



The project focuses on the development of fortified villages, known as *qala*, in Afghanistan and neighbouring regions. Resembling medieval castles, these structures are typically surrounded by thick walls with towers at the corners and a single entrance. *Qala* can be seen as 'miniature cities', containing distinct areas for various functions and serving as centres of power for landlords who oversee essential irrigation systems in the surrounding desert. The *qala* settlements played a key role in social organisation during the Islamic period, with some of the earliest examples dating back to the Oxus civilisation (2250–1700 BCE). Evidence suggests that the region underwent a different evolution of urban and rural settlement than the better-studied areas, for instance, Mesopotamia (Iraq).

This project will examine how factors such as water scarcity, cultural diversity, safety requirements, and proximity to trade routes influenced the geographical location of *qala* villages. Two key study areas have been selected for this research: the Balkh oasis (ancient Bactria) and the mountainous valleys near Kabul (Logar and Maidan). This project will have an innovative character and will widely use advanced research methods, including artificial intelligence (AI), remote sensing, 3D modelling, and sensory archaeology, alongside historical and ethnographic sources. We aim to develop new AI models to identify *qala* structures and the surrounding old agricultural fields using HEXAGON spy satellite images. By combining remote sensing with AI, we will map underground irrigation systems (qanats), canals, and paleochannels. Although these areas were part of the Silk Road, it is unclear whether *qala* villages functioned as key nodes in this network. Therefore, we will utilize historical and ethnographic data, integrated with Geographic Information Systems (GIS) methods, to reconstruct the connections between *qala* villages and their surroundings.

Through detailed architectural studies, 3D modelling, and sensory analysis, we aim to gain insight into the human experience of these settlements. This will reveal not only their types, but also the status and quality of life of their inhabitants. Analysing the identified fields and architectural layouts will help us determine how many people typically live in a *qala* village and understand their agricultural needs, providing insight into their economic conditions. We are also exploring the relationship between these fortified settlements and ancient canals, qanats, roads, and the local landscape. This will shed more light on the cultural, social, economic, and geographical factors that contributed to the development of these remarkable villages in Afghanistan, Iran, and Central Asia.