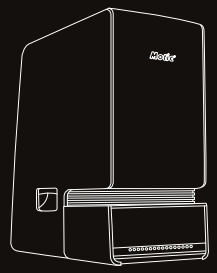
Motic®

MORE THAN MICROSCOPY



EasyScan GO

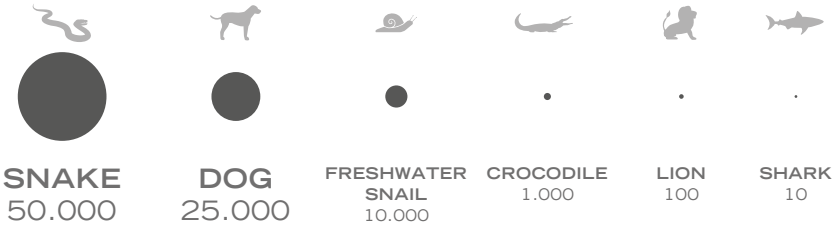
OPTICALLY INTELLIGENT DISEASE SCANNING

WHY FOCUS ON MALARIA?

Malaria is an infectious disease spread by the bite of the world's deadliest animal: the mosquito. Once it enters the human body, the parasite lodges itself in the liver where it multiplies, and bursts into the blood stream where it begins infecting red blood cells. People who get malaria get high fevers, shaking chills, and flu-like illness. Left untreated, malaria can be fatal – and it significantly burdens global health systems in growing regions.

THE DEADLIEST ANIMAL IN THE WORLD

Number of people killed by animals per year



Half the world is at risk

Malaria parasites infect 200 million people and kill 400,000 every year. The disease is typically found in tropical and sub-tropical countries in Asia, sub-Saharan Africa, and the Americas. Even in Europe and North America, thousands of cases are diagnosed from infected travelers returning home.

The deadliest malaria strain is developing resistance to our most effective drug

Resistance to a widely used treatment, artemisinin, in the *Plasmodium falciparum* strain has been detected in Southeast Asia. The reason? Artemisinin has been used in Southeast Asia for decades longer than most of the world—giving the parasite more time to adapt. Widespread use of counterfeit drugs, coupled with improper dosages of the drug has sped up resistance.

Researchers depend on microscopy to track drug-resistance cases

The majority of cases are diagnosed using rapid diagnostic tests (RDTs)—a diagnostic device similar to a home pregnancy test. While RDTs are quick and easy to use, microscopy can identify the malaria species and overall parasite count. For that reason, it is critical to monitoring drug effectiveness. However, analysis of a blood smear using microscopy requires a skilled lab technician to look at up to 100 different fields of view over 20 minutes to make a diagnosis.

Malaria is one of the hardest diseases to identify on a microscope slide

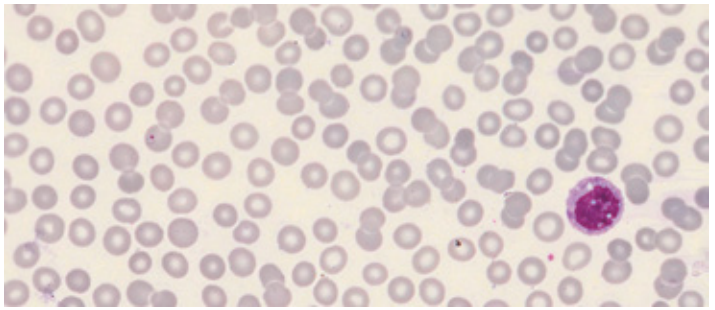
There are very few highly skilled malaria microscopists in the world who can do it accurately. At very low infection levels, a microscopist must be able to find a single parasite in 100,000 red blood cells, the equivalent of finding marbles in a standard football pitch, in 20 minutes. Fatigue combined with large numbers of slides and unfamiliarity with the parasite results in misdiagnoses and limits researchers' ability to compare results across geographies.

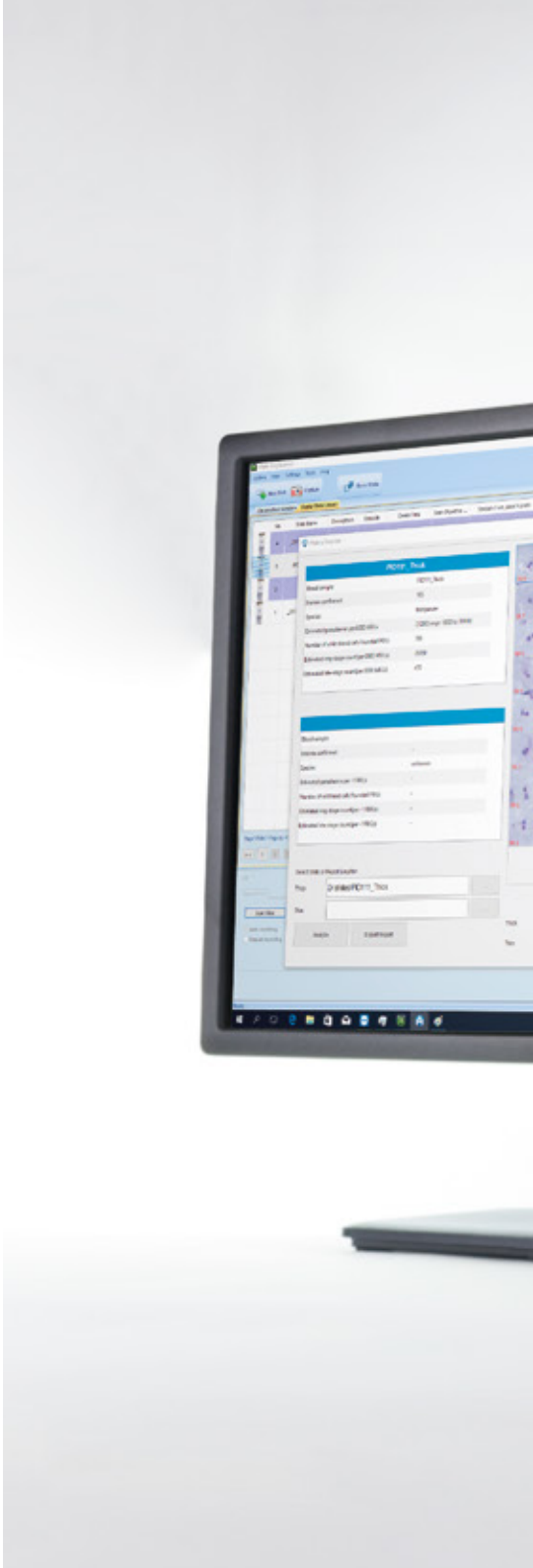
A JOINT EFFORT

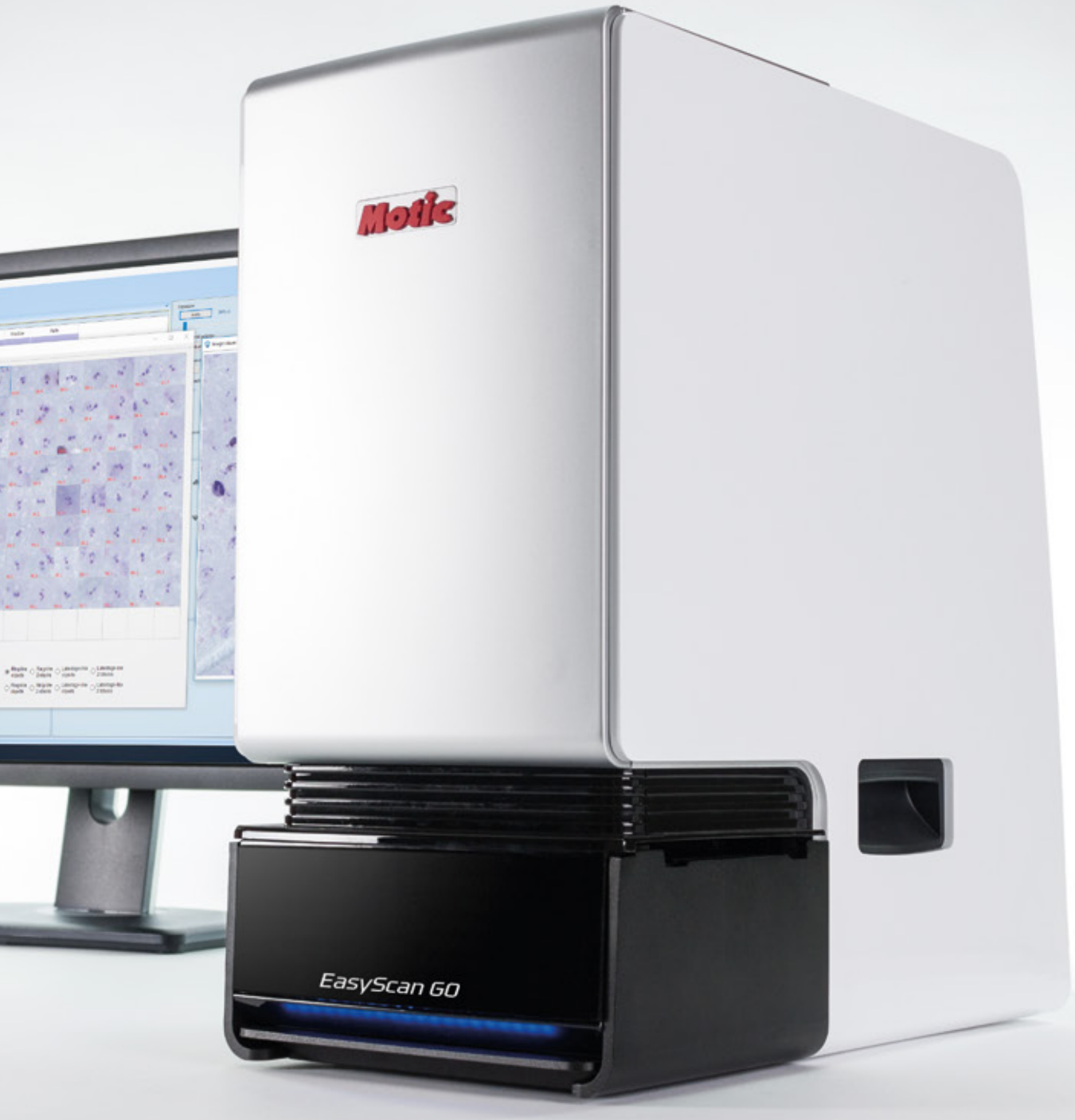
A research team at Intellectual Ventures' Global Good Fund believed the process could be automated. If computers can learn to recognize faces and fingerprints—why not malaria parasites? And if they could build a microscope that automatically identifies the most difficult disease, couldn't they do the same for other major diseases in the future? Motic agreed. In 2017, the companies teamed up to build a smarter microscope.

To succeed, the diagnostic tool would need to be cost-effective, easy-to-use and able to do the job quickly, accurately, and automatically. The situation called for convolutional neural networks (CNNs)—a branch of machine learning well-suited for image classification tasks. The Global Good team trained an early prototype to recognize malaria by showing it four million scanned images of infected and non-infected blood samples from all over the world. Field tests of an early prototype showed the central algorithm was as reliable as an expert microscopist.

In parallel, Motic—a manufacturer of high quality, affordable microscopes—had been developing an advanced slide scanner for the digital pathology marketplace. In 2017, the companies partnered to integrate Global Good's software into Motic's existing line of EasyScan microscopes.







THE SOLUTION

EasyScan GO

GLOBAL GOOD AND MOTIC INTRODUCE THE EASYSCAN GO, A BREAKTHROUGH AI-POWERED MICROSCOPE BUILT TO FIGHT DRUG-RESISTANT MALARIA AND ASSIST IN CASE MANAGEMENT

Using custom image recognition software, EasyScan GO is capable of identifying and counting malaria parasites in a blood smear in the same time-range as an expert microscopist.

USE CASES

By putting a more intelligent microscope in the hands of laboratory technicians everywhere and focusing on the most-difficult-to-identify disease first, Motic and Global Good are making a future where disease detection is simplified and standardized, and quality diagnosis is within reach for every family.

Antimalarial Drug-Efficacy Monitoring

End user: Research collaborators working on antimalarial drug-resistance tracking.

Improved data quality and standardization across geographies, enabling more drug efficacy monitoring.

Ability to open new sites in regions with fewer trained microscopists.

Reduction in training needed for new technicians.

Malaria Surveillance

End user: Technicians in health facilities informing national and global surveillance systems.

More precise and consistent data to improve surveillance systems and target resources accordingly.

Assisted Primary Diagnosis of Malaria

End users: Lab technicians in laboratories providing primary diagnosis and with consistent access to power and existing microscopy capabilities.

Assisted Quality Control of Malaria

End User: Lab technician in district, national and regional laboratories providing confirmatory diagnoses.

Ability to more accurately identify malaria, and rule it out through detection of Chagas disease, microfilaria and sickle cell.

Allows lab technicians to work more efficiently by shouldering labor-intensive step of identifying parasites.

EasyScan GO SIMPLIFIES DIAGNOSIS

ACCURACY

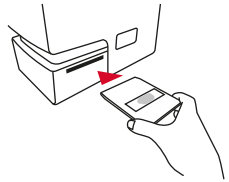
EasyScan GO diagnoses malaria as accurately and as quickly as an expert microscopist.

PRICE POINT

EasyScan Go has a modular pricing scheme as well as a special price policy for low- and middle-income countries. Please contact your nearest Motic office to learn more about the price.

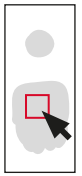
FUTURE APPLICATIONS

All malaria species.
Anything on a blood film—including Chagas disease, microfilaria and sickle cell.
Other sample types, such as sputum, feces and tissue.



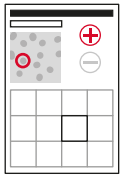
1

Insert malaria slide into cassette and load cassette into EasyScan GO.



2

EasyScan GO provides user with image of entire slide. User selects region of interest.



3

User presses ‘Scan’. EasyScan GO scans and analyzes selected region in 20 minutes. EasyScan GO produces report that shows whether patient is infected, the malaria species, and estimated parasite count.

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THE FUTURE OF AUTOMATED QUALITY DIAGNOSIS BEGINS NOW

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Motic Instruments (Canada)
130 - 4611 Viking Way. Richmond, BC V6V 2K9 Canada
Tel: 1-877-977 4717 | Fax: 1-604-303 9043

Motic Deutschland (Germany)
Christian-Kremp-Strasse 11, D-35578 Wetzlar, Germany
Tel: 49-6441-210 010 Fax: 49-6441-210 0122

Motic Hong Kong (Hong Kong)
Unit 2002, L20, Tower Two, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, Kowloon
Tel: 852-2837 0888 | Fax: 852-2882 2792

Motic Europe (Spain)
C. Les Corts 12, Pol. Ind. Les Corts. 08349 Cabrera de Mar, Barcelona, Spain
Tel: 34 93 756 62 86 | Fax: 34 93 756 62 87

CE

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