

Leica GeoMoS Monitoring Solution

From any data to final information

JISDM Vienna, 30. March 2016

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- when it has to be **right**

Leica
Geosystems

Leica GeoMoS – Monitoring Solution

From any data to final information

- Intro Monitoring
 - Risk Management
 - Applications
- Create your monitoring system
- Monitoring software platform
- Outlook
- Summary



Leica GeoMoS – Monitoring Solution

Risk Management

Reduce your risk

- Visual and manual inspection
- Manual **monitoring** (campaign)
- Automatic **monitoring**
- Generate early and quick information
- Take timely action
- Safety
- Cost reduction



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Risk Management

When is monitoring required?

- Potential problem
- Instability
- Long-term deformation
- Ageing Infrastructure - Maintenance
- Extended life time
- Climate changes
- Seismic Event
- Preservation of evidence



Leica GeoMoS – Monitoring Solution Applications

- Landslides
- Rock falls
- Crustal deformation
- Subsidence
- Environmental
- Bridges
- Buildings
- Construction
- Dams
- Open pit mining
- Underground mining

Natural hazard monitoring



Structural monitoring



Mining monitoring



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Application – Bridge Monitoring, (Nanjing – Shanghai)

Precise 3D GNSS Monitoring

- All bridges between Nanjing – Shanghai
- **Taizhou** Yangtze River Bridge
- Information (Real-time)
- 20 to 30 GNSS sensors per bridge
- 20 Hz data



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Application – Large Dam, Yunnan, China

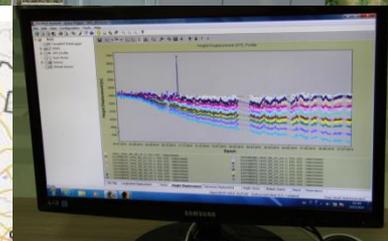


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Application – Large Dam, Yunnan, China

Precise 3D Monitoring (TPS/GNSS)

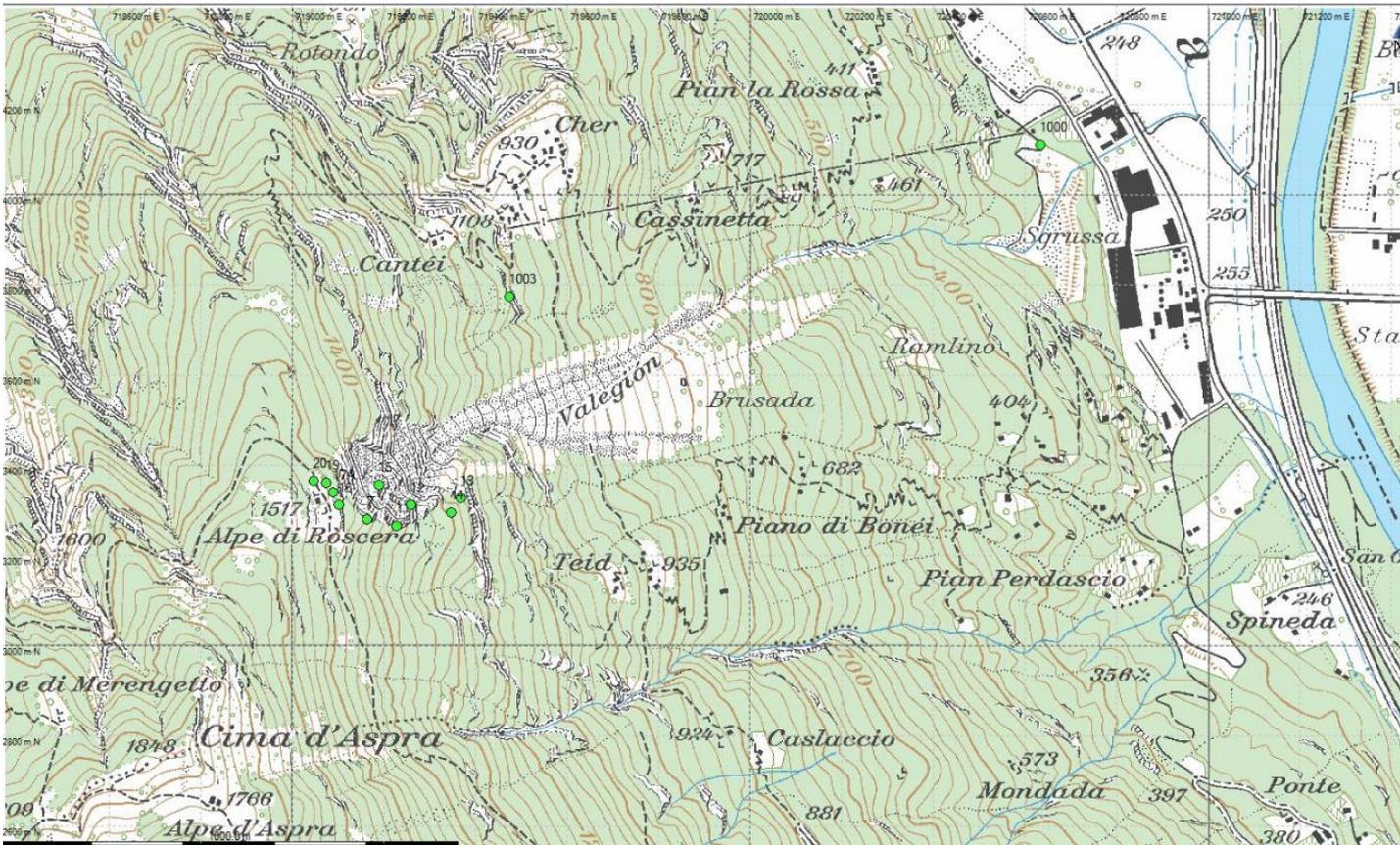
- 52 GM10 sensors
- Co-located GNSS on prisms
- 7 TM50 and 100 prisms
- Check Deformation
- Extreme Engineering
- Safety/Risk



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Application – Landslide Preonzo, Ticino, CH

May 2012 – A Total Station and several prisms in 2 km distance



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Application – Landslide Preonzo, Ticino, CH

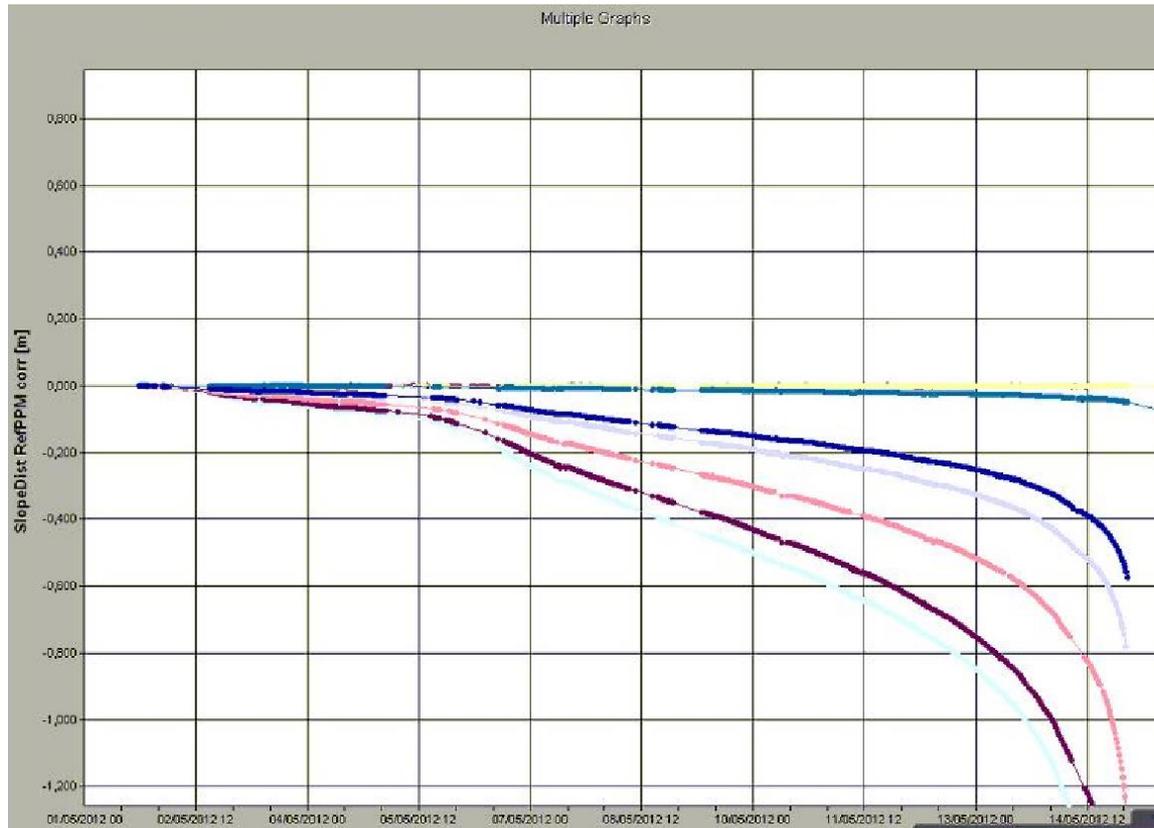
Instable?



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Application – Landslide Preonzo, Ticino, CH

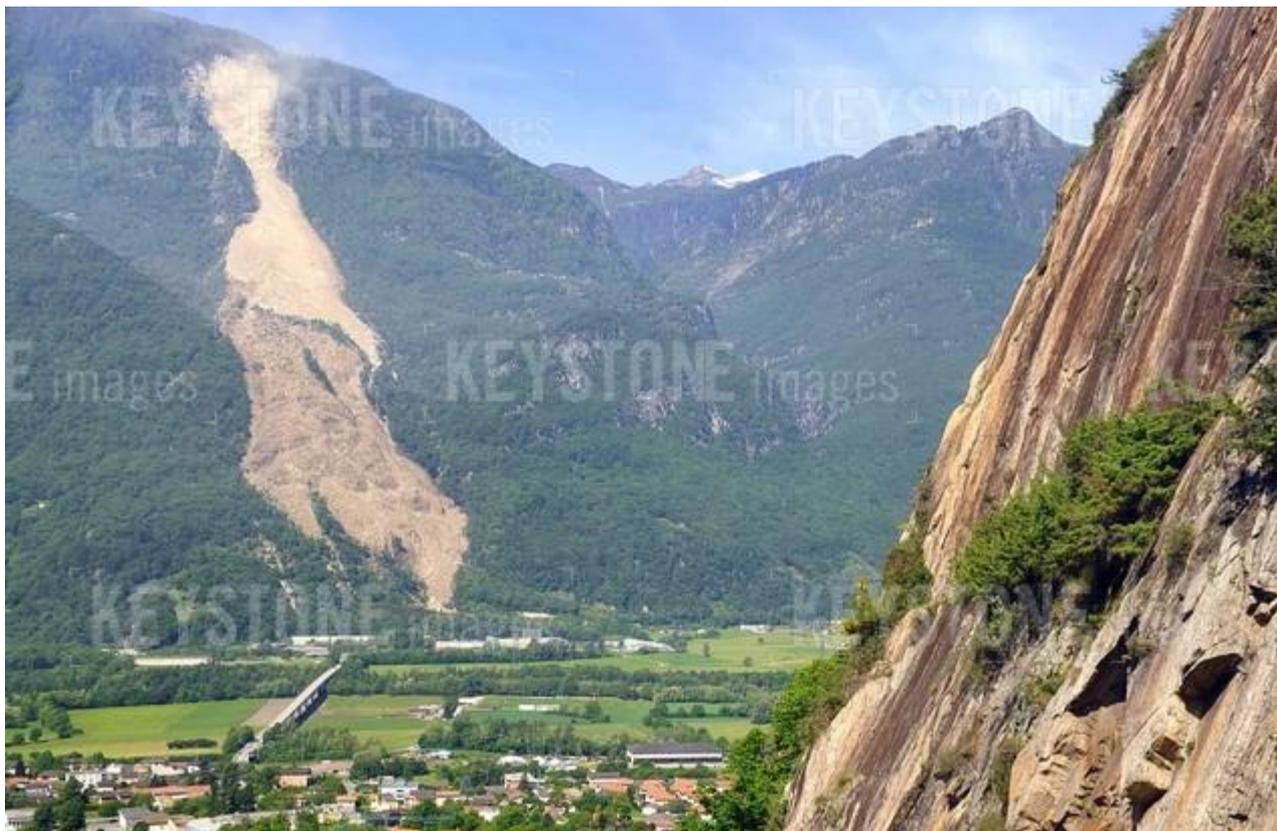
Real data 14 days – predict the date of slope failure



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Application – Landslide Preonzo, Ticino, CH

After the event – May 2012



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Application – Chemical Industry, Italy

Multiple TM50 for precise prism monitoring



Leica GeoMoS – Monitoring Solution Application – Copper Mine, Chile

Energy equipment - Precise prism monitoring (Elevation 4'500m)



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Create your monitoring system

Who is involved?

- Provider of the solution and products
- Monitoring Service Provider
 - Management
 - System Operator
- User Groups
 - People in critical area
 - Experts
 - Authority – Make decisions

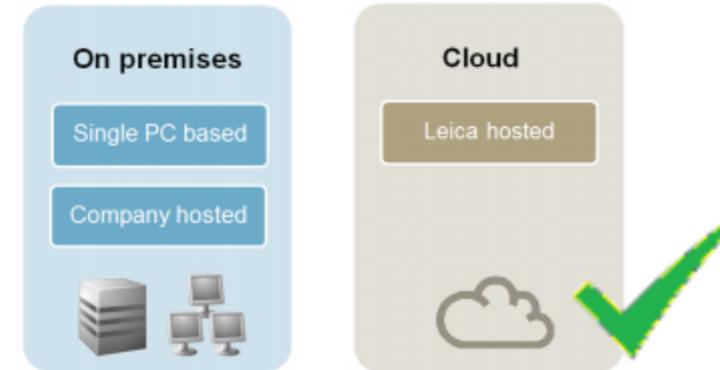


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Create your monitoring system

The monitoring service provider

- On premises installation or cloud version
- **Automatic visualisation and reporting**
- Flexible licensing – from small to large projects
- Flexible and secure user access
- Manage multiple projects in a single system
- Easy integration of 3rd party systems – link to any channel of monitoring information – Open Interfaces

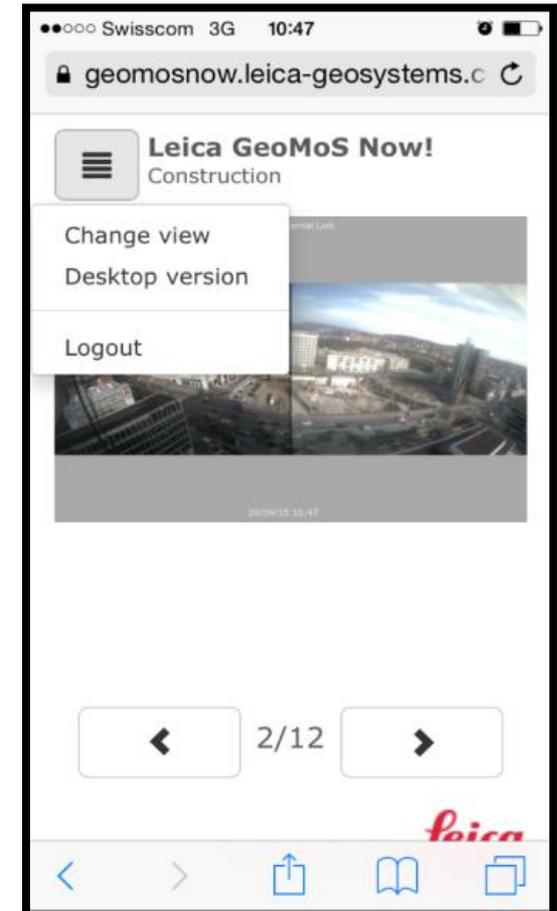


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Create your monitoring system

The users of the information

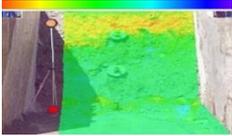
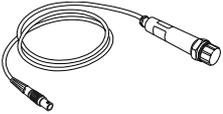
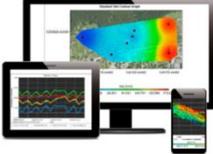
- **Simply UI, Mobile Web Site**
- **Use any browser on any device** (office or mobile)
- Nice customized tables, graphs, maps images and reports
- Simply inform anywhere and anytime
- Show notifications
- Use your own device



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Create your monitoring system

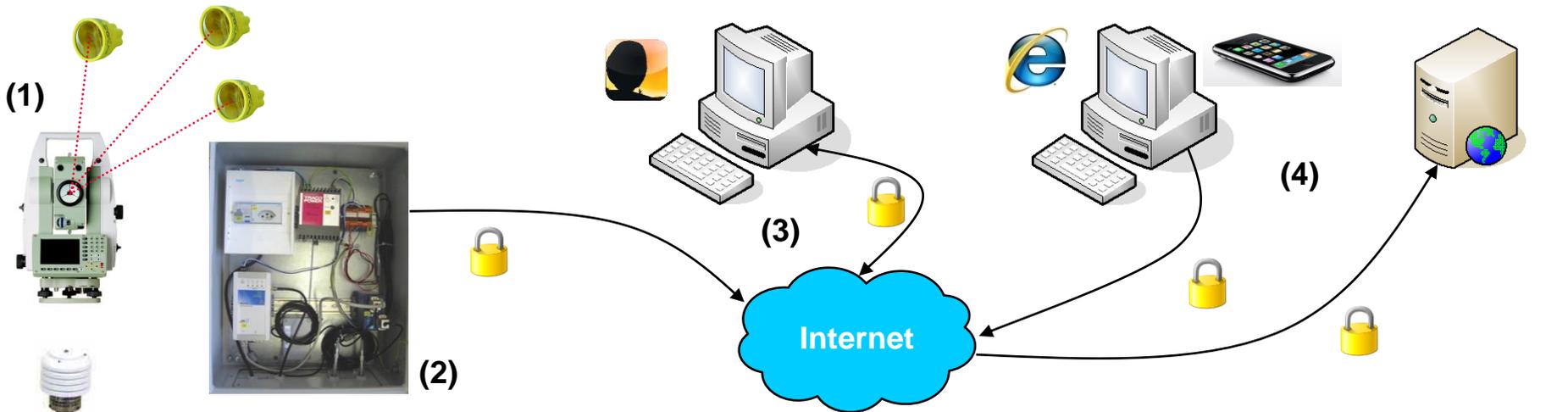
Depending on the monitoring problem you combine a set of sensors

Geodetic sensors TM50/GNSS	Remote sensing MultiStation	Geotechnical, Environmental sensors	Energy Comms Accessories	Software On premises Cloud	Service & Support
	 <p>MS60</p>				
					
					
		 <p>Offline Import</p>			

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Create your monitoring system

Distributed monitoring system



Site / Project

Service Provider

User Groups

Leica Cloud



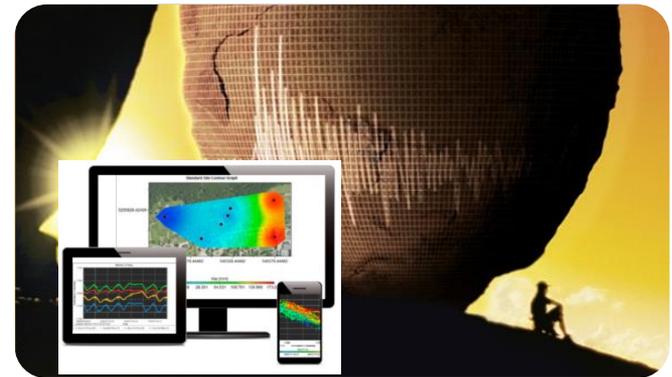
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The software platform

Monitoring & Analysing and Visualising



GeoMoS Monitor



GeoMoS Now!

- All included
- From raw measurement to final report

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The software platform

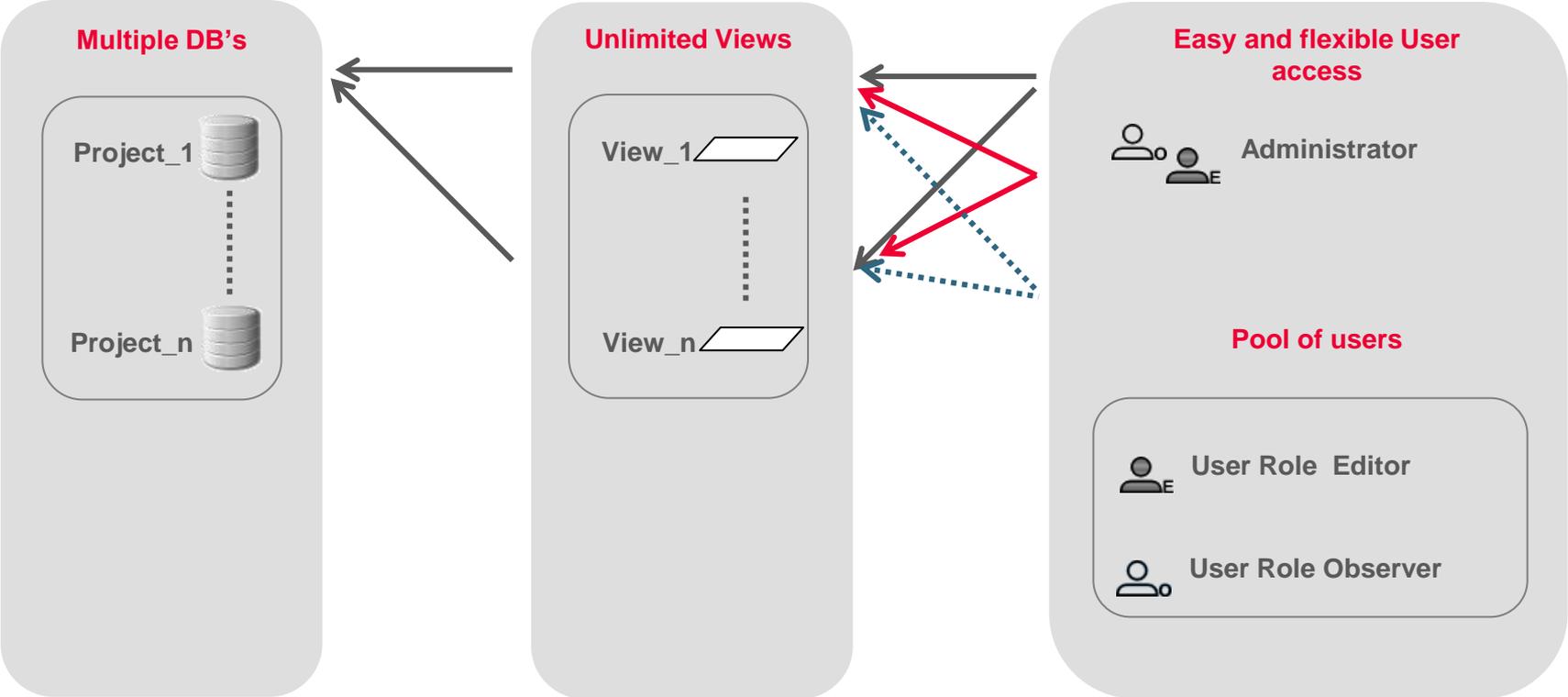
	Monitoring – Process (24/7)
	Acquire Any Data (1 to 3) Direct, Logger, File, Software, Images
	SQL Server, Centralized data management
	Combine Sensors and Data Any Result
	Process
	Inform with Limit Check and Messaging (Email / SMS) and Action (4), System health
API	Connect GeoMoS to any Software (5)



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The software platform

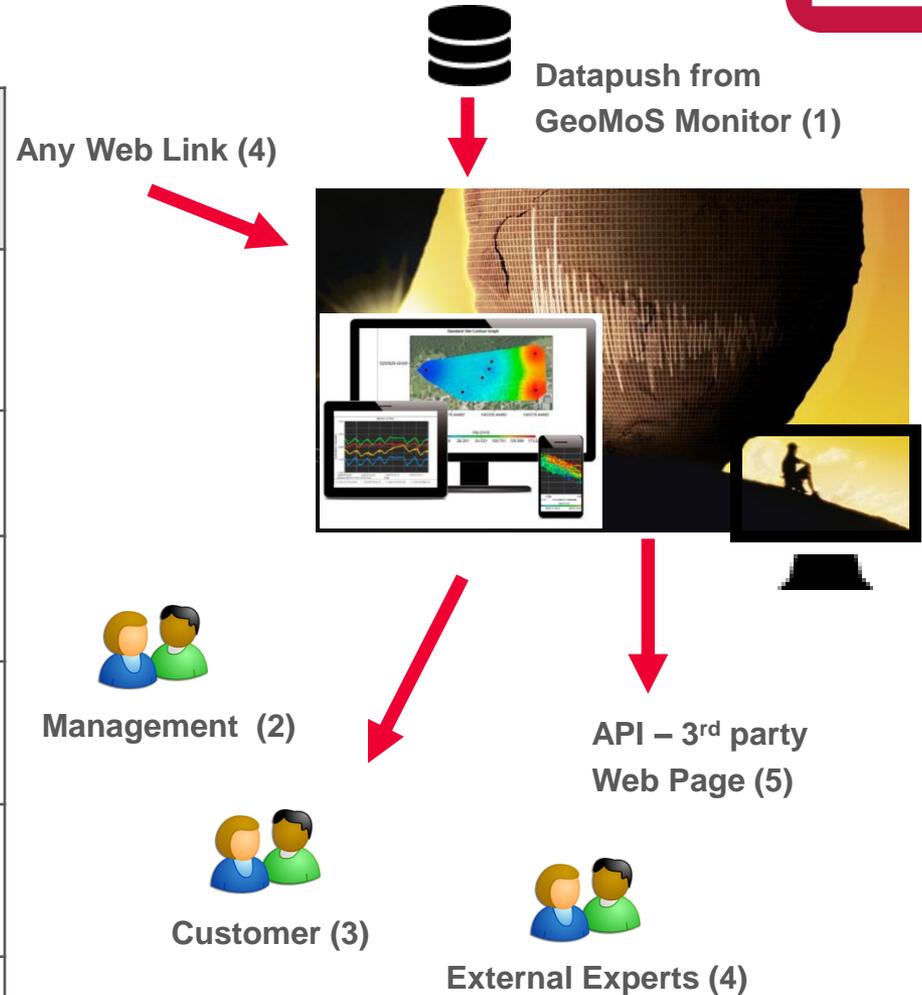
GeoMoS concept to distribute the information to the users
 Similar to Web Content Management Systems



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The software platform

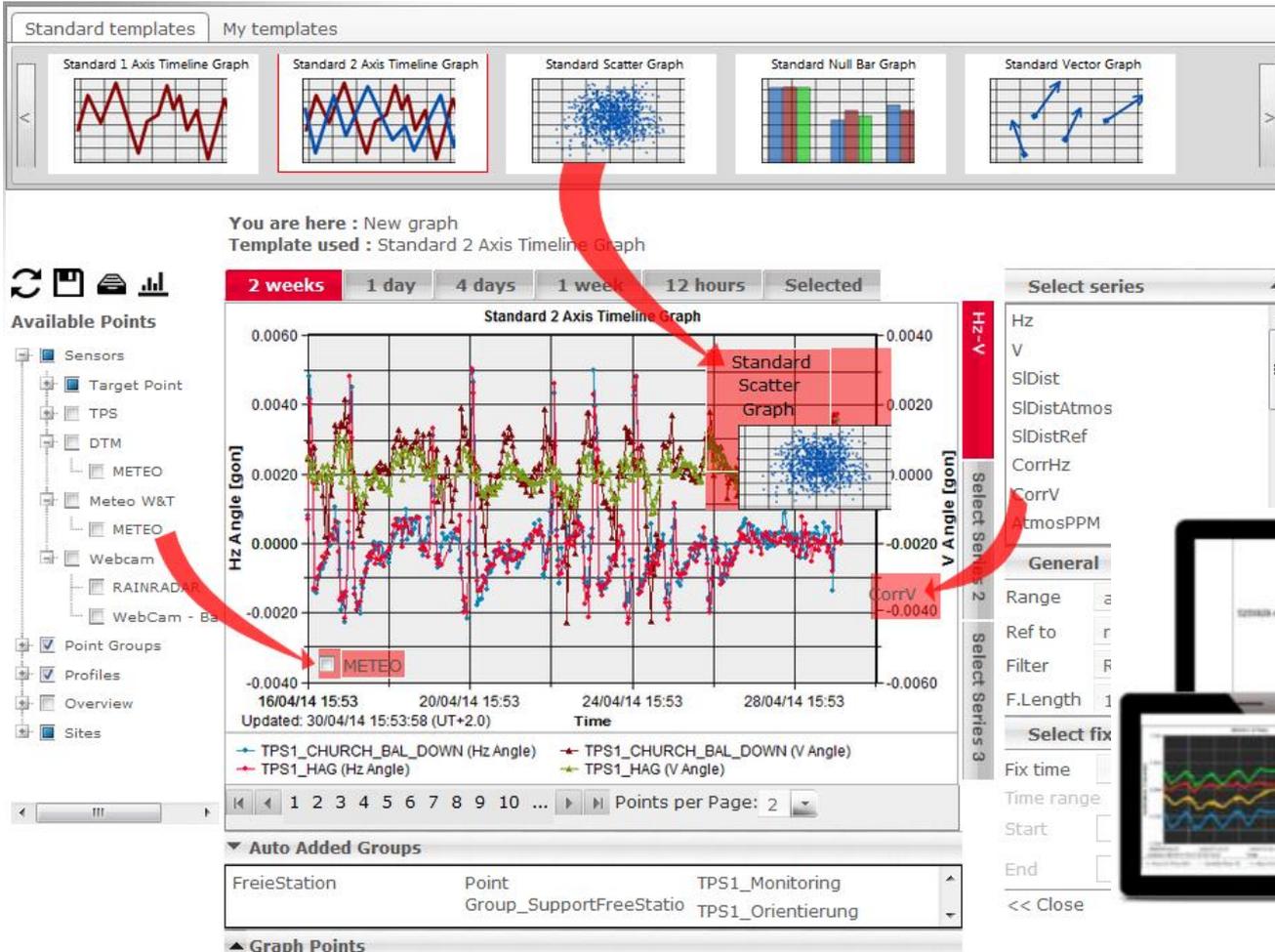
	Analyzing , Visualization Process and automatic Reporting
	Data Push from GeoMoS Monitor (1)
WWW	Any Web Link (4)
	Inform all involved User Groups (2, 3, 4)
API	API to connect to 3rd party Web Page (5)
	Easy access for all user groups, with any Web Browser
	Create specific information for any user group





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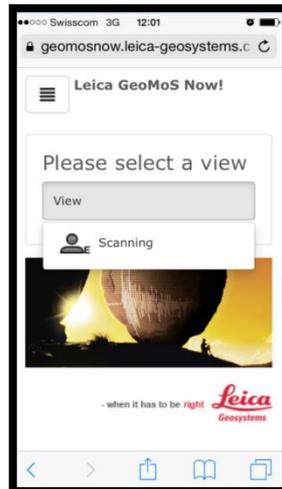
The software platform



Leica GeoMoS – Monitoring Solution Outlook

Technical trends – more automatic monitoring! – more Apps!

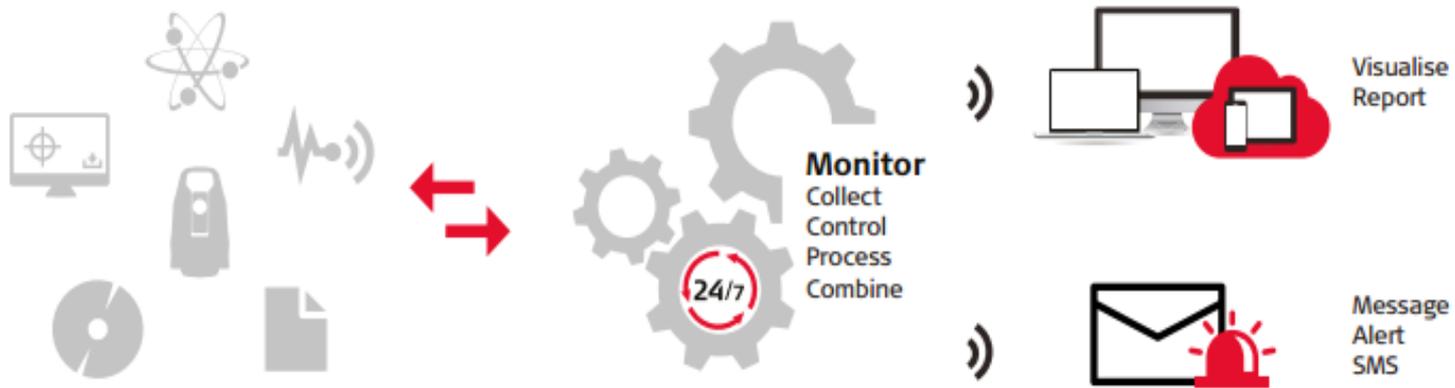
- Internet enabled sensors
- MEMS, sensors with low energy use
- Communication everywhere
- Fusion of modern monitoring techniques



Leica GeoMoS – Monitoring Solution Summary

Benefits of a long year proven monitoring solution

- Modular & Flexible & Reliable (small to large, 24/7/365)
- Scalable customisable (individual project requirements)
- Combine Monitoring & Inspection
- We inform you



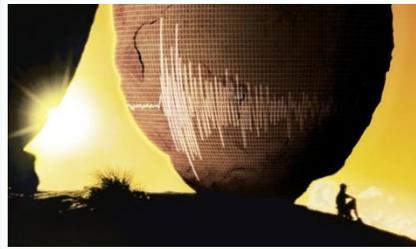
Leica GeoMoS – Monitoring Solution Summary

GeoMoS Open Interfaces paving the way to the Internet of Things (IoT)

Any Data

- Sensors (InternetEnabled)
- Loggers
- Files
- Images
- Databases
- Software

Leica GeoMoS



Any Information

LAN
INTRANET



CLOUD
INTERNET

Many Thanks for Your Attention.

Leica Geosystems AG Switzerland, Heerbrugg
Geomatics Division
GNSS Reference Stations and Structural Monitoring Group



- when it has to be **right**

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