Facts

An estimated 25-30 million people in over 80 countries across the world are small-scale artisanal miners, with over 150 million people depending on such mining for their livelihoods (Alliance for Responsible Mining).

Artisanal and small-scale mining (ASM) is largely a poverty-driven activity, which is most often unregulated. This results in health & safety issues for the miners themselves, as well as environmental problems and economic losses for governments. There is potential for improving the situation for all parties, but this is currently unrealized to a large extent, with some ASM operations in fact being classed as criminal activities.

SYMIN is a satellite-based solution that addresses this issue by combining Very High Resolution (VHR) satellite imagery with sound expert analysis in order to support mineral governance. SYMIN's use in Afghanistan provides a valuable source of technical and analytical information for the monitoring of ASM activities worldwide.

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Partners

- GAF AG, DE
- German Aerospace Center, DE
- Institute for Environmental Security, NL
- Bonn International Center for Conversion, DE

Funded by

the European Space Agency under the Value Added Element (VAE) of the EO Envelope Programme. VAE aims to support the industrial community in the use of Earth Observation data.

> *"The use of high-resolution satellite imagery, supported by appropriate training of personnel within the Ministry of Mines and Petroleum, will **significantly enhance the capability of the Ministry with regard to monitoring artisanal and small-scale mining** (...) This approach will substantially reduce the effects of constraints such as terrain and security. It will also help the Ministry to **make optimum use of its resources in monitoring and controlling mining activities and their environmental impact**, and in ensuring that revenue accrues to the fiscal authority where it is due"*
>
> **Vaughan Smith** - Senior mining engineer and consultant to the Ministry of Mines and Petroleum, Kabul

SYMIN

Monitoring informal mining from Space

Image © GAF AG

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SYMIN

Bonn International Center for Conversion B·I·C·C

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DLR

esa

SYMIN

Monitoring informal mining
with remote sensing technology

Project Objectives

Use Earth Observation (EO) and Remote Sensing methods to detect artisanal and small-scale mining activities in Afghanistan

Produce maps and basic geographical information

Generate end-user dossiers for monitoring and inspecting artisanal and small-scale mining and provide assistance to miners

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"Satellite information can support the Afghan Ministry of Mines and Petroleum regarding activities associated with the informal mining sector - SYMIN is helpful in addressing an information gap around the location of many artisanal operations that otherwise are either inaccessible because of remoteness or field security"

Michael Stanley - Lead Mining Specialist
Oil, Gas, Mining and Chemicals Department; World Bank Group

System Description

The system is based on Very High Resolution (VHR) satellite imagery. The data generated by the satellites is first verified using semi-automatic image analysis. It is then interpreted by office- as well as field-based experts and developed into end-user dossiers.

End Users

- National ministries and departments
- Geological surveys
- Environmental protection agencies
- Natural resources governance organizations and civil society

Results

Through the use of Earth Observation (EO), the project successfully identified and analyzed areas and spots of digging - fresh gravel and old tailing cones, roads, vehicle tracks, huts and ruins as well as mining equipment.

Security: EO demonstrated its suitability as a tool for use in the resolution of conflicts and also with regard to resource governance, with a focus on resource hotspots.

Reliability: With appropriate rules such as end-user agreements in place and assistance provided in the form of ground truthing, EO can be a sound source of information for improving governance.

Transparency: EO can be used for identifying active and inactive sites, as well as for the monitoring of environmental impact and of legal compliance.

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Download project poster, dossiers and presentations: www3.gaf.de/symin/downloads

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