slimes, tailings, especially in understanding the percentage of finer size of ore minerals and the level of comparison with that of feed material.

K.T. Sharana Gowda in his keynote address made a critical analysis of iron ore resources of the country from the point of their optimal utilization. He emphasized that good grade iron ores (estimated to be about 25 b.t) will be exhausted in 35-40 years, going by the present rate of consumption. He called upon all the concerned for meticulous planning of iron ore production keeping in mind the steel requirement of the country, which is expected to be about 168 kg per capita by 2020.

In another session on iron resources, B.P. Ravi stressed the need for process characterization of the iron ore beneficiation. He observed that this can help to use low grade iron ores, so that growing demand for iron and steel can be met with.

In his opinion, proper implementation of process characterization (texture, granulometry, physical and chemical properties, merit and limitations of processes etc) and geo-technical map data are of vital importance in optimized sustainable utilization of the available iron ore resources.

B.C. Prabhakar in his keynote address on sustainable mining observed that in spite of the impressive contribution of mining sector to our GDP, several serious concerns related to mining are not addressed by mineral entrepreneurs, both public and private, though stringent regulations exist. He quoted the Earnst and Young report of 2010 where exposure to fraud and corruption by mining and metal companies, is stated to be very high and it is the root-cause of most mining related adverse effects, be it ecology, human conflicts, depletion of resources and violation of regulations.

A tenacious plea that unless a holistic approach, i.e. welfare of local communities; investment of mining profits to improve health, education and job opportunities; utmost care for environment and finding ways to substitute the depleting ores are attended to, sustainable mining remains a distant dream.

Thirty nine research papers were presented on the above said focal themes. Dr. P.C. Naganoor conducted the technical programs of the seminar. The valedictory function was presided by Prof. T.C. Rao. Dr. R. Dhana Raju, former Associate Director, AMD, Hyderabad, was the chief guest. During the valedictory function Prof. K.L. Bhat, Dept. of Metallurgy, NITK, Surathkal was felicitated by the staff and students of the Mineral Processing Department for his valuable academic contributions. Sri C. Rudrappa proposed vote of thanks.

A Review on Digital Aerial and Satellite Cameras and Electronic Robotic Theodolites
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A Decade of Progress of Digital Aerial Cameras (DAC).

Began journey as Amsterdam of prototypes in 2000. A passive remote-sensing technology rapidly evolved into sensors which advanced from capture capability of around 20 mega pixels per frame a decade ago to 200 mega pixels today and holds lot more in store in future. Features: Better radiometric resolution, Elimination of film processing and scanning costs, Highly automated workflow, Generation of photogrammetric products (DEM) and Ortho-mosaics.

DAC architecture: Either of linear CCD arrays or area CCD chips placed in the focal plane. Linear-array or push-broom scanners employ a single lens head. Capturing of colour (RGB) and the NIR is done by placing three or more linear arrays in the focal plane, upon each of which are projected different bands of the electromagnetic spectrum using beam-splitters. The area CCD array solution results in a frame camera consisting of several (multi-head) cones. Categorized DACs as linear- and area-array solutions.

Another based on technological criteria, considers dimension (size, weight and number of pixels of CCD chip in the focal plane), resulting in a distinction between small-, medium- and large-format cameras. Small-format frame cameras are typically equipped with area CCD chips containing 20 to 30 mega pixels. For a medium-format camera these numbers double or even triple, and for an area CCD chip in a large-format camera they may be nearly ten times as high. Typical applications for small-format cameras are corridor mapping, updating site maps, engineering projects, and as image-acquisition device operating alongside airborne Lidar scanners. System developments stemming from China, USA and Israel. Beijing Siwei has constructed a large-format system configured from four Hasselblad [Changeable lenses. The 37x49mm CCD chip placed in the focal plane of each camera consists of 22 mega pixels]. US-based Pictometry and competitors have developed an oblique camera system comprising five cameras rigidly mounted together in one casing. Israel-based VisionMap recently marketed a panorama camera with across-flight-line FoV of over 100 degrees.

Large Format: for accurate bulk topographic and cadastral mapping of larger areas (2.9cm GSD at 500 m flying height) and Wide-Angle (4.3 cm GSD at 500 m flying height).

Large-medium format: array size 11,704 x 7,920 and 4.3cm GSD at 500m flying height. Image format of 196 mega pixels (17,310 across track x 11,310 along track) and pixel size of six micrometer.

Medium Format: With radiometric resolution of 14 bits, capture of quality images, even in poor light conditions. Image size is 6,096 x 6,500 pixels and the multispectral sensor allows simultaneous capture of true-colour (RGB) and NIR images. Panchromatic array size 9,735 x 6,588 (colour and NIR: 5,320 x 3,600) also available.

Linear Array: For accurate mapping, as well as remote-sensing applications. The multispectral sensor collects RGB and NIR imagery simultaneously [three panchromatic linear arrays at differing viewing angles, enabling creation of reliable