

Research Assessment Exercise 2020
Impact Overview Statement

University: The Hong Kong Polytechnic University (PolyU)

Unit of Assessment (UoA): 18-Planning and Surveying (land and other)

Total number of eligible staff of the university in the UoA: 22

(1) Context

This UoA is represented by four research groups: **Geographic Information Technology, Land Surveying, Utility Surveying** and **Urban Studies**. In all these sub-disciplines, we ensure our research has impact through extensive collaboration with Government Departments/Agencies and industry. The impact of our research is widespread; our research has enhanced performance, efficiency and accuracy in non-academic institutions/beneficiaries at different geographical locations including HK, China, South East Asia and Europe.

Geographic Information Technology (Geo-informatics): The focus of this group is to undertake basic research on fundamental issues in urban informatics, on the development of enabling technology, and on its practical application, with impact on different levels. The beneficiaries of this research include the Geo-information sector, environment and planning, the community and industry. Some of the specific sectors impacted include (1) *Transport Department, HK (ICS#1)* for which a public transport query and guiding system has been developed. [REDACTED]

(2) *National Administration of Surveying, Mapping and Geoinformation of China*, for which theoretical models for reducing errors and increasing accuracy of spatial data have been developed. The model results in this case have been adopted for the development of the National 1:50,000 DEM Standard in Mainland China (3) *HK Observatory*, where the team led by Dr Zhizhao Liu developed a GPS-based atmospheric vapour estimation technique that has been adopted by the HK Observatory for improved weather observation.

Land Surveying (Measurement and positioning): The beneficiaries of the research by this group include civil engineering, transportation and the land surveying community and industry. The specific areas of impact are (1) *Lands Department, HK*—By working on the Hong Kong Geoid Model led by Prof Wu Chen, the team collaborated with the Lands Department (LD) to solve the GPS positioning instability problem in HK. Their technology has been adopted by the LD and benefited the surveying industry in HK and low latitude areas globally. Our researchers discovered that GPS measurements were not stable in the late afternoon in HK due to strong ionospheric activity and so they developed a method to solve the problem (2) *Societies of Hong Kong, Mainland China and Taiwan*—The researchers, led by Prof XL Ding, developed a multi-antenna GPS to monitor landslides and deformation due to large-scale construction. The technology has been implemented in HK, Mainland China and Taiwan to monitor dams, landslides, long-bridges and tall buildings (3) *Chinese Space Agency, China*—The team developed a new integrated technique for landing site characterization [REDACTED] with improved reliability (ICS#2).

Utility Surveying and Urban Studies: The beneficiaries of the research by these groups include the planning and real-estate community and the industry. The impact was seen in government policies. This includes the integration of event-led flagship projects (EFPs) into urban renewal to avoid major development, showing an indifference to the needs of local communities. By engaging residents in action and opinion sharing, better community planning strategies could be developed. Consequently, there was a response from the government for the formulation of a cross departmental coordination unit to facilitate the approval process for development and for studying to set up a statutory heritage trust in Hong Kong. The community planning project in Xiamen, with

the implementation of this approach, won the Third Prize at the Guangdong Best Planning Project Awards (2015).

(2) Approach to impact

Our impact approach within the assessment period included the following: (1) To encourage members of staff to engage in impactful societal projects such as policy research projects, Innovative Technology Fund (ITF) projects and the Environment and Conservation Fund (ECF), which involved collaboration with industry. Impact is also a major factor in our annual departmental awards. (2) Encourage staff members to transfer enabling technology to public services and/or commercial companies. The University has placed this under a KPI system and established the PolyU Technology and Consultancy Co. Ltd (PTeC) to handle related issues such as technology transfer and consultancy. (3) To organise workshops/talks/training sessions for non-academic users in government and industry, [REDACTED] (Advanced Photogrammetry), [REDACTED] Asia (Training & Demonstration on Underground Utility Surveying) and [REDACTED] (CPD seminar). In addition to enhancing the scholarly and scientific underpinnings, the research in UoA18 aims to improve industrial and professional practice and deliver societal impacts. Our research practices to support impact are: (1) To place emphasis on research that tackles fundamental issues, to influence government organizations and industrial sectors, and to improve societal well-being. Particular attention is paid to the ITF and policy research projects from the Public Policy Research (PPR) funding Scheme and Construction Industry Council (CIC). Over the last 5 years, the UoA has successfully secured thirteen ITF projects (HK \$ 42 million), three PPR projects (HK \$ 1.7 million) and industry funding (HK \$ 48 million) (2) To conduct collaborative research with international, national and local partners, as well as user-communities. For example, in 2016, Prof. Wu Chen collaborated with the Lands Department and local industry to obtain an ITF project with an amount of over HK \$ 6 million to establish indoor positioning and navigation infrastructure in HK, [REDACTED]

(3) Strategy and plans

Our strategy and plan to support impact includes augmenting our impact on standards, emerging policy, practice and public service, through our focused research areas. The specific strategy and plans are: (1) To continue encouraging staff members to become involved in impactful societal projects such as the ITF project and ECF, which is in collaboration with industry. (2) To launch the International Society for Urban Informatics and the International Journal of Urban Informatics to showcase and disseminate our research. (3) To establish a good track record of our impact to prepare for the next RAE (via training). (4) To promote Knowledge Transfer (KT) projects with commercialization potential/impact/patent with the help of the Innovation and Technology Development Office (ITDO) and Institute for Entrepreneurship (IfE).

(4) Relationship to case studies

We have submitted two case studies (*An Innovative Smart Public Transport Information System* and *Planetary Remote Sensing Contributing to Space Exploration Missions*) for the current exercise. The first ICS, *An Innovative Smart Public Transport Information System*, illustrates our basic research, enabling technology development and application in public service. The impact is at the government level, i.e. on procedures of the workplace, on standards, and specifications. The second ICS, *Planetary Remote Sensing Contributing to Space Exploration Missions*, emphasizes the development of enabling technology and collaboration with industry for research and technology transfer. The UoA supported the research underpinning this ICS via funding, organization of international conference in PolyU (2017 International Symposium on Planetary Remote Sensing and Mapping), travel support for research collaborations, outreach activities, etc.