

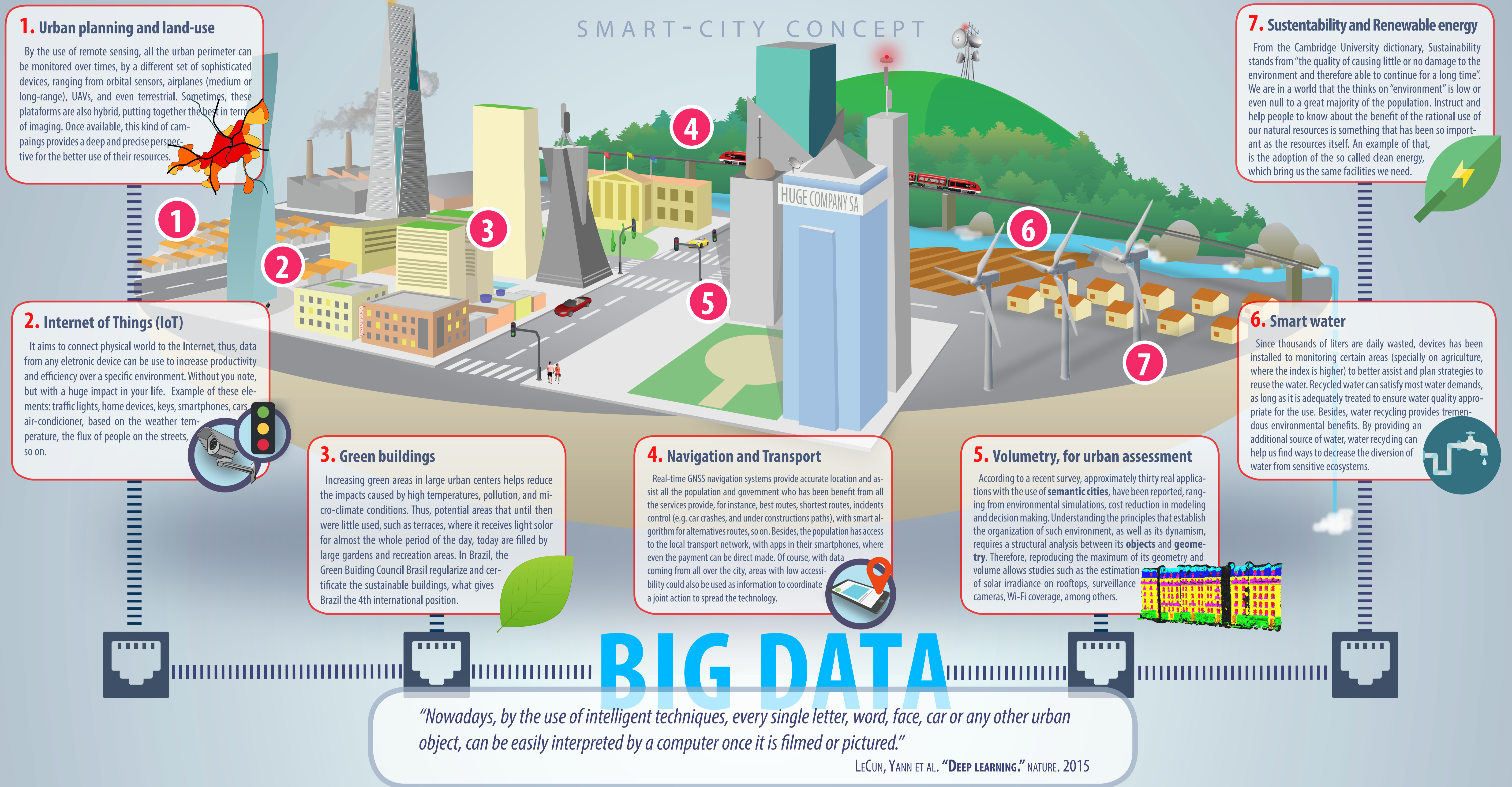
TOWARD SMART CITIES THROUGH AUTONOMOUS DETECTION AND RECONSTRUCTION

THE BRAZILIAN PANORAMA IN 3D MAPPING

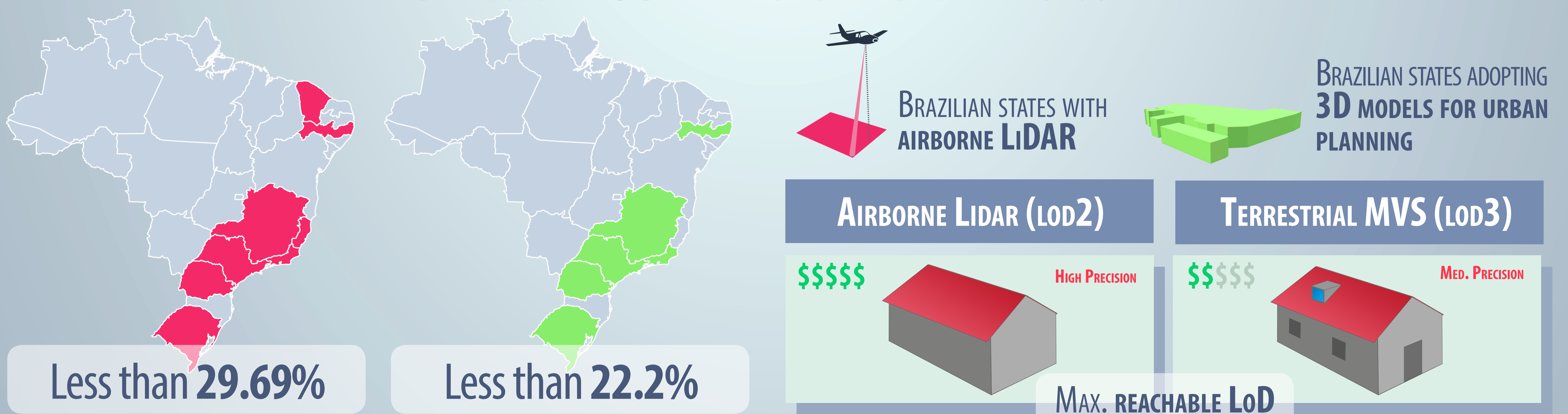
INTRODUCTION

Nowadays, by the use of intelligent techniques, every single letter, word, face, car, urban object, and many others, can be easily interpreted by a computer once it is filmed or pictured. At the same time, we have lived under a great moment in research regarding large-scale 3D urban reconstruction. New lines of studies has been exploited in order to establish more sophisticated understandings in how urban spaces could be better managed. Recently, and thus mature, a new demand in the areas of **Photogrammetry** and **Remote Sensing** is leading the research to a next level of analysis, in which a **mix of technologies**, such as IoT (Internet of Things), Cloud services (e.g. SaaS, IaaS), ready-to-use Machine Learning libraries, have turn what were until then very unlikely, in something feasible and practical in our daily lives.

Not long ago, the representation of cities through virtual scenarios were mostly directed to entertainment application, rather than Cartography or with support to any detailed analysis. Since mid-2010, however, the combination of two research fronts has motivated the mapping of cities, with resources ranging from the use of more sophisticated hardwares. The appearance of LiDAR (Light Detection and Ranging) [VOSELMAN, G.; DIJKMAN, S. et al. 2001], **Structure-from-Motion (SfM)** and **Multi-View Stereo (MVS)** workflows [SNAVELY, N.; SEITZ, S.; SZELISKI, R. 2006], for instance, brought to real the possibility to acquire the volume of things. With this remarkable stage, together with concepts of urban **Big Data** acquirement, we heading increasingly to **semantic analysis** and better estimates.



BRAZILIAN 3D MAPPING AND EXTRACTION



CONSIDERATIONS

- The technologies to **observe cities**, such as sophisticated sensors, reconstruction and classification techniques, **evolve as the numerous architectural styles**
- It is essential to think that the **multiplicity of architectural styles** is not the only problem
- **Materials** used in construction, might become **dynamic** and, therefore, do not present a single static structure of a building
- **In Brazil**, there are several issues that makes 3D mapping even **more challenging**



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