NDT

Oil & Gas

Aerospace

Shipyards

Construction

Munition

Railways

Power Line

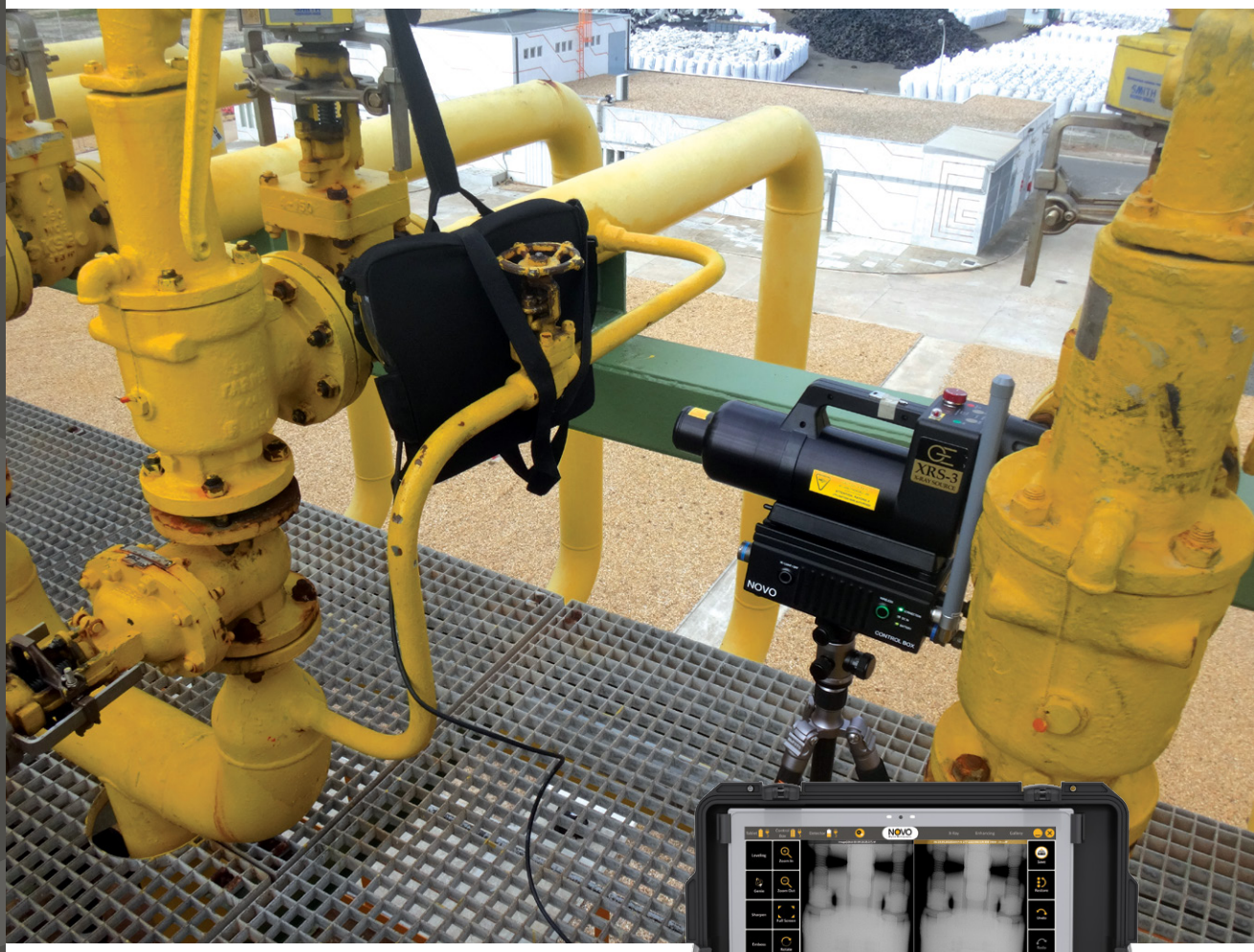
English

# NOVO

Digital Radiography

## *INNOVATIVE • COMPACT • RUGGED*

*Portable Digital Radiography Systems*





www.NOVO-DR.com

January 2017

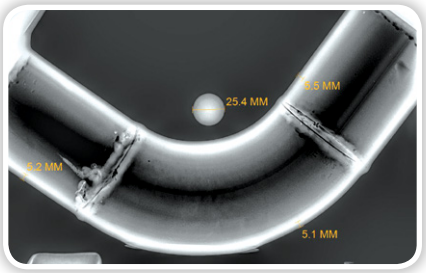
***NOVO DR offers NDT professionals portable Digital Radiography X-ray systems designed for field & laboratory operations, whilst providing the highest image quality.***

In contrast to film or Computed Radiography, Digital Radiography (DR) uses a X-ray digital image capturing device (Detector). This technology enables us to generate immediate and high quality X-ray images while keeping radiation levels to the minimum. Once generated the X-ray image is displayed on a tablet immediately, then using our User Friendly proprietary software the image can be processed, enhanced, shared and digitally stored and accessed on the spot.

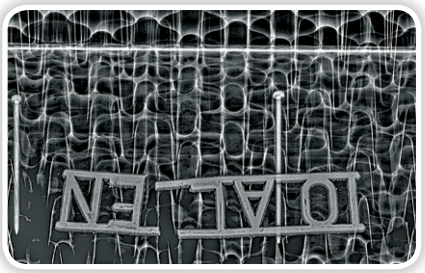
Having DR as our core technology we've developed and customized a compact, lightweight, rugged, weather proof system with wireless and battery operation capabilities. These features allow us to examine tight and elevated places, offer a fast workflow and prolong operation time making the system ideal for the various NDT applications.

# *Popular Applications*

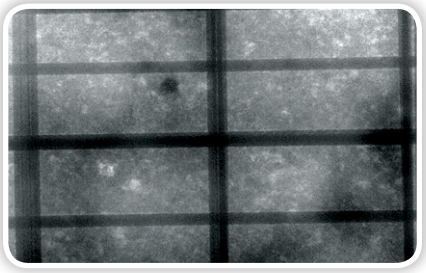
## *Oil & Gas*



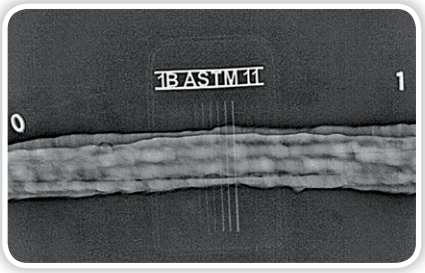

## *Aerospace*



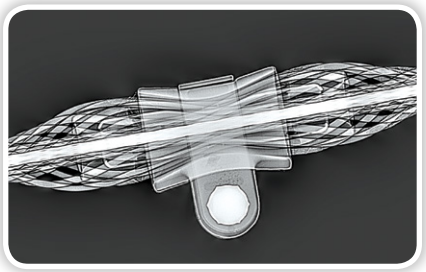
## *Construction*



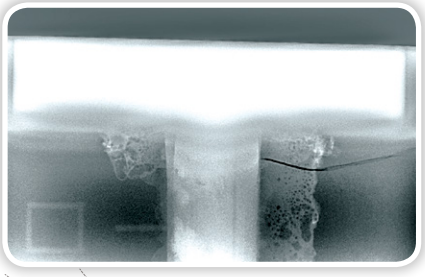
## *Shipyards*



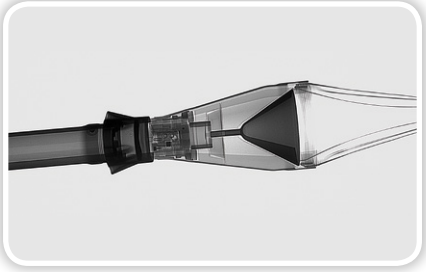

## *Power Line*

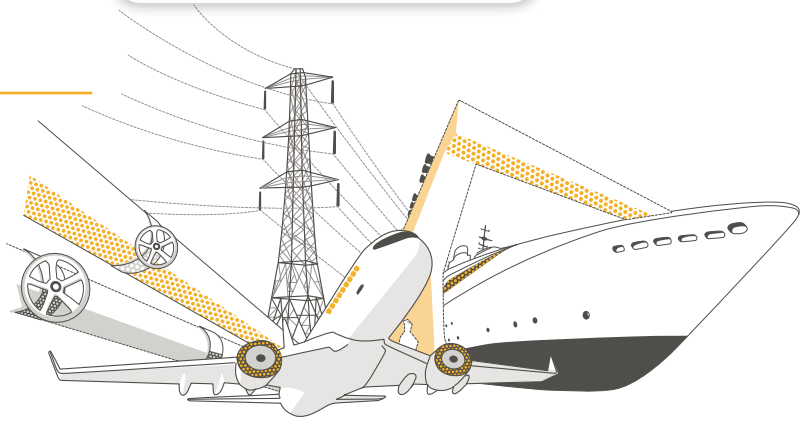


## *Railways*



## *Munition*





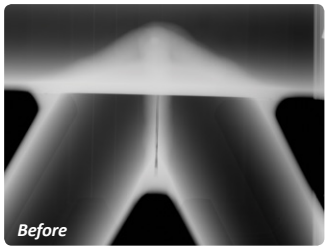
# System Highlights

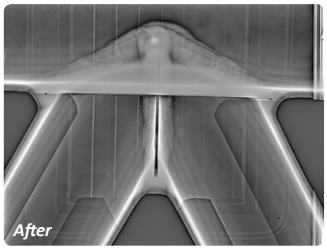
## Highest Image Quality:

**16-bit Latest Generation**

State of the art Digital Radiography detectors that produce, with a touch of a finger, exceptional high quality images with incredible detail and high penetration capabilities.

Genie

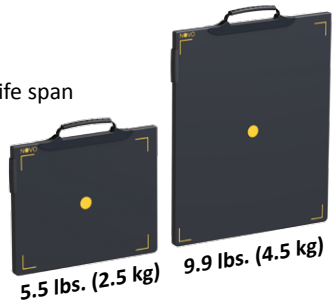



## Cutting Edge Detectors:

**Thinnest, Lightest, most Durable**

- Unmatched Image Quality!
- 16-bit Latest Generation
- Built-in shielding for maximum life span
- High Dose Compatible
- Thickness 0.6” (15.6mm)
- Drop Tested 20” (50cm)
- Load Proof 330 lbs. (150 kg)




## Most Rugged System:

**Suitable for all Terrain and Weather Conditions**

- Usage in Extreme Weather Conditions
- MIL-DTL 38999 Connectors
- MIL-STD-810G Tablets
- Drop Tested Detectors
- Rugged Cases

## Smallest Foot Print:

**Complete System in a 25” Pelican Case on Wheels**

Each system includes:

- Detector
- Tablet
- X-ray Source
- Control Box
- 50m Communication Reel
- Additional Modules & cables

Backpack configurations are available as well.

## Touch Software:

**Simple User Friendly Touch Interface**

- Operating & Controlling the System
- Powerful Automatic Enhancing Algorithms
- Optimal Viewing Experience
- Variety of Tablets; rugged 7" up to a 20" 4K display.
- Windows® 10

Windows 10

## Parallel Multi Location Control & Display:

**Downrange Durable Tablet & Safe-Zone up to 20” 4K Display**

Use one tablet closer to the inspected object and a second tablet from a greater distance.

Both tablets can be used to:

- Control the System
- Display X-ray Images
- Image Enhancing, Storing & Sharing.

## Longest Battery Life:

**Over 16 Hours of Battery Operation**

While out in the field battery longevity can be crucial, with over 16 hours of operation with a single full charge, you can focus on what's important.

# Products

*The NOVO NDT products family is designed for NDT radiography professionals working in tough field & laboratory conditions.*
*Our system is located in a 25” Pelican™ Case and includes a Detector, Tablet & Software, Control Box, 50m Communication Cable on a Reel, Tripod Mount and additional Modules & Cables. In addition, the Discovery system is designed to hold a variety of Golden X-ray Sources - XR150, XR200 and XRS3.*

## NOVO 15 DISCOVERY

- NOVO 15WN Detector (9.1” x 11.2” Imaging Area)
- Panasonic Toughpad™ FZ-G1 Tablet (10.1" Display)
- NOVO Touch Professional Software
- Wired and Wireless Communication

## NOVO 15 DISCOVERY 4K

- NOVO 15WN Detector (9.1” x 11.2” Imaging Area)
- Panasonic Toughpad™ 4K Tablet (20'' Display)
- NOVO Touch Professional Software
- Wired and Wireless Communication

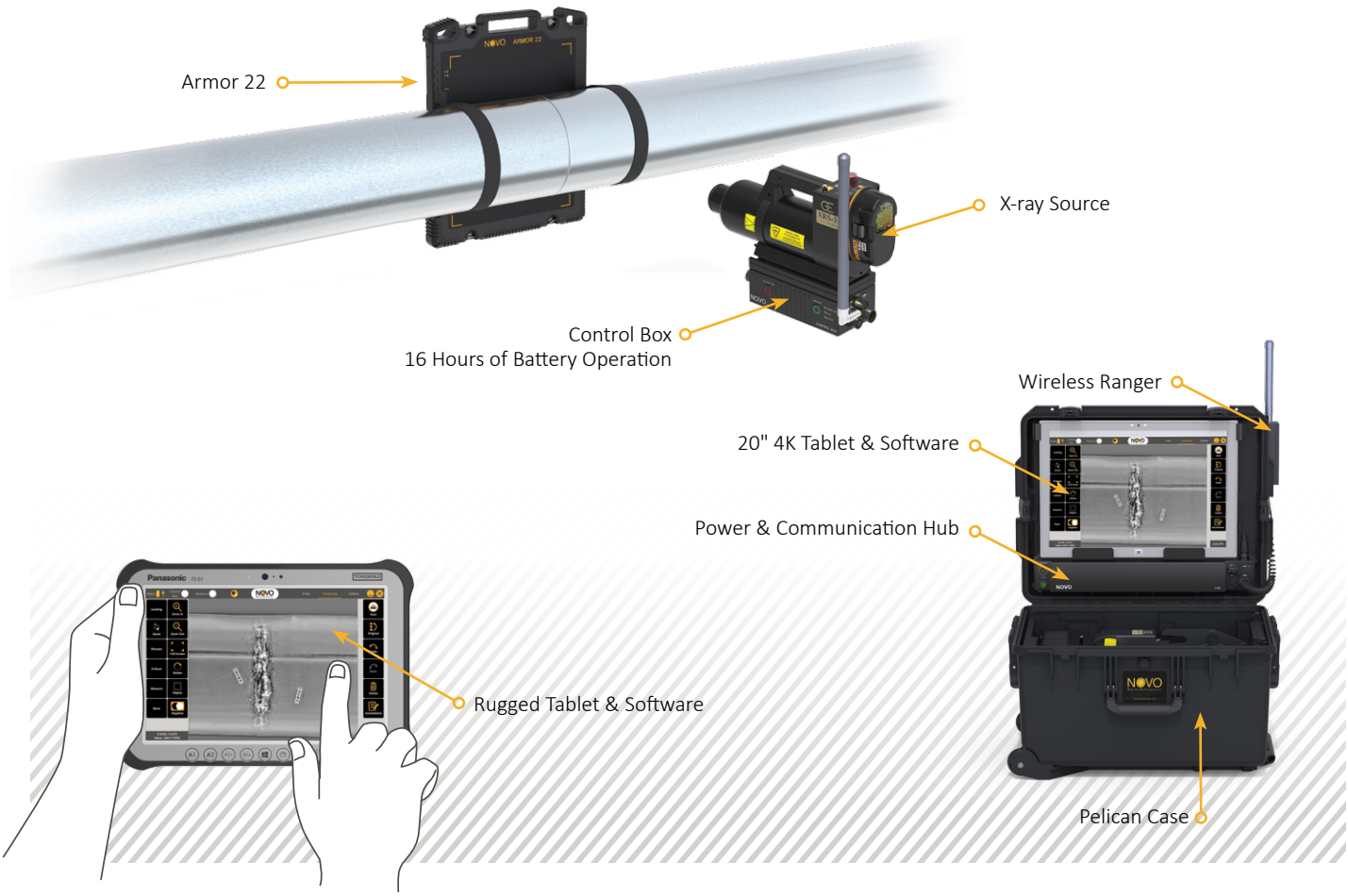
## NOVO 22 DISCOVERY

- NOVO 22WN Detector (14” x 16.8” Imaging Area)
- Panasonic Toughpad™ FZ-G1 Tablet (10.1" Display)
- NOVO Touch Professional Software
- Wired and Wireless Communication

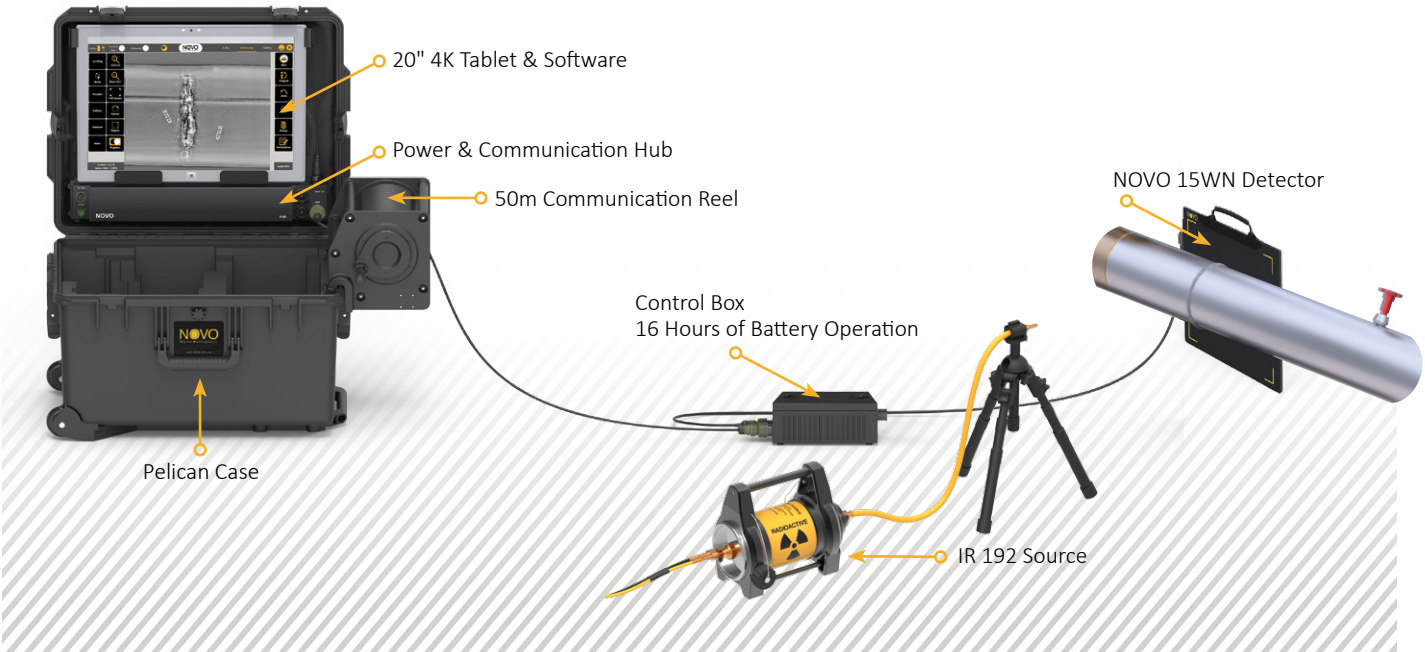
## NOVO 22 DISCOVERY 4K

- NOVO 22WN Detector (14” x 16.8” Imaging Area)
- Panasonic Toughpad™ 4K Tablet (20'' Display)
- NOVO Touch Professional Software
- Wired and Wireless Communication

# *Wireless Set Up: Configuration Example*




# *Wired Set Up: Configuration Example*



# Technical Specifications

## Detector

| System | NOVO 15 Discovery | NOVO 15 Discovery 4K | NOVO 22 Discovery | NOVO 22 Discovery 4K |
|---|---|---|---|---|
| **Detector Model** | NOVO 15WN | | NOVO 22WN | |
| **Detector Imaging Area** | 9.1" x 11.2" (23.1cm x 28.5cm) | | 14.0" x 16.8" (35.6cm x 42.7cm) | |
| **Detector Size** | 10.6" x 13" (26.9cm x 33cm) | | 15.2" x 18.2" (38.5cm x 46.2cm) | |
| **Active Area (Imaging Area / Detector Size)** | 74% Active Area | | 85% Active Area | |
| **Detector Weight** | ~5.5 lbs. (2.5kg) | | ~9.9 lbs. (4.5kg) | |
| **Detector Load Proof** | 330 lbs. (150kg) | | 330 lbs. (150kg) | |
| **Detector Drop Test** | 20" (50cm) | | 20" (50cm) | |
| **Detector Thickness** | 0.6" (15.6mm) | | 0.6" (15.6mm) | |
| **Bit Depth** | 16 bit latest generation | | 16 bit latest generation | |
| **Life Span** | Over 100K rem* | | Over 100K rem* | |

*Over 100K rem of direct exposure on the detector

## Cases *(all cases are customized by NOVO DR)*

| Case | Description | Case External Dimensions |
|---|---|---|
| **NOVO 15 Discovery System**<br>**NOVO 22 Discovery System**<br>**NOVO 15 Discovery 4K System**<br>**NOVO 22 Discovery 4K System** | Rugged iM2750 Pelican™ case | 24.6" x 19.7" x 14.4" (62.5cm x 50cm x 36.6cm) |
| **Optional Backpacks** | Patrol<br>Tactical<br>Urban | 28.0" x 19.0" x 13.0" (71.1cm x 48.3cm x 33cm)<br>18.0" x 13.0" x 10.0" (45.7cm x 33cm x 25.4cm)<br>19.0" x 12.25" x 6.5" (48.3cm x 31.1cm x 16.5cm) |
| **NOVO Folding Slider Case** | Rugged 1740 Pelican™ case | 44.2" x 16.1" x 14.0" (112.2cm x 40.9cm x 35.6cm) |

## Folding Slider*

| System | NOVO 15 Discovery | NOVO 15 Discovery 4K | NOVO 22 Discovery | NOVO 22 Discovery 4K |
|---|---|---|---|---|
| **Folding Slider Size (folded)** | 38.6" x 11.8" x 10.6" (98cm x 30cm x 27cm) | | | |
| **Imaging Area** | 27.3" x 22.4" (69.3cm x 57cm) | | 33.6" x 28.0" (85.4cm x 71.2cm) | |

*The folding Slider is an external module and comes in a Customized 1740 Pelican™ Case

## Tablets

| | Panasonic Toughpad™ 4K | Panasonic Toughpad™ FZ-G1 | Panasonic Toughpad™ FZ-M1 |
|---|---|---|---|
| **Screen Size** | 20" | 10.1" | 7" |
| **Screen Resolution** | 3840 x 2560 (4K) | 1920 x 1200 | 1280 x 800 |
| **Screen Brightness (NIT)** | 300 | 800 | 500 |
| **Multi-Touch** | 10 point touch | 10 point, glove touch | 10 point, glove touch |
| **Operating System** | Windows® 10 | Windows® 10 | Windows® 10 |
| **Weight** | 5.27 lbs. (2.4 kg) | 2.5 lbs. (1.1 kg) | 1.2 lbs. (0.54kg) |
| **Military Standard** | N/A | MIL-STD-810G | MIL-STD-810G |
| **Dust & Water Resistance** | N/A | IP65 | IP65 |
| **Drop Rating** | 1 ft (30cm) | 4 ft (1.2m) | 5 ft (1.5m) |

## X-ray sources

| | XRS-4 | XRS-3 | XR200 |
|---|---|---|---|
| **KVP** | 370 | 270 | 150 |
| **Weight** | 22 lbs. (10 kg) | 12.6 lbs. (5.7 kg) | 11.8 lbs. (5.4 kg) |
| **Size** | 17.5" x 5" x 8.5"<br>(44.5cm x 12.7cm x 21.6cm) | 14" x 4.5" x 7.5"<br>(35.6cm x 11.5cm x 19cm) | 12.5"x4.5"x 7.5"<br>(31.75cm x 11.5cm x 19cm) |

• Designs and specifications are subject to change without notice •• Numbers are rounded for convenience purposes ••• E&OE

# Control Box

**NOVO's Control Box provides unique power, communication, X-ray control and lighting capabilities for maximum flexibility in field operation:**

## Power

- Built-in battery
- 16 hours of operation
- Unlimited power when connected to AC
- Built-in quick charger for fast charging
- The auto sense feature allows the control box to switch between AC power and battery power automatically

## Communication

- Wireless Communication
- Wired Communication
- Hybrid Mode Communication

## X-ray Control

- Controls a variety of X-ray sources
- Supports all Golden Engineering sources
- Supports constant potential sources
- Compatible with Isotopes such as Iridium-192 source

## Lighting

- White LED Flashlight
- Infra-red Flashlight
- LED is used for lighting the inspection environment and as a safety feature when the X-ray is activated
- Infra-red Flashlight illumination provides a discreet solution when needed

## Mounting Points

- D-Rings located on the top
- 1/4" Thread located on the bottom
- Can be mounted on a tripod or straps

## Rugged & Weatherproof

- MIL-DTL 38999 connectors
- Special weatherproof design
- Reliable operation in all weather conditions

## Direct Connection

- Easy connection to Golden sources
- Minimizes the number of items taken down range – Golden & The Control Box are now connected
- Used as an elevated platform for the Golden source

## LED Indicators

- LED Indicators show the CONNECTION, DC IN and BATTERY status at all times
- During Infra-red illumination, the LED indicators are switched off

## Audible Siren

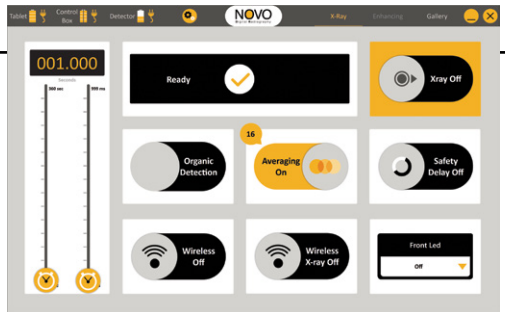
- Audible Siren is automatically activated during X-ray operation

## Remote On/Off

- Switching the Control Box both On & Off remotely is possible when using wired communication.
- Turning Off the Control Box remotely is possible when using wireless communication.



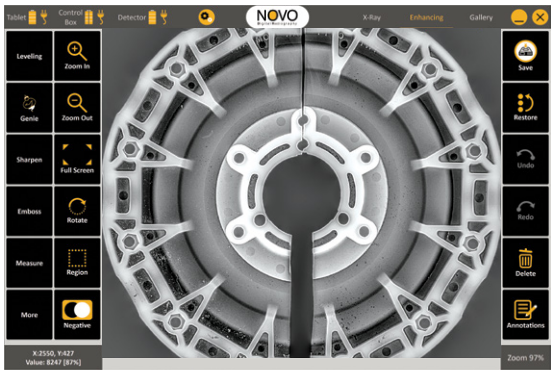
# NOVO Touch Professional Software




The The NOVO Touch Professional Software is NOVO's proprietary software developed from the ground up to provide the best experience and functionality for field & laboratory operations. Supporting Windows® 10 and compatible with both standard PC's and the latest touch screen technology NOVO's User Friendly Software offers intuitive operation for grabbing X-ray images, automatic powerful image enhancement, annotating, archiving and sharing information, in the different file formats such as TIF, DICONDE and others.

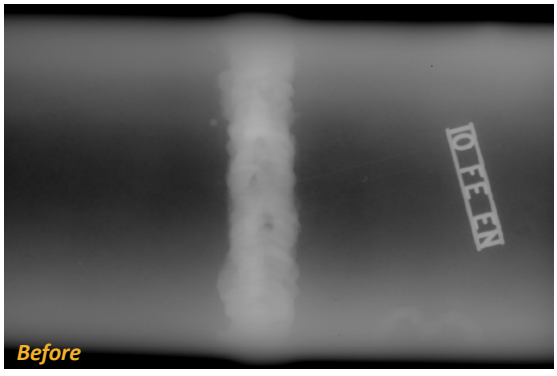
In addition, the NOVO Touch Professional Software has built it tools such as Duplex Wire, ROI Image Statistics, Single/Double Wall Thickness, Double Wall Technique and CNR in order to support the newest and strictest international standards.

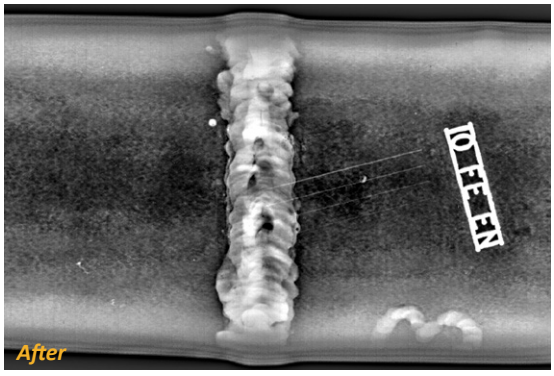
Another important feature of the NOVO Touch Professional Software is the ability to control hardware features such as illumination, switching from wired to wireless communication, activation of a variety of X-ray sources and more.



## The Genie Enhancement Feature

**Enhancing Images for Clear and Improved, Higher Quality Results**



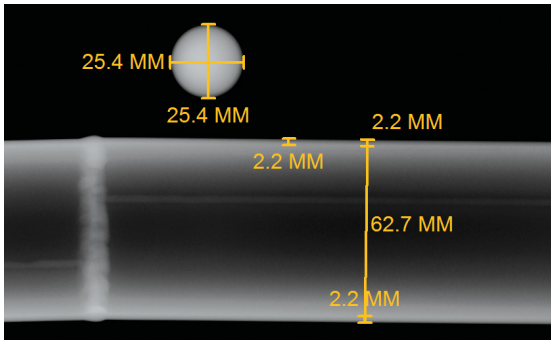

## International Standards

The NOVO Touch Professional Software consists of numerous measuring tools and enhancement features. Furthermore, you may use the NOVO Touch Professional Software to archive, share and process image reports. The combination of these software capabilities provide the necessary tools to support multiple international standards such as:

- BOEING 7044 Ver C
- ISO_17636-2_2013(E)
- ASME Section V article 2
- ASTM DICONDE

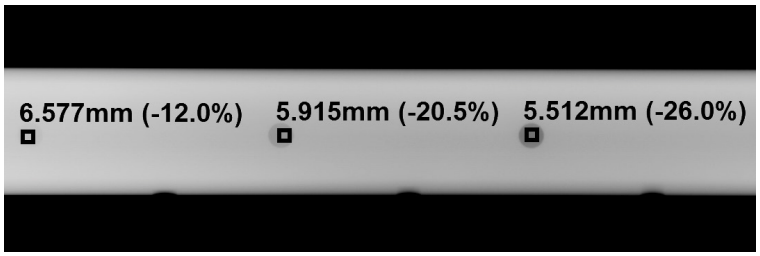
## *Line Profile*

**Fast, Easy & Automatic Wall Thickness Measurements**



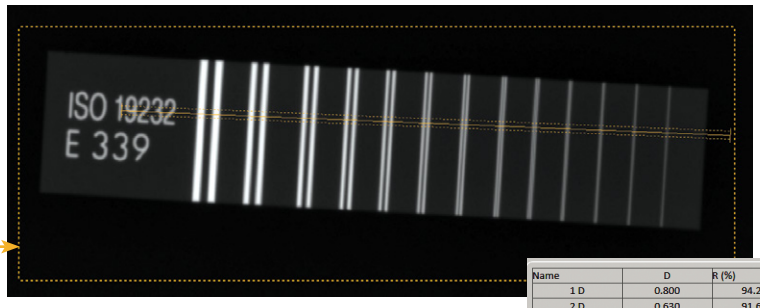

## *DWT*

**Simple & Intuitive Double Wall Technique Tool**




## *SRb*

**Select the Region of Interest and leave the rest to NOVO's Automatic Spatial Resolution Tool**

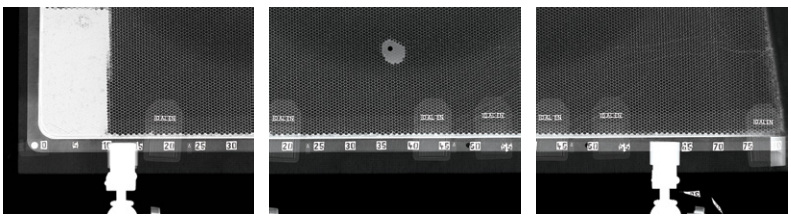



*Region of Interest*

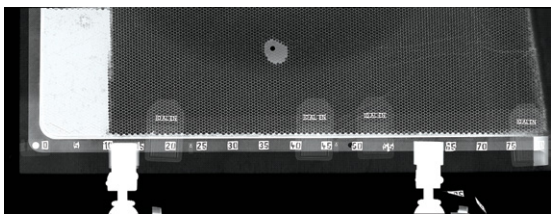
| Name | D | R (%) | DDRD |
|---|---|---|---|
| 1 D | 0.800 | 94.217 | 8858.14 |
| 2 D | 0.630 | 91.687 | 9000.00 |
| 3 D | 0.500 | 86.596 | 8787.00 |
| 4 D | 0.400 | 79.517 | 8703.00 |
| 5 D | 0.320 | 64.433 | 8680.29 |
| 6 D | 0.250 | 49.319 | 8456.57 |
| 7 D | 0.200 | 34.997 | 8295.00 |
| 8 D | 0.160 | 23.483 | 8175.86 |
| 9 D | 0.130 | 6.968 | 8034.43 |

## *Stitching Feature*

**Use the Manual or Automatic Stitching Feature to Create One Large Image**



*Before* - *Multiple X-Ray Images*



*After* - *One Large X-Ray Image*

# Components & Features

## Detectors

NOVO 15WN
~5.5 lbs. (2.5kg)
9.1" x 11.2" Imaging Area

NOVO 22WN
~9.9 lbs. (4.5kg)
14.0" x 16.8" Imaging Area

The NOVO 15WN and NOVO 22WN wireless, robust and battery operated Detectors have been specially designed with built-in shielding for maximum life span and can withstand high dose exposures in a variety of field work and laboratory operations. In addition to the outstanding image quality and immediate results. NOVO's Detectors contain special features such as a magnetic cable connector. This feature allows hassle free and reliable cable connection.

## Tablets

Panasonic Toughpad™ FZ-M1 7"

Panasonic Toughpad™ FZ-G1 10"

Panasonic Toughpad™ 20" 4K

NOVO offers a variety of Windows® 10 based Panasonic Toughpad™ Tablets; 7”, 10.1” MIL-STD tablets and a revolutionary 20" 4K Display tablet. All tablets can be operated from our customized case or quickly detached for hand held use. Together with the NOVO Touch Professional Software, the tablets are used to control the system's operation, display the X-ray images as well as image analysis. Every system must contain at least one tablet to operate. The use of two tablets for simultaneous work and analysis is optional – one tablet for control and display near the inspected object and a second tablet located at a greater distance.

## X-ray & Gamma Sources

XRS-4

XRS-3

Constant Potential

Gamma Source

NOVO’s systems are designed to operate perfectly with Isotopes (e.g. Iridium-192, Selenium-75), Industrial Constant Potential Sources and the entire range of Golden Engineering battery operated pulse X-ray sources. With NOVO’s systems, that range between fully wireless operation to fully wired operation, safety distance is easily obtained. Due to much higher detection sensitivity (compared to film and CR) we reduce energy doses, increase safety, improve productivity, prolong tube life and enable Isotopes usage even at very low curie.

## Power & Communication Hub

Attached to the Discovery 25” Pelican™ Case the Power & Communication Hub contains Military standard connectors, fast data USB 3 ports and an AC outlet (when external power is available) all of which can provide power and communication to the entire system (when working in wired configuration).


Power & Communication Hub

## Wireless Ranger

The NOVO Wireless Ranger is a battery free, lightweight, compact wireless transceiver, which extends the wireless communication range between the tablet and the inspection area up to a staggering 400m line of sight. Using the Wireless Ranger's built in magnets it can be mounted on the tablet, when hand held, on the rugged case or on any other ferromagnetic object such as a vehicle, without the use of any tools.


Wireless Ranger

## Communication Cable

The communication cable provides reliable and fast data transmission between the tablet and the detector. The cable also delivers Power Over Line for unlimited operation time when an external power source (such as vehicle DC to AC inverter) is available. NOVO's custom made reel is lightweight yet robust and can be used connected to the case or as "stand-alone". Additional extension cables of 50m, 100m and 150m are available for a maximum of 300m operation range. For operation ranges that exceed 300m, please see NOVO's wireless solutions.


Built-in 50m Reel


Extension Reel

## Tripod Mounts

The Tripod Mount is a lightweight accessory that firmly holds the detector and provides two 1/4" standard threads used in order to connect to a tripod, manipulation arm etc. The connection is secured by a safety pin, allowing almost unlimited positioning. The Tripod Mount is typically used for positioning the detector in elevated inspection points.

NOVO 15 Tripod Mount
~0.9lbs. (~0.4kg)

NOVO 22 Tripod Mount
~1lbs. (~0.5kg)

## Armor

Using the newest shock absorbent technology and providing additional mechanical protection, this custom tool free case provides the utmost protection to the Detector.
The Armor's special water resistant design supports both wired and wireless communication, allows multiple positioning options (tripod, straps etc.) and provides a simple battery replacement.



Armor 22

Armor 15

## Soft Protective Cover

The Detector Soft Protective Cover provides additional weather and impact protection as well as a carrying strap, D-rings and a tripod mount opening, contributing to maximum flexibly when positioning the detector. The Soft Protective Cover supports both wireless and wired operation.

## Folding Slider

The NOVO Folding Slider is the ideal solution for large object inspection. This sturdy, portable and easy to handle module provides a inspection area of 2X2 when using the NOVO 22 WN and 3X2 when using the NOVO 15 WN.

Controlled by the NOVO Touch Professional Software, the NOVO Folding slider has completely automated movement. The NOVO Folding Slider will produce multiple X-ray shots (4/6 depending on the Detector) and generate an outstanding high quality mosaic image, all with a touch of a finger.

Once folded the NOVO Folding Slider has a small footprint, making it easy to move around and ideal for storage in a car or any other storage options.

**** Tripod not included***

## Detector Stand

The Detector Stand is a custom made accessory firmly holding the Detector in an upright position (portrait or landscape) when required. The Detector Stand is built in a way that allows both a standalone approach *(figure a)* and an approach where the detector is leaning on a wall *(figure b)*. The stand's low profile design provides high flexibility in tight places.

Figure a

Figure b

## Optional backpacks

For extended portability NOVO provides a variety of customized backpacks. Starting from the Urban day backpack and up to the larger Patrol backpack.

Urban Backpack

Tactical Backpack

Patrol Backpack

# Lookout

**The NOVO Lookout is a 3 in 1 accessory enabling the following capabilities:**

## Organic Detection

- Assists in identification of the content and nature of the inspected item by providing organic / in-organic detection
- A color X-ray image is automatically displayed
- The Organic Detection Dual Energy Images comply with airport security standards


## Live Video

- Provides a Live Video stream of the inspected item
- The Camera switches automatically between day / night mode (Infra-red)
- Provides A Still Image that can be grabbed and used for analysis and documentation

## Live Audio

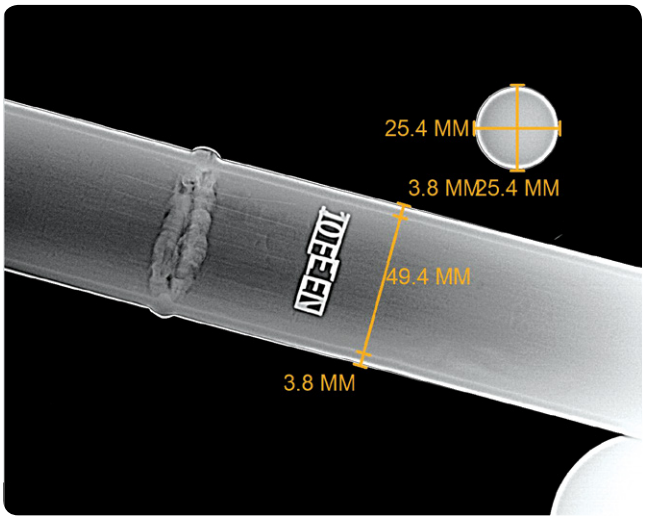
- Provides a Live Audio stream of the inspected environment allowing the operator to hear the Golden's "clicks" in addition to monitoring the sounds of the surrounding area

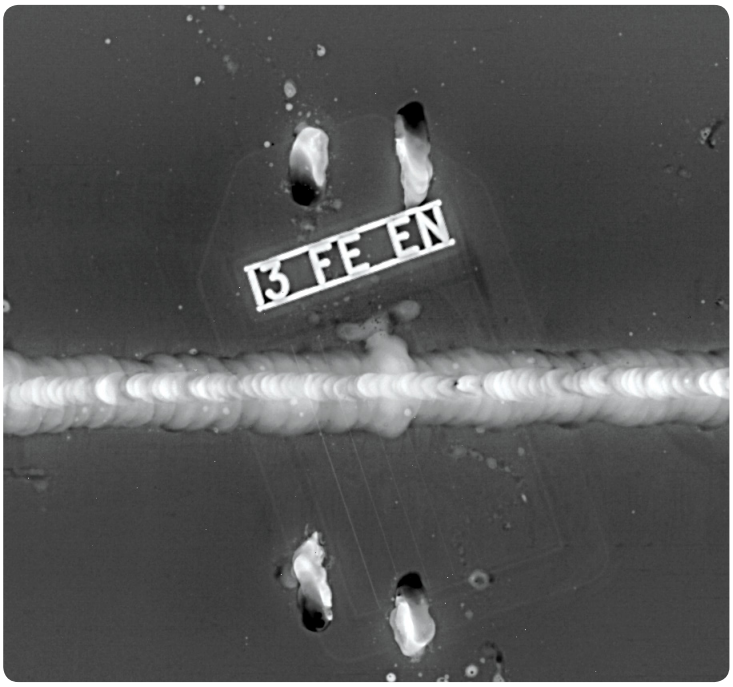

- ***Light weight***
- ***Controlled completely by NOVO Touch Professional Software***
- ***Compatible with Golden Engineering XR150, XR200 and XRS-3 sources***
- ***Tool-free***

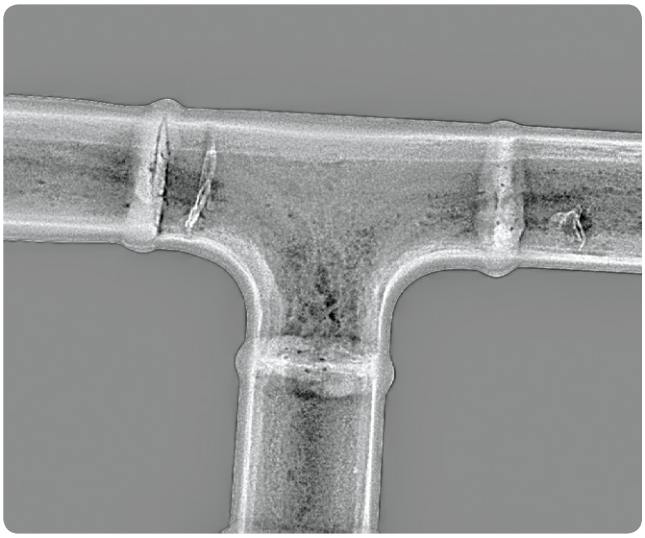
# Robots Integration

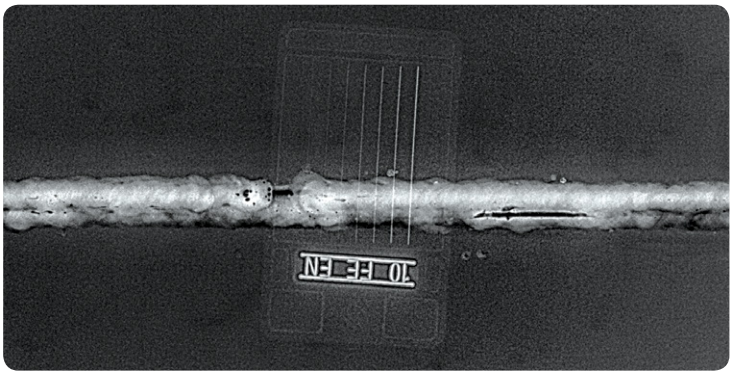
As NOVO's detectors are the lightest of their kind, they allow integration even with small robots while providing excellent manipulation, flexibility and reach. NOVO's systems can be either controlled independently, or when necessary - communication and power can be channeled through the robot. When "no human approach" is required, NOVO's systems are the robot's ideal partner.

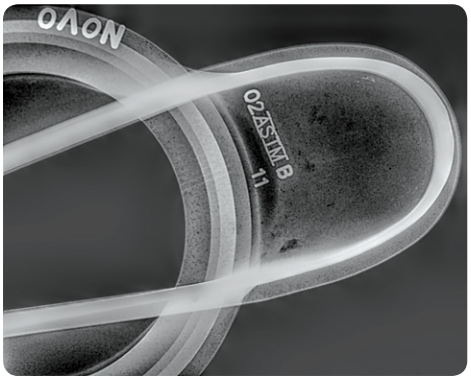
# X-ray Samples

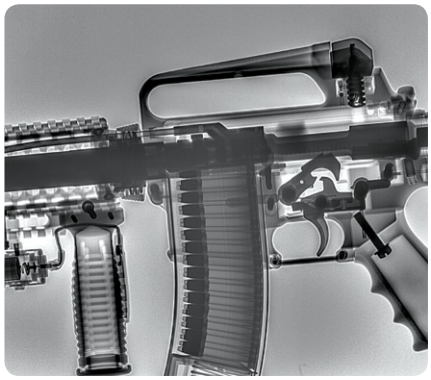


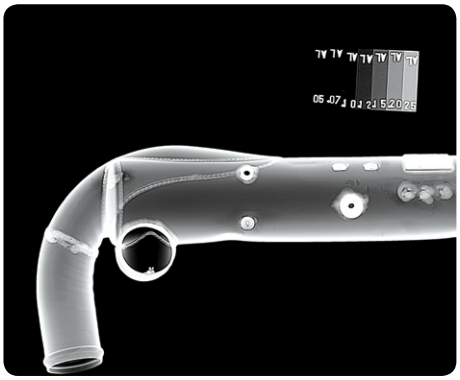



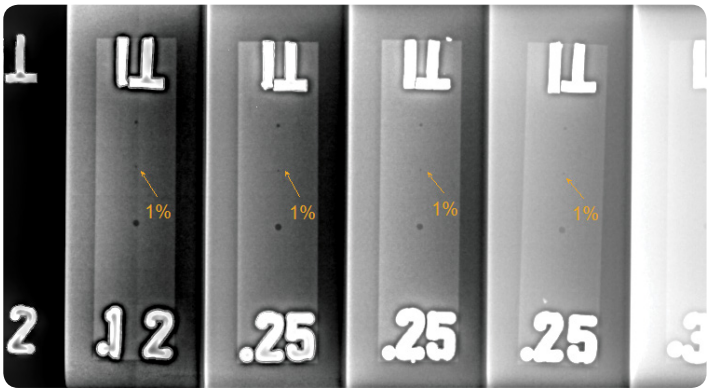


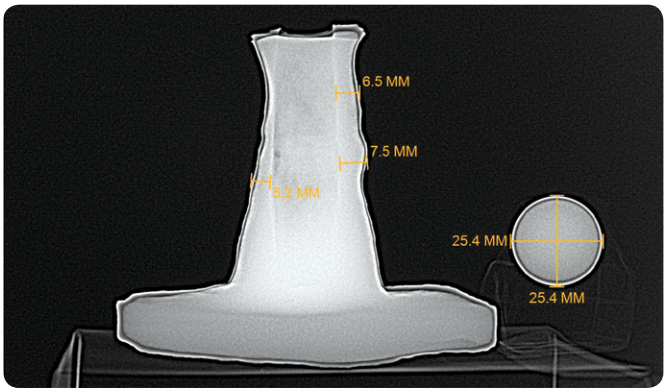












NOVO

Digital Radiography

# *Portable Digital Radiography Systems*

## *About NOVO DR Ltd*

***NOVO DR Ltd.*** *is the leading developer and manufacturer of Portable Digital Radiography X-ray Inspection Systems. We produce the latest generation flat panel based radiography inspection systems for the Security, NDT and Science and Art sectors.*

*Combining our decades of experience and intensive in-house R&D, NOVO DR is taking portable digital radiography to the highest level possible while emphasizing the following strong points:*

- ***Highest image quality***
- ***Portability & Small footprint***
- ***Ruggedness***
- ***Efficient user experience***
- ***Field work optimization***

*INNOVATIVE • COMPACT • RUGGED*

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