Lights of a City Under Siege -
Disruption to Kandahar Airport Lights Increases as the Taliban Entered the City

by Brooke Bowser, Christopher Elvidge, and Morgan Bazilian
As U.S. troops began their withdrawal from a 20-year conflict in Afghanistan, the Taliban were steadily gaining more ground in rural regions of the country. Kandahar, the second-largest city in Afghanistan and the capital of the southern Kandahar Province, was a strategic advancement in the Taliban’s eventual seizure of the nation’s capital, Kabul. Kandahar also has historical significance as the location of the Taliban’s rise to prominence in the 1990s.

In May, U.S. troops departed from the military base at the Kandahar airport and turned operations over to the Afghan government. After several weeks of assault in districts outside the city, the Taliban entered Kandahar on July 9. Initially, the airport, which is located about 10 miles southwest of the city, remained in the Afghan government’s control.

The Afghan Air Force’s air strikes against the encroaching Taliban forces were not enough to deter the insurgence. In late July, the Taliban turned their attention to the airport itself. At least three of their rockets struck the airport’s runway during the night of July 31. There were no injuries, but flights out of the city were temporarily halted.

On August 12 the Taliban broke through the city’s defenses. The Kandahar governor announced a surrender to Taliban forces and most of the Afghan security forces fled the city. A paramilitary group of Afghan forces called Unit 03 continued to hold onto the Kandahar Airport even after the rest of the city had fallen. Running out of ammunition and water while facing the Taliban’s ultimatum to surrender, the remaining besieged troops were eventually evacuated on August 16, after which the Taliban secured control of the airport.

Surfacing videos and images allowed onlookers to glimpse the series of events, but the country’s lights may also contain a story.
Radiance measurements processed by the Payne Institute’s Earth Observation Group (EOG) provide a unique view of events unfolding in Afghanistan. Since 2012 the EOG has used data provided by NOAA’s Visible Infrared Imaging Radiometer Suite (VIIRS), a satellite instrument that collects near real-time imagery of the Earth, to monitor light radiance at multiple sites across the world, including at the airport located in Kandahar, Afghanistan.

Observations from the past several months shows the airport’s lighting has dimmed. Outages began on May 14, and the lights have remained out many nights since then. This summer was not the first-time changes in lighting occurred at this site. Results show lights dimming in February of 2015 and further dimming in September 2020.

In a 2020 paper on indicators of electric power instability, the EOG explained that electricity is fundamental to a country’s prosperity and economy. Dimming lights or outages occur most frequently in developing countries where power production may be less reliable or unable to meet demand.
“Barring war or catastrophic events, the year-on-year changes in lighting are quite small. Most cities are either largely stable over time, or are gradually increasing in indices such as the mean, variance, and lift, indicating a trajectory that proceeds across multiple years,” researchers explained in the paper.

According to the data, the airport lights were out on the nights of each of the events leading up to the Taliban’s take-over in Kandahar. In fact, the lights remained out for most of the past month. In the handful of nights with the lights on, they remained much dimmer compared to the same time last year.
ABOUT THE AUTHORS

Brooke Bowser
Communications Associate, Payne Institute for Public Policy

Brooke Bowser is a recent graduate from the University of Wisconsin - Madison where she earned a degree in Environmental Sciences and Life Sciences Communication. Her background in ecological research and environmental communications led to her development as a science writer striving to craft engaging and accessible science stories for all audiences.

Christopher Elvidge
Senior Research Associate, Director of Earth Observation Group

Christopher D. Elvidge has decades of experience with satellite low light imaging data, starting in 1994. He pioneered nighttime satellite observation on visible lights, heat sources including gas flares and wild fires, as well as bright lit fishing vessels. He led the development of these nighttime remote sensed products with images from DMSP, JPSS, and Landsat satellites. These data are very popular and used globally in both public and private sectors. As of February 2018, he has more than 11,000 scholarly publication citations.

Morgan Bazilian
Director, Payne Institute and Professor of Public Policy

Morgan Bazilian is the Director of the Payne Institute and a Professor of public policy at the Colorado School of Mines. Previously, he was lead energy specialist at the World Bank. He has over two decades of experience in the energy sector and is regarded as a leading expert in international affairs, policy and investment. He is a Member of the Council on Foreign Relations.
ABOUT THE PAYNE INSTITUTE

The mission of the Payne Institute at Colorado School of Mines is to provide world-class scientific insights, helping to inform and shape public policy on earth resources, energy, and environment. The Institute was established with an endowment from Jim and Arlene Payne, and seeks to link the strong scientific and engineering research and expertise at Mines with issues related to public policy and national security.

The Payne Institute Commentary Series offers independent insights and research on a wide range of topics related to energy, natural resources, and environmental policy. The series accommodates three categories namely: Viewpoints, Essays, and Working Papers.

For more information about the Payne Institute please visit:
https://payneinstitute.mines.edu/

DISCLAIMER: The opinions, beliefs, and viewpoints expressed in this article are solely those of the author and do not reflect the opinions, beliefs, viewpoints, or official policies of the Payne Institute or the Colorado School of Mines.