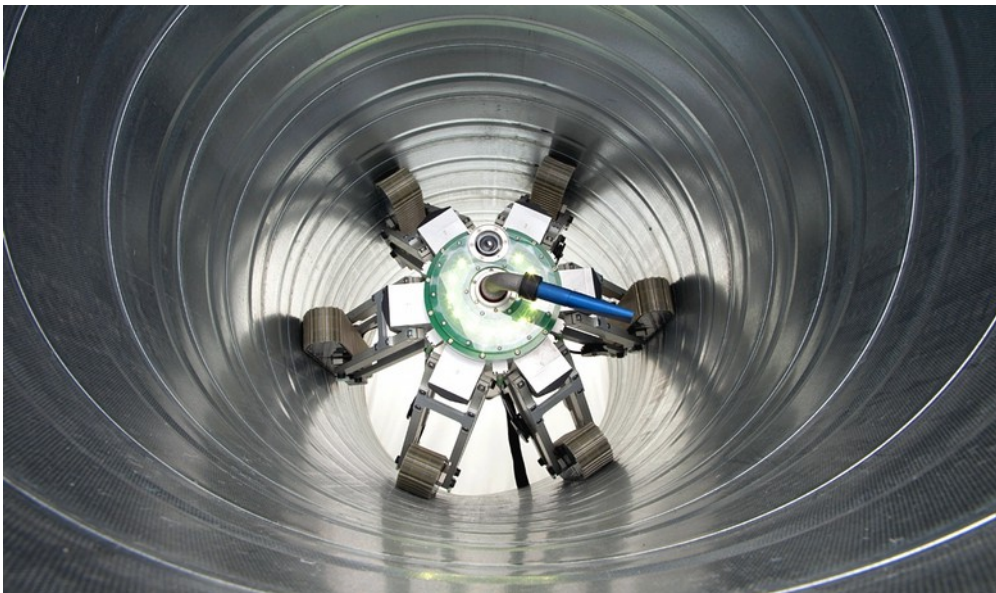


Service and Maintenance

Service and maintenance representatives are ready to react to any customer inquiry to deliver solutions in as short a time as is possible.

Online assistance with telephone support allows the client to discuss their needs without delay and the team to be able to respond in the event of unforeseen difficulty, with advice for the possibility to continue or express delivery of the required part or parts.

We have a maintenance schedule that would see Jetty refurbished every five years. These refurbishments would include update any developments and will ready your Jetty for the coming five years.



"At last we can breathe easy, now Jetty is here"

Contact Us

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Company Registration

VAT Registration: CZ64943607

The company is registered in the Commercial Register at the Municipal Court of Prague, Section C, Entry No. 42536.

About Neovision

Neovision, s. r. o. is a private Czech company founded in 1995. Neovision specializes in machine vision systems for high accuracy measurements, quality inspections, and robot navigation, including robots for laser welding. Neovision delivers machine vision systems for integration into production lines and third party devices, as well as full-fledged single purpose machines with machine vision systems and robotized workplaces. Neovision's system design maximizes customer assets by delivering highly reliable systems and minimizing operational and maintenance costs.



Distributor: