

## Appendix-I

### Request for Proposal (RFP) for

### High Altitude Long Endurance Aerial Platform (HALEAP)

#### Background

In recent years, there is an increasing interest in the development of aerial platforms that have long endurance while operating at high altitudes, for telecommunications, digital broadcasting, and remote sensing applications. Such systems can be utilized as multi-mission platform to increase the cost-effectiveness and affordability for these applications. These systems are required to maintain a quasi-stationary position while operating in the lower altitudes of Stratosphere, where ambient wind speeds are of low magnitude.

#### Problem Statement

Design a High Altitude Long Endurance Aerial Platform (HALEAP) for station-keeping at four fixed locations, and moving between them, while carrying a dedicated communications payload.

#### ***Mission Requirements***

1. The HALEAP must be able to maintain its position over a Metro city for around three months, and the relocated to another Metro city within five days, as follows:  
Midnight of 31<sup>st</sup> December to Midnight of 25<sup>th</sup> March: Over Delhi  
Midnight of 31<sup>st</sup> March to Midnight of 25<sup>th</sup> June: Over Kolkata  
Midnight of 30<sup>th</sup> June to Midnight of 25<sup>th</sup> September: Over Chennai  
Midnight of 30<sup>th</sup> September to Midnight of 25<sup>th</sup> December: Over Mumbai
2. The HALEAP may be deployed at any altitude between 15 km and 20 km AMSL, but it should be able to always maintain its location within a ground footprint of 5 km x 5 km during the entire period of deployment at a particular station.
3. The system should be able to generate adequate power to maintain station, and to relocate to the next location within five days, without the need to bring it down.
4. The HALEAP should be able to cater for a continuous power consumption of 1000 W by a payload weighing 100 kg.
5. The HALEAP should be able to take-off and land within 2 km @ ISA sea-level.
6. Assume all flight operations are conducted in Indian Reference Atmosphere (IRA). However, the variation in the magnitude and direction of ambient winds must be considered while designing the HALEAP, using models such as the Horizontal Wind Model developed by US Naval Research Laboratory in 2008<sup>1</sup>, and updated in 2015<sup>2</sup>.

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<sup>1</sup> Drob, D. P., et al. (2008), An empirical model of the Earth's horizontal wind fields: HWM07, J. Geophys. Res., 113, A12304, doi:10.1029/2008JA013668.

<sup>2</sup> Drob, D. P., et al. (2015), An update to the Horizontal Wind Model (HWM): The quiet time thermosphere, Earth and Space Science, 2, 301–319, doi:10.1002/2014EA000089