# Design constraints on operational LBS

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## Introduction

Delivering fully operational location-based services (LBS) is proving to be a difficult task. Only a small number of LBS are operational and revenue earning in 2006 if we define LBS as fully location-aware applications delivering services through client-server or peer to peer architectures over wireless, cellular and satellite communication networks. In one sense this is surprising given the huge interest in LBS, in another sense it seems that LBS are simply following a well worn path through the 'hype cycle' (Gartner 2005). In 2003-4 LBS were passing through the 'peak of inflated expectations', while in 2005 they were in the 'Trough of disillusionment'. If LBS are to progress up the 'Slope of enlightenment' to the 'Plateau of productivity' an assessment is needed of what is needed for LBS to succeed.

This paper is focussed on what the experiences of research and development into LBS have told us about the design constraints on operational LBS. This work is going on in a range of disconnected communities e.g. ubiquitous computing, mobile (geo)web services, geopositioning, telecartography, mobile HCI and personal navigation to name just a few, and few researchers have attempted a synthesis (Lopez 2004). This paper tries to assess what is now known with confidence about LBS design, in order to encourage convergence and greater cooperation between the various players in the chain of LBS relationships required to make these systems work (LBS value chain, figure 1).

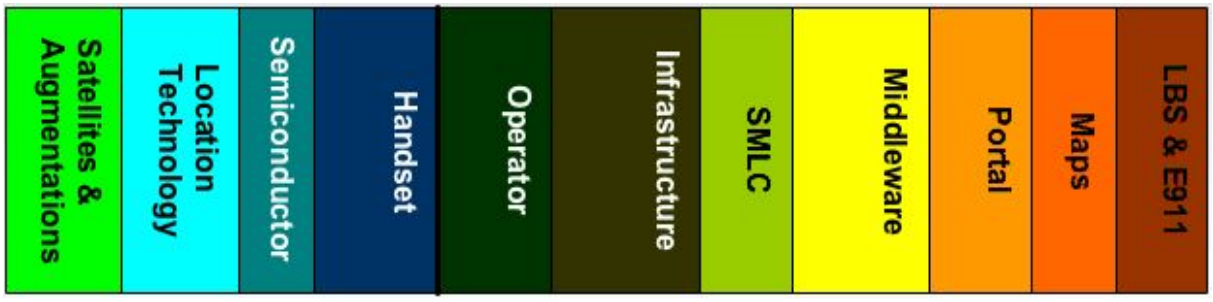


Figure 1 LBS value chain (courtesy of C. de la Fuente)

Finally, specifying definitions is important in a rapidly developing field. The assumption is adopted here that the following are not LBS within the richer sense defined here:
- autonomous clients with positioning, locally stored content and limited network updates (e.g. in-car navigation tool with traffic updates)
- mobile devices with low resolution geopositioning delivered by mobile telephony such as cell global identity, and simple tiled service scopes, such that the relationship between location and scope is weak (e.g. where's my nearest functions on GPRS equipped phones)
This assumption exposes the author's view that LBS must be able to self-customise their services, based upon high resolution physical location and semantically rich location context, and that this is the definitive core functionality of LBS. This is not to say that web and WAP

delivered geographic information is not valuable in itself, merely to emphasise the distinction between Google Local directions on a mobile device and an application like allsportgps.com.