→ ECN100V in vacuum chamber

# Vacuum blackbodies

**FOR CRYOGENIC OR AMBIENT** **IRRADIATIVE ENVIRONMENT**

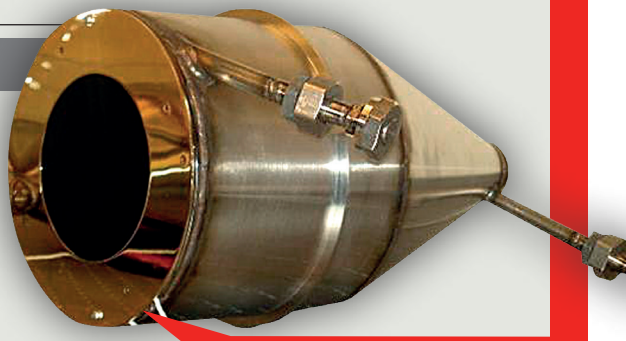
## INTRODUCTION

Vacuum blackbodies combine performance of traditional infrared reference sources with specific features in order to operate in vacuum chamber, at cryogenic or ambient temperatures. They can emit over an ultra extended temperature range, set and controlled with high accuracy.

They consist in a vacuum compatible emissive head connected to a controller located out of the chamber. High stability of regulation is ensured by the optimized control of the losses through radiation and conduction.

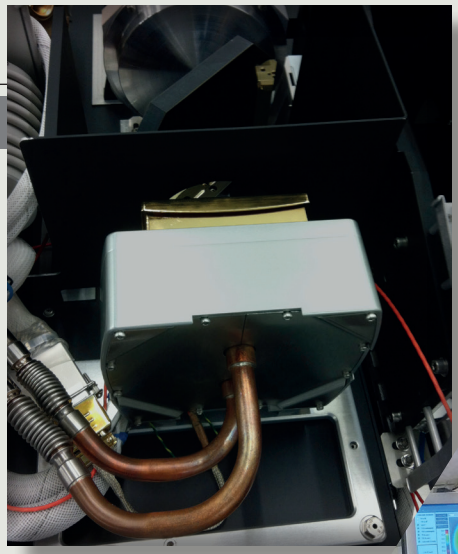
High emissivity up to 0.999 is obtained thanks to a vacuum compatible coating on a specific surface structure of the blackbody. Temperature of the emissive surface is measured in real time via high precision calibrated Pt sensors.

Various principles of thermal exchanges are available to suit different applications such as characterisation and radiometric calibration of space borne imagers, non-uniformity correction of infrared sensors, etc...



→ RCNV with 0.999 emissivity

→ test of a spatial instrument with DCN1000 V



## BENEFITS

- Extended area up to 500x500mm²
- Temperature range from +100K to +425K
- Real time display of temperature data in C°, K and F
- Integration in clean room conditions
- Use of vacuum compatible coatings and materials
- Fast response time and high stability
- High thermal uniformity and emissivity
- Guaranteed radiometric specifications
- Intuitive interface
- Remote control via Ethernet interface, R5232, iEEE488
- Radiometric calibration over multiple bandwidths
- Built-in test equipment (BITE)
- Vacuum chamber electrical feedthrough included
- Exclusive compensation of chamber reflected radiation
- Infratest LT control software



NATIONAL INSTRUMENTS LabVIEW

## OPTIONS

- Drivers LabVIEW for all communication interfaces

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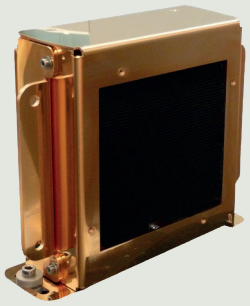
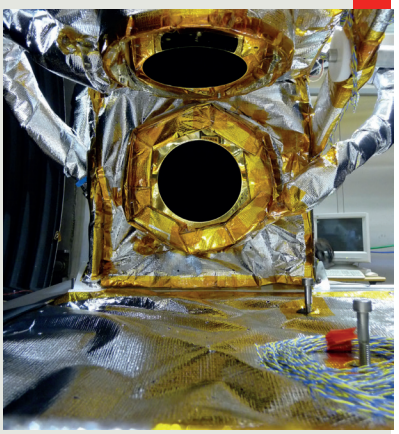
→ ECN1000 V20



→ DCN1000 V4



→ Characterization of space borne imager


→ New generation Blackbody Controller

## TECHNICAL DATA

| | DCN1000V | ECN100V | RCNV |
|---|---|---|---|
| Principle | TEC and circulating fluid cooling | Heater, cooling through cryogenic cold plate (included) | Fluid circulation around cavity |
| Emissive surface | 100x100 and 200x200 mm² | 50 x 50 to 500 x 500 mm² | Φ 100 mm |
| Absolute temperature range | 233 K to 423 K | 100 K to 423 K | 100 K or 235K to 335 K |
| Emissivity | 0.98 ± 0.02 (0.99 in option) | 0.99 ± 0.01 | **>0.999** |
| Stability | 10mK | 10mK | 50mK |
| Temperature measurement accuracy | ±0.01 °C | | |
| Thermal uniformity at irradiative environment temperature ±5 °C | ± 0.01°C | | |
| Heating time | <10 minutes for any 10°C | <45 minutes from 293K to 423K | <30 minutes for any ΔT |
| Display resolution | 0.001 °C (surface temperature and set point) | | 0.001 °C (surface temperature) 0.01 °C (set point) |
| Operating temperature (head) | -20°C to 70°C | 80K to 350K | -20°C to 70°C |
| Operating pressure (head) | $10^{-6}$ to 1 bar | | |
| Remote control | Ethernet interface, RS5232, IEEE488 | | |
| Operating temperature (controller) | +5°C to +45°C | | |

*Above information is subject to changes without notice*

HGH

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