

IBIS-FL

An innovative sensor for remote displacement monitoring of slopes and movement in terrain and structures



IBIS-FL: REAL TIME REMOTE DISPLACEMENT MONITORING BASED ON MICROWAVE INTERFEROMETRY

IDS Ingegneria Dei Sistemi S.p.A.
GeoRadar Division, Via Enrica Calabresi 24, 56121 Pisa (PI) Italy
Tel. +39 050 31241 Fax +39 050 3124201
georadarsales@idscorporation.com

IDS Brasil Engenharia de Sistemas Ltda.
Rua Haddock Lobo, 1.307, 5° Andar, sala 51, Cerqueira César,
Cep 01414-003 São Paulo-SP, Brazil
Tel. +55 11 3060 9364 Fax +55 11 3896 1951
idsbr@idscorporation.com

IDS North America Ltd.
418 Sherbrooke Street East, Montreal, Quebec H2L 1J6, Canada
Tel. +1 514 789-0082 Fax +1 514 398-0527
idsna@idscorporation.com

IDSNA, Inc.
885 Parfet Street, Unit E, Lakewood, CO 80215, USA
Tel: + 1 303 232 3047 Fax: + 1 514 398 0527
idsna@idscorporation.com

IDS Australasia Pty Ltd, Perth
Level 3, 267 St George's Terrace, Perth, WA, Australia, 6000
Tel: + 61 7 3205 5524 Fax: + 61 7 3205 5536
idsau@idscorporation.com

IDS Australasia Pty Ltd.
Unit 5, 3-5 Hinkler Court, Brendale, Queensland, Australia, 4500
Tel. +61 7 3205 5524 Fax 61 7 3205 5536
idsau@idscorporation.com

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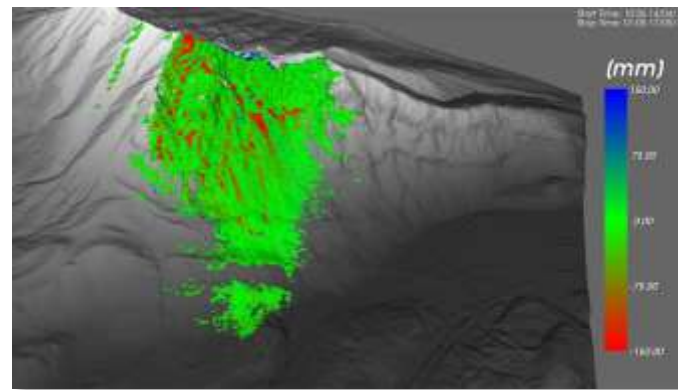
Asian Contec Ltd.
B-28, Okhla Industrial Area, Phase-1, New Delhi-110020,
Tel : +91-11-41860000 (100 Lines) Fax: +91-41860066
Sales Help Line : +91-11-41406926, Email : sales@stanlay.in
web : www.stanlay.in www.stanlay.com

IBIS-FL

IBIS-FL is a highly innovative solution for monitoring movement in slopes and structures. It uses interferometry to remotely measure the simultaneous displacement of thousands of points over large areas. This is done remotely without the need for direct access to the site or any invasive equipment. IBIS-FL provides a highly accurate displacement time series for each point allowing areas of movement to be clearly distinguished and alerts to be issued if movements exceed a selected threshold. IBIS-FL can be used to provide information and early warnings on landslides, terrain subsidence, and volcanoes as well as man-made structures such as dams and cultural heritage sites.

IBIS-FL Benefits

- **Helps identify areas of risk** for landslide prevention and landslide mitigation projects by providing a complete and real time stability assesment of a slope.
- **Provides accurate monitoring** of a landslide or a large structure remotely without the need to place contact sensors in areas of risk.
- **Reduces the time taken** to obtain a complete kinematic characterization of a landslide, monitoring the displacement.



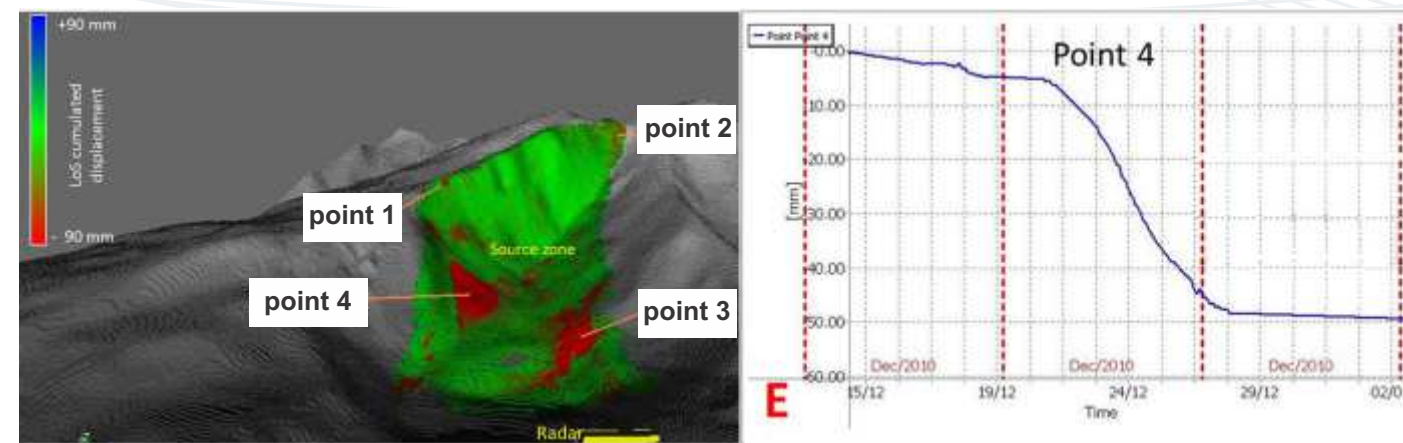
IBIS Guardian cumulative displacement map

IBIS-FL Features

- **Remote sensing:** Real time remote sensing at up to 4 km with no need for equipment to be installed on the monitored area.
- **Accuracy:** Measures displacements of as little as 0.1 mm @ 4km range. No other instrument can match the same accuracy.
- **3D rendering:** Real time 3D map of displacements over areas of several square kilometers. The user can easily understand and locate the displacements.
- **Always operative:** Operates day & night in all weather conditions.



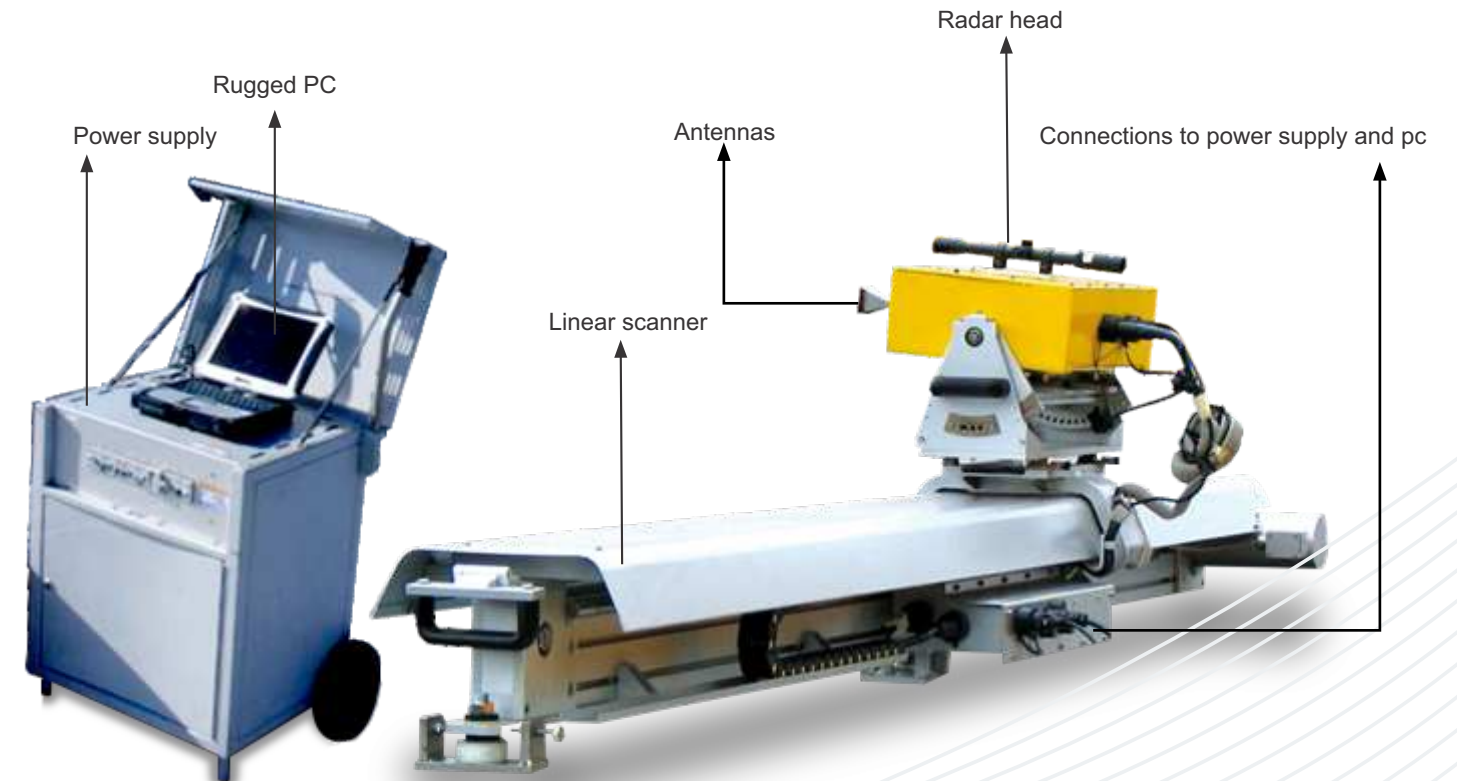
IBIS-FL monitoring a dam



Guardian monitoring software showing a cumulative displacement map and the displacement over time at a specific point

IBIS-FL Configuration

IBIS-FL consists of a radar head mounted on a rail to allow accurately measured lateral movement which can be set up anywhere with a line of sight within 4km of the target area. IBIS-FL's Guardian software suite provides automatic real-time processing of radar data, visualization of displacement maps with multiple analysis options (extraction of time series for displacements, velocity, inverse of velocity) and the possibility to create multiple hazard-maps with user-deined alarm criteria for active monitoring.



SYSTEM SPECIFICATIONS	
SPATIAL RESOLUTION	Range: 0.5m Cross range: 4.4mrad (0.5m by 4.4m @ 1km; 0.5m by 8.8m @ 2.2km)
ACCURACY	0.1 mm (depending on range)
OPERATING RANGE	10 m to 4000 m
FREQUENCY BAND	17.1- 17.3 GHz
RADIO FREQUENCY EXPOSURE (RADIATED POWER)	0.400 W
SCAN TIME	< 3 min
POWER CONSUMPTION	<100W
ENVIRONMENTAL	IP65
CERTIFICATION	EC, FCC, IC

SOFTWARE SPECIFICATIONS	
IBIS GUARDIAN MONITORING	• User friendly intuitive interface
	• Real-time Automatic processing
	• Automatic advanced atmospheric corrections
	• Alarm generation with User-deined levels and multiple Alarm criteria
	• Long datasets for geotechnical back analysis
	• Fully geo-referenced interactive data handling
	• User deined zones for Alarm generation
	• Import of multiple digital layers for displaying geological information
	• Exportability of outputs to mine planning software