

Seminar on Global Positioning System Current Trends and Applications

**AeSI Conference Hall, Bangalore
7th January 2005**

Sponsors: 11 Organisations-including Companies that manufacture GPS products, Integrate GPS based systems and market GPS products.

Delegates: Drawn from DRDO Labs, ISRO, CSIR, and private Industries.

INAUGURAL SESSION

Sri. J.K.Sharma, President, AeSI, Bangalore Centre, in his welcome address, covered the importance of GPS Technology and his recent exposure to application areas such as “Road Information Systems” and “Disaster management Systems” with GPS/GIS.

Sri. J.Padamanabhan, the co-chairman of the seminar organizing committee spoke about the importance of the seminar topic, the earlier efforts of AeSI & MITAA in this direction, the scope of the present seminar, subjects to be covered, and the details of the exhibition arranged as a part of the seminar.

The seminar was then inaugurated by Dr. K.G.Narayanan. In his inaugural address he covered various issues such as International scene with US based and Russian based GPS systems, control exercised by USA including denials of service at its will, the need for a public policy in our country on a matter of this nature, the urgent need for the professional bodies like Aero Society, Institution of Engineers and MITAA to effectively contribute in formulating the same. He highlighted the efforts made under his guidance in terms of using GPS as a part of weapon systems development in DRDO labs.

Dr. S.Pal gave a lucid, interesting and informative key note address. He pointed out that in his epic Megha Sandesh Poet Kalidasa used the principles of Navigation while charting a route for Megha to reach Alkapuri giving the enroute fixes in a vivid manner. He gave a good account of the existing GPS Systems of USA and Russian origin, the emerging European systems and the SBAS System GAGAN of India. He highlighted the various application areas of GPS-GIS systems, including Forestry, Environment & Resource Management, Disaster Management, Agriculture etc. He added the details of Indian/ISRO system “GAGAN”, which is under development and which will make India one of the few countries having its own satellite based augmentation system.

Sri.V.Babuji, President, MITAA, Bangalore Chapter proposed the vote of thanks.

TECHNICAL SESSIONS

Session 1: GPS Technology in Aerospace and in Defense Applications.

The session was chaired by Sri.V.Desikan and coordinated by Ms.Swarnalatha. The session featured four technical presentations, out of which two were from private companies working in GPS area and the rest were from Defense Labs.

Presentation #1: In his presentation, Sri.Mohan Chandra from ASL explained the developmental and engineering efforts involved in realising MIL specification GPS Receivers and the experiences gained by his organization. ASL's products supplied to Navy, CVRDE-DRDO and others also were covered by him.

Presentation #2: Dr. Jayanta Kumar Ray of Accord Software & Systems Pvt. Ltd. spoke about the high Integrity GPS-SBAS Avionics receiver indigenously developed by them. In his presentation he explained the details of National Aerospace Modernisation, the design challenges in Avionics Receiver, the definition of Integrity and integrity requirements, the details of safety and reliability analysis and methods, Receiver Autonomous Integrity Monitoring (RAIM) requirements/test procedures and test results. He also gave a brief about their products and how they meet the needs of various parameters involved in GPS systems.

Presentation #3: Sri.Debadatta Maharana from Aeronautical Development Agency presented the "Use of GPS in Flight Testing of LCA". In his lucid presentation he covered important points such as the advantages of using GPS as against DGPS in flight testing of LCA, the application areas such as "AIR DATA CALIBRATION" and "Inaccuracy evaluation" etc. He brought out that the GPS method could successfully be used for "Subsonic tests" and "transonic tests" with quite good results.

Presentation #4: Ms. Rajitha Reddy from LRDE made a presentation on "Integration of GPS with INS" covering the areas such as the forms of navigation and factors governing their choice, advantages and disadvantages of INS and GPS, the integration of INS and GPS leading to a better accuracy compared to either of them, when used alone.

Session 2: GPS Technology in Transport Sector, Power Generation & Distribution

The session was chaired by Sri.N.P.Ramasubba Rao and coordinated by Ms.Mahalakshmi. Two presentations from private sector and one from defense lab were made in this session.

Presentation #5: Sri.Sankarasubramanian of Mobiapps spoke on "m-Track – A GPS based Solution" He presented the challenges encountered in 'logistics' and 'Asset Management' areas. He explained as to how these are met using GPS, GSM, Web and internet technologies in arriving at an elegant solution. He gave the technical details of 'mTrack Solution' and operational advantages offered by 'mTrack' products.

Presentation #6: Sri.Narayan Panigrahi from Centre for Artificial Intelligence and Robotics (CAIR)-DRDO Lab presented a paper on "Processing of GPS data in GIS for visualization and modeling". He covered the various aspects of GIS, which as a visualization and modeling tool for spatial as well as non-spatial data pertaining to earth. The use of GPS as a geo-spatial data collection and simulation tool and visualisation tool in GIS was clearly brought by him. He described the details of GPS-GIS integration and explained as to how such integration can be used for a variety of applications including generation of terrain change reports periodically, guidance and navigation of projectiles (weapons) to home on to a correct target location-effective 'fire direction', on line tracing of mobile objects etc.

Presentation #7: Sri.Shyam Kumar of AMDL gave an interesting presentation on the use of GPS in all the three segments of Power Sector, namely, Generation, Transmission and Distribution. He explained how the electricity Grid Code and CERC stipulated standards for Q&R of power can be met using GPS and the benefits that accrue out of the same in improving both the quality and reliability of power systems.

Session 3: GPS Technology Current and Future Trends

This session was chaired by Prof. Mohapatra of I.I.Sc. Bangalore and co-ordinated by Ms.Chinmayee Madhavan. Three papers were presented, one each from Defense, CSIR and ISRO.

Presentation #8: Mrs. Veena Dixit from CABS (DRDO) spoke on “Pseudolite Concepts & its Applications. In her presentation she covered the aspects such as the manner in which Pseudolite can augment the traditional GPS navigation techniques, types of Pseudolites and how they can be realized, the application areas and issues of concern.

Presentation #9: Dr.Sridevi Jade of C-MMACS (CSIR) addressed the seminar on the “Current Trends and Future Trends of GPS”. In her talk she outlined the details of GLONASS of Russia and NAVSTAR of USA and the civilian application spin-off’s. She spoke about the Wide Area Augmentation Systems (WAAS) and the role of Geo-Stationary Satellites. She opined that use of GPS for location-based services is the emerging area of GPS applications. With the European Union launching a Satellite Navigational System in 2005-6 called GALILEO, the dependency on NAVSTAR GPS will be reduced as new services like Search & Rescue Operations and high accuracy for civil community will be available. She gave some details on GAGAN, an Indian WAAS and Japanese new Nava system QZSS scheduled for 2008

Presentation #10: The last speaker, Sri.P.Soma from ISTRAC/ ISRO, gave a very interesting presentation on “GPS For Civil Air Navigation: Current Trends”. He covered the various topics such as Radio Navigation Techniques, different phases of Air Navigation and the equipment used, GNSS (Global Navigation Satellite System) and its constitutional elements, GPS and DGPS, the need for GPS Augmentation and options available. He the enumerated brief details on Satellite based Augmentation Systems (SBAS) & their architectures, coverage of SBAS being implemented, Ground Based Augmentation System (GBAS) Architecture. He gave a detailed account of GAGAN (GPS Aided and Geo Augmented Navigation), a joint initiative of Airport Authority of India and ISRO. He also highlighted the benefits of GAGAN to civil aviation.

GPS Forum

Sri.Padmanabhan, Co-Chairman of the Organising Committee very aptly brought out the need to have a GPS-User forum and the advantages thereof. The concept was well received by one and all. This will open up a new vista for furthering the technology interests of our community in the area of GPS technology.

The seminar formally ended with a comprehensive summation of the day’s proceedings by Sri.Ramasubba Rao.

Adequate time was provided for the delegates to have a good look at the exhibition stalls put up by Companies - Accord, AMDL, WEBSTAR, ASL, MELSS, and Exultsoft and they utilized it fully.

In general and in summation, the Seminar conducted by the Bangalore Centre of AeSI and the Bangalore Chapter of MITAA covered a number of current and emerging application areas in which GPS based solutions can be elegantly used. It provided a common platform for the practicing GPS users and developers to exchange views on this interesting subject. It is unique in the sense that it was not just a theoretical exposition with classroom like lectures on GPS but

provided lot of practical information on GPS based applications. The exhibition added colour to the content.

