There is a lot of discussion these days about handheld devices, which are popularly referred to as “handhelds.” Many people, especially in India, also assume that “handhelds” means “mobile phones,” although that would be only a subset of the overall category. Different types of “handhelds” include Ultra-Mobile PCs (UMPCs), Mobile Internet Devices (MIDs), Personal Digital OLPC-XO Assistants (PDAs), PDA Phones, Mini-Tablet Computers, Handheld Terminals (sometimes also called Handy Terminals), and sub-notebook computers.

The basic questions about handhelds are:

1. What are the functional features that the device must absolutely have, in order to fulfill the requirements of the project? These include screen and overall device size, device weight, storage capacity, local-language capability, and peripheral(s) connectivity, among others.
2. Is the cost of each of the above features reasonable and would it be justifiable for that particular project, or would you be paying a premium for a particular device that claims a feature that really may not have much practical value or use but appears wonderful?
3. Does the device have adequate battery life (enough for at least one workday shift) per charge, and is the device too dependent on mains power?
4. Is there any solar power charger available for the device?
5. Does the device provide appropriate connectivity features that match the connectivity network(s) available in the geography of the project?
6. Does the device provide sufficient “off-line” working capability, so that any unforeseen or unexpected break in connectivity does not adversely affect the progress of the project?
7. How reliable and/or rugged is the device for the region and environment of the project site(s)?
8. Is there any service backup available for the device at or near the project site(s)?
9. How easy is it to program the device for the specifics of your project, or to make changes to the program(s)?

**Types of Handheld Devices**

![Diagram of Types of Handheld Devices]

- **Devices**
  - Smartphone
  - Cellular

- **Services**
  - WLAN/3G/WiMAX/LTE...
  - Internet

- **Content & applications**
  - Music
  - Video
  - Social networking
  - Ringtones
  - Internet
  - News & information

**Types of Devices**

- **Consumer Electronics**
  - iPod
  - e-books

- **Portable Entertainment Devices**
  - Portable Media Player
  - Toys

- **Cellular Devices**
  - Multimedia phone
  - Feature phone
  - BlackBerry

- **Ultra Mobile Devices**
  - Personal Nav Device
  - Mobile Internet Device
  - Netbook

**Service Categories**

- **WLAN/3G/WiMAX/LTE**
- **Internet**
- **Web 2.0**
The Handhelds are expected to usher in rapid development in the areas of E-Governance, Hardware, Radio, Video and TV, Research / Advocacy, Tele-Centre, Application / Content, Computer based Training / Employment.

1. **Tablet PCs**

   Besides the CPU and battery, other components in a typical Tablet PC include:
   
   - accelerometers
   - gyroscopes
   - graphics processors
   - flash-based memory
   - WiFi and / or cellular chips and antennas
   - USB dock and power supply
   - speakers
   - a touch-screen controller chip
   - camera sensors, chips and lenses

   Accelerometers and gyroscopes help the tablet determine its orientation so that it displays graphics in either portrait or landscape mode. The graphics processor or GPU takes the load off of the CPU when it comes to generating graphics. The WiFi or cellular components connects the tablet to a computer network. The tablet may also have a Bluetooth receiver, allowing it to interface with other Bluetooth devices.
There are two basic methods of creating touch screens for tablet devices: resistive screens and capacitive screens. Manufacturers choose one method. Resistive systems detect a touch on a screen through pressure. Tablets that require a stylus often use resistive screens. Resistive screens can be susceptible to damage. A capacitive system also detects changes in electrical fields but doesn't rely on pressure. A capacitive system includes a layer of material that stores an electrical charge. When you touch a conductive material to this screen, some of that electrical charge transfers over to whatever is touching it.

A Tablet PC is portable and the primary input device is the touchscreen. Tablet PCs are becoming a trend and more and more users prefer it instead of a notebook.

2. **Tablet PCs – Price less than Rs. 10,000**

The author opines that for Indian conditions, Tablet PCs which are priced at less than Rs. 10,000/ [Ten Thousand Only] are affordable and are likely to accelerate the development initiatives at all levels. Some of the Tablet PCs in this price range are mentioned below.

- **WishTel Tablet**
- **ATab 7 inch for Students**
- **Classpad Tablet**
- **BSNL – Penta T-Pad IS701R**
- **Kobian iXA**
- **Attitude Daksha**
- **Xtab A10**
- **Sanei N77 Elite**
- **Wammy 7 ICS tablet**
- **Micromax Funtab**
- **Veedee D10e**
- **Ainol Novo 7 Tornados 7**
- **Karbonn Smart Tab 1**
- **BSNL Penta TPad IS703C**
- **Zenithink ZT-282 C71+**
Xtab A10 Plus

HCL Me U1 and HCL MyEdu

Last but not the least:

Aakash Tablet

Aakash tablet also available for Students at discounted price for Rs. 1138

3. Aakash Tablet [http://www.akashtablet.com/features.html]

In October 2011, the Ministry of Human Resource Development announced the launch of a low cost tablet computer called ‘Aakash’ in a tie up with DataWind, the manufacturing company of these low cost tablets also commercially known as UbiSlate 7.

The main focus of the Government was to empower the students and introduce the use of technology in education across the country. These tablets will be made available to the students of various state Universities at half the price or completely free of cost. The remaining cost in this case will be borne half by the Government and half by the Universities themselves.

When these tablets were launched initially, around 30000 units were handed over to select students and IIT Rajasthan in particular, to test and send in reviews and feedback. After paying close attention to the feedback the company and Government, decided to revamp the tablet with better specs to ensure trouble free performance.
The new **Aakash 2 tablet** also called as **UbiSlate 7+** was announced in April 2012 and has the following features.

- Anytime & Anywhere Internet access with Cellular connectivity for only Rs. 98/- per month (in India only)
- Connect via GPRS or WiFi
  - GPRS: Embedded modem eliminates the need for external dongles and allows Internet access everywhere
- WiFi: Allows fast Youtube videos at hotspots
- Fast web access even on GPRS networks, across the country using DataWind's patented acceleration technology
- Web, Email, Facebook and much much more!
- High Quality Video Streaming & HD Quality Video Playback
- Games, Full Office suite, Educational software, Over 150,000 apps!
- Expandable memory to 32GB
- Use any ordinary pen-drive
- Even plug-in a 3G dongle
- And it's a Phone to make/receive voice calls

**Specifications**

- Android OS 2.3
- Cortex A8, 800 Mhz Processor with HD Video Co Processor
- 256 MB RAM
- Storage: (Internal) 2GB Flash / (External) 2GB to 32GB Supported
- Peripherals: 1 Standard USB Ports
- Audio Out: 3.5mm jack
- Display and Resolution: 7" Display with 800x480 pixels
- Supported Document Formats: All Version Office Document formats and many more
- High Quality Video Streaming & HD Quality Video Playback
- Input Devices: Resistive Touch Screen
- Connectivity with GPRS & WiFi IEEE 802.11 a/b/g
- Battery: Upto 180 minutes of battery, AC adaptor 200.240 volts

The tablet also got a boost in the **2012 Union budget** with the Government allocating **Rs. 765 crore for the Aakash project.**
4. **Conclusion**

The author has been fortunate to participate in many discussions both formal and informal since the days of People PC. Simputer has also been discussed. Deliberations of specific Chip-Sets with multinationals have been very helpful.

5. **Acknowledgements**

The author thanks Mr. Satish Jha, Chairman, One Laptop Per Child Project India for a lucid Valedictory Address on “Aakash” and related aspects at the International Conference on Software Engineering held under the aegis of CSI Division II [Software] at Indore on 07 September 2012.

The author places on record his sincere thanks to Dr. Vinay L Deshpande, Chairman & CEO Encore Software Ltd, Bangalore, Prof. C R Muthukrishnan, Formerly Deputy Director, IIT Madras and Mr. K S Lakshminarayanan, Formerly Chief Technology Advisor, Electronics Corporation of Tamilnadu [ELCOT] for all the interactions on this topic.