

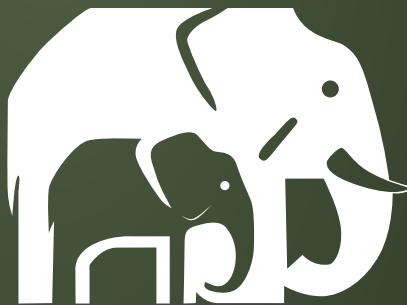


project  
**ngulia**

**Wildlife Security through  
Bottom-Up Technology**

*A Kenya Wildlife Services Initiative  
supported by the Stimson Center and Linköping University*

**KENYA  
WILDLIFE  
SERVICE**



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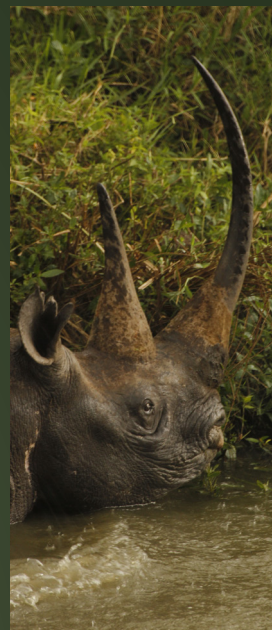
STIMSON

## Introduction

On a bright day inside the Ngulia Rhino Sanctuary in Tsavo West National Park in Kenya, the guardians of the rhinos – the park rangers – can see as far as Mount Kilimanjaro. It emerges in the distance beyond a layer of other peaks that surrounds Ngulia. The area is called rhino valley because a couple of decades ago around 10,000 rhinos roamed here. Today, there are only about 650 black rhinos left in all of Kenya. Tsavo's elephants are also under threat from poachers, as are other endangered wildlife around the world.

That over 140,000 elephants and more than 3,500 rhinos worldwide have been slaughtered by poachers in the last few years is not only a conservation challenge; today, terrorist organizations and transnational criminal syndicates are benefitting from transnational wildlife crime. For countries like Kenya that rely on the tourist-popular animals, reduced numbers are a threat to economic development.

It is in this context that the Kenya Wildlife Service has partnered with the Stimson Center to initiate a pilot project using technological solutions to protect the Ngulia Rhino Sanctuary. Linköping University has also joined the effort as a technology partner with world class expertise.



## Project Ngulia

Project Ngulia is one part of an emerging global response against increasing levels of wildlife and broader environmental crime. The overall goal of the pilot project is to deploy an impactful, cost-effective and bottom-up technological platform that secures the Ngulia Rhino Sanctuary in Tsavo West National Park. The technological solution will be scalable and replicable to other national parks in Kenya, and can address a wide range of natural resource and trans-boundary challenges.



## Background phase (2010–2013)

The Stimson Center, in partnership with some Kenyan government agencies and nongovernmental organizations, conducted a comprehensive analysis of the security and development environment in East Africa, particularly focusing on Kenya. One outcome from the analysis was an invitation by the Kenya Wildlife Service to conduct a capacity building pilot project in Tsavo West National Park.

## Phase 1 (2014)

The Kenya Wildlife Service, Stimson, and Linköping conducted a technologically feasibility study at the Ngulia Rhino Sanctuary. This exercise resulted in a pilot project plan. KWS and Stimson signed a Memorandum of Understanding in late 2014 and began preparations to execute the plan. The first step was to enhance capabilities for command, control, and communications (C3).

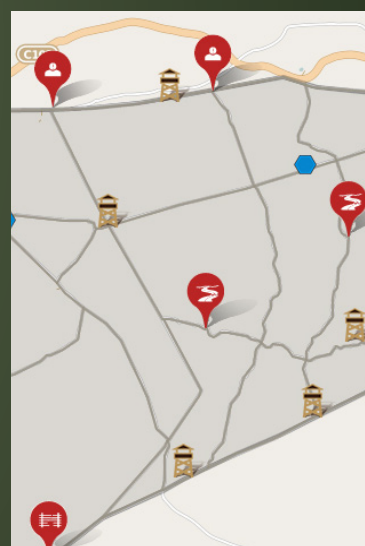


## Phase 2 (January – June 2015)

Following several visits to Ngulia to collect information from commanders, rangers, and researchers, development of a smartphone-based C3 software was initiated. Specifically, the C3 system is an input device, where rangers note their observations regarding security and wildlife matters. Photo documentation is available as well as automatic geo-tagging. The app is also a navigation tool, where park rangers get their position overlaid on a map. The interface includes local landmarks such as waterholes, roads, trails, bunkers, borders, their patrol routes and the like.

The commander app includes the same functionality as the ranger app, but is foremost an administrative tool and platform for officers. The map interface shows the position and trajectories of all rangers and vehicles, security alerts and rhino observations. The data can be accessed in real time or be analyzed in retrospect. Commands are issued by broadcasting voice or text messages, and patrolling routes or ambush positions are defined for individual rangers.

A first version of the C3 system was deployed to a subset of the Ngulia rangers. Based on the feedback, the C3 software was subsequently updated by extensive collaboration with technical experts at Linköping University and iHub. Simultaneously, Kenya's telecommunications company Airtel agreed to support the pilot project with Sim Cards, airtime and data, while improving connectivity at the sanctuary.



## Phase 3 (July–December 2015)

At the end of the summer, the C3 platform was launched in the field, including smartphones to rangers, tablets to commanders and research team, as well as hardware to improve connectivity in the sanctuary. The product is designed by the users, developed by local experts and devoted to commanders, rangers and researchers. As with all software, it will be continuously updated to support the needs of the end-users.

Simultaneously, as the C3 platform is being rolled out in Ngulia, additional sensor systems are being tested in Kolmården Wildlife Park in Sweden to evaluate applicability to the Ngulia project. There will be opportunities for KWS staff to evaluate the technology in Sweden during the fall. Technology that will be tested includes sensor systems and radar for border and intruder detection. Radar technology will be able to cover large objects moving inside and around the Ngulia border. Smart algorithms will be developed to distinguish humans from animals, and to monitor the rhino movements. The radar systems will have coverage of 5 and 10 km radius, respectively.





## Phase 4 (2016)

Project partners believe that a phased approach to technology development and deployment is important. During the successful execution of previous phases, partners will continue to secure the relevant stakeholders and hope to deploy additional technology at Ngulia. The testing at Kolmården will be critical for additional technological steps, as well as ensuring that the solution remains cost-effective.

## Phase 5 (end 2016 →)

At this point, the park rangers, commanders and research team will take full advantage of the technological platform that make their jobs easier, advances their mission and cuts costs for KWS. This will provides an opportunity for the KWS and other partners to scale and replicate the system in Tsavo and other parks.

