

The background is a collage of three images: a stack of books on the left, a clock face on the top right, and a yellow clock face on the bottom right. The text is centered in a white box with a black border.

# REPORT OF SURVEY ON FOLLOW-UP INITIATIVES OF THE UN/USA GNSS REGIONAL WORKSHOPS IN THE FIELD OF TRANSPORTATION

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# Introduction

- UN/USA organized four regional workshops between 2001-2002.
- And an expert workshop in Vienna, in Dec. 2002.
- The aim of the workshops was to address the recommendation of UNISPACE III on GNSS technology applications for sustainable development.
- The focus was to help the developing countries benefits from GNSS applications through capacity building.
- Translating to extended user base of the technology, particularly in the developing countries.

# Intro..

- The regional workshops came up with recommendations.
- These were developed in pilot projects in Vienna 2002.



# Report Objectives.

- Identify initiatives on implementation of recommendations arising from the workshops.
- Access the status of implementations
- Identify the problems encountered
- Identify recommendations not actioned
- Prioritize pilot projects.
- Propose modalities of implementation.



# Survey methodology

- Questionier circulated by OOSA to all workshops participants.
- Feedbacks analyzed
- Other sources such as international conferences reports, e-mails and web browsing employed.





# Workshops Rec..

- Kuala Lumpur-Malaysia, Aug 2001.
  - Held for the benefit of developing countries in Asian-Pacific regions
  - Recommended the establishment of GNSS forum by IMO.
  - The issue to address includes operational requirements, performance standards, user requirements and interoperability of the GNSS technology.



# Workshops Rec...

- Vienna Austria, Nov 2001.
  - Held for the benefit of countries in eastern Europe.
  - Noted the GNSS as defined by ICAO includes:- GPS, GLONASS, SBAS, ABAS and GRAS.
  - GPS has significantly raised the platform of Aviation Safety.
  - SBAS, WAAS and LAAS developed to meet limitations of The GPS.
  - This includes signal integrity, availability, accuracy and continuity
  - GNSS has been widely applied in Europe for Marine voyage and road mapping activities



# Workshops

## Recommendations Summary

- Chile, April 2002.
  - For the benefits in Latin America and the Caribbean.
  - Training and Capacity building for ATC and ATM on GNSS recommended.
  - Setting of GNSS training and research centre with OOSA support was Advocated.








# Workshops Rec..

- Lusaka, July 2002.
  - Held for the benefits of user communities of Africa and Western Asia.
  - Noted the lack of effective regional structures on GNSS
  - Lack of centralized and institutionalized academic environment to galvanize regional expertise
  - Recommended a conference of Africa's Civil Aviation Director General's Conference to deliberate on the concept of one Africa Sky.



# Vienna, Dec. 2002

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- Recommends a pilot project
  - Aimed at increasing political awareness with respect GNSS applications.
  - Involves:
    - Introduction documents prod./dist.
    - Formation of GNSS national group
    - Formation of GNSS regional group.
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# Survey Reports Feedbacks.

- Marius-Loan Piso (Romania)
  - Development of GNSS-Galileo application Centre.
  - Supported by Romania Space and Aeronautics Programme.
  - Programme at implementation stage, to be established in 2004.
  - To disseminate GNSS professional and general knowledge. To offer test facilities and Consultancy services.
  - Difficulties encountered is in the need to harmonize public , commercial and individual developers GNSS policies.

# Feedbacks..

- Balota Octavian from Romania.
  - Promoting the completion of a permanent GNSS network stations (ROMPOS)
  - Undertake a feasibility on ROMPOS.
  - Difficulties encountered is lack of reference baseline to base projections on.
  - Poor appreciation of the project by decision makers





# Feedbacks..

- M. Klobusiak and K. Leimannova (Slovakia).
  - Developed a project for the establishment of Slovak Permanent GNSS Service (SPGS)
  - To be operated on Slovak Spatial Observation System
  - Reported that Slovakia has joined the activity in central and Eastern Europe for the establishment of a uniform DGNSS basis infrastructure for navigation, positioning and real time locating.
  - Two workshops held in Berlin on the above.
  - Awareness problem and poor Government support are key hindrance encountered



# Feedbacks...

- Tomas Hlasny (Slovakia).
  - Initiated the establishment of a regional GNSS coordination group.
  - Publication of the recommendation of the workshops to enhance awareness.
  - Publication of the technical perspective of the GNSS components to enhance capacity and skills development.
  - Problems encountered has to with coordinating the activities of the regional group with OOSA.



# Feedbacks..

- William Martinez Diaz (Columbia)
  - Presentation on the Importance of the Geocentric Reference Systems for the Americas (SIRGAS) in Brazil
  - Justification and technical support for the implementation of a National Network of Permanent High Accuracy GPS Stations for Columbia.
  - Reported that:-
    - A national Policy for spatial Technology is being drafted.

# Feedbacks..

- Official adoption of a Geocentric Reference Framework based on Geodetic Space techniques.
- Technical foundations for the determination of a new vertical reference systems , based on gravity observation discussed at the XXIII general assembly of the international union for Geodesy and Geophysics in Sapporo, June/July 2003.





# Feedbacks..

- Realization of GPS campaign on tide gauges to monitor the mean sea level
- EUREF and SIRGAS have agreed during the Sapporo meeting on the Definition of a vertical datum.
- Made presentations and short courses on various subjects on GNSS.






# Feedbacks..

- Difficulty encountered borders on the adoption of SIRGAS by regions using National classical datum not defined by space techniques
- The need for financial assistance to enhance the training programme was also requested for.





## Feedbacks..

- **Surendra Pal (India).**
  - Reported that the ISRO is establishing its own S-BAS called **GAGAN** (GPS and GEO Aided Navigation)
  - GAGAN would provide seamless navigation over South Asian region extendable to South East Asia and Austria and will fill the GAP between EGNOS and MSAS.
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# Feedbacks

- GAGAN will also provide services to road, rail and waterways.
- It will also be used for GIS, water management agriculture, mining, and town planning.
- Preliminary exploratory dialogues with some of the Asian countries with aim of providing with GAGAN services on going.
- A user interaction workshop and seminar under planning.
- Several lectures and training workshops conducted by the participants on GNSS technology applications and GAGAN.

# Feedbacks..

## ■ T. Ahmed-Rufai ( Nigeria).

- Development of Abuja Map (Capital City) of Nigeria, showing the Cadastral details, Facilities locations, road networks and the city developmental plan.
- Mapping of the wet lands and flood plains for sustainable rice production.
- Development of a vehicle location system and fleet management system.
- Development of a Navigational Aid for tourism and self navigation in the Capital city.





# Feedbacks..

- Hosted a mini workshop for senior personnel of the Government Ministries on the applications of GNSS technology presented by Optron, marketers of Trimble GPS from South Africa.
- Organizing a National hands-on-tools training workshop on GNSS for 300 technical staffs of user communities and Government Agencies and Parastatal in Nigeria. 18 Ministries/ Agencies/Services participating in LOC meeting.



# Feedbacks..

- Evaluating the possibility of an L-band payload on the platform of the Nigeria Communication Satellite Programme as an SBAS augmentation to provide seamless Navigation over African in addition to serving other GNSS applications requirement.
- Financial constraints hindered implementation of the training programme which is still pending.






# Feedbacks..

- Hassanudeen Z. Abidin (Indonesia)
- Conducting a research on GPS-based vehicle tracking systems.
- Undertaking a collaborative research with a Malaysian colleague on the concept and implementation strategy of WAAS for South East Asian region.
- Inadequate funding constitute the major problem in this initiative





# Survey Reports from Other Sources

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- Africa.
  - 14<sup>th</sup> meeting of AFI planning and implementation regional group on GNSS held in Yaoundé, Cameroon from 23<sup>th</sup> -27<sup>th</sup> June 2003 under the auspices OF ICAO.
  - IATA, supported by ICAO, US NIMA, and FAA established the GNSS procedures development and implementation program with the following project outline:-
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# Survey Reports-Africa...

- World Geodetic Surveys (WGS-84 Surveys).
- Development of GNSS (RNAV) non-precision approach procedures.
- Development of GNSS standard instrument arrivals (STARs) and departure (SIDs) procedures.
- Modification of airspace structure design to meet the GNSS requirements.



# Survey Reports-Africa

- Development and preparation of all relevant charts.
- Flight verification of GNSS (RNAV) procedures
- Drafting of GNSS (RNAV) legislation and regulation.
- In addition, a training seminar and workshop for ATS from Seychelles, Tanzania, Kenya, IATA , ISI and other stakeholders in attendance was held in Kenya in September 2003.



# Survey Reports-Africa

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- An implementation workshop was held in Zambia 2002, with attendance from Zambia, Botswana, Malawi, IATA, ISI and regional airlines operators.
  - Meetings with airspace users from Africa took place in Europe in October and December 2002
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# Survey Reports-Africa

- Department of Transport of USA (DOT) in November 2002 co-sponsored a GNSS implementation seminar with ICAO and Kenya Civil Aviation Authority in Kenya. A pilot project for the implementation of GNSS in East African Community was outlined.
- FAA in cooperation with IATA is supporting a project on flight inspection on GNSS procedures at major airports in SADC region. (Reported by Ava Wilkerson of FAA during Yamoussoukro Decision on Air transport liberalization in West and Central Africa in Togo, 26 February 2003)
- FAA has also conducted training of African specialists under the safe skies initiatives and supporting training centres in Africa with tools and training materials



# Survey Reports-Australia

- The civil GPS service interface committee international sub committee meeting was held in Melbourne, Australia, 10-11 Feb 2003.
- The Australian GNSS Coordination Committee (AGCC) established by the Minister for Transport and Regional Services in May 2000 has to date initiated the following work:-
  - Development of a national strategic policy for GNSS implementation, in which consideration of existing augmentation systems is to be an element; this work is being undertaken by a Policy Development working group;

# Australia

- Development of a promotion and education strategy for the purpose of promoting the importance of GNSS coordination;
- Investigation of legal and safety issues associated with GNSS; two priority issues are liability resulting from damage caused by system failure, and protection of signals from jamming or interference;
- The AGCC is also establishing strategic links with appropriate forums in Australia such as the Radio communications Consultative Committee and International Radio communications Advisory Council, and bodies in other countries such as the Civil GPS Service Interface Committee (CGSIC) in the United States.





# Europe

- **Europe-** As part of the EC/ESA joint effort with UN/OOSA for GNSS applications, EC and ESA have launched about 100 projects/studies, costing over C 60m
- aimed at assessing the GNSS applications and services from different point of views. More than 60 M€ have been committed to this project. As reported by Claudio Mastracci, Director of Applications, European Space Agency, summary of on-going EC/ESA projects/studies are as follows;





# Europe..

- Road (22 projects): projects aimed to introduce GNSS on car guidance, fleet management, road charging and advanced future technology for intelligent navigation;
- Rail (13 projects): a big effort is made to demonstrate the potentiality of GNSS for safety improvement in this domain and support to European Standards;
- Maritime (14 projects): control/monitoring of dangerous goods transportation, harbor safety critical maneuvers, in-land waterway navigation, support to IMO standards for vessels Automatic Identification System (AIS);


# Europe..

- Personal Navigation (21 projects): GNSS/Mobile phone integrated solutions for “location based services”, emergency call, civil protection personnel/assets management, blind support, child/people tracking;
- Aviation (8 projects): classical navigation for aviation, airport ground movement management, helicopters navigation, support to international standards;
- General: “horizontal” issues like standards, market, regulatory and legal aspects of GNSS services;
- Others: emerging new applications (precision farming, timing, law-enforcement);





# Europe...

- Also at Graz, in Austria, the seventh conference in the GNSS series titled “GNSS 2003” was held under the auspices of the European Group of Institutes of Navigation (EUGIN) and hosted by the Austrian Institute of Navigation (OVN) and ran from 22-25 April 2003.
  - The conference focused on the present status as well as on future developments in navigation systems, with special emphasis on Galileo.
  - The implementation of new technologies in navigation was illustrated by the industry exhibition, which ran in parallel to the conference.
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## Asian-Pacific...

- ***Asia –Pacific***-During the 3<sup>rd</sup> APEC transportation ministerial meeting held at Lima, Peru from 6th to 9th May 2002 titled “connecting APEC: pathways to prosperity” a joint statement issued *noted* the progress of its work on safety and security across all modes, including environmental considerations and the adoption of new technologies such as Satellite Navigation and Communications (SN&C) systems, and Intelligent Transport Systems (ITS)”



# Asian-Pacific

- The joint statement also declare their understanding that “SN&C and ITS can contribute much to the Region's most significant transportation needs relating to saving lives, time, money, energy and the environment through more effective use of the existing transportation systems and related infrastructure.
- The statement also endorse continuation and development of work with emphasis placed on the recognition of the fast pace of the technology advancements, taking advantage of the benefits which will accrue to the transportation industry



# Asian-Pacific

- Also during the ATC conference held in July 12, 2002, in Beijing , China, the Asian-Pacific region GNSS initiatives outlines and deliberated on key issues among which was putting in place a GNSS implementation team GIT whose work programs are as follows:
- Facilitate an incremental approach for use of GNSS for multimodal transportation as validated by cost benefit analysis of satellite navigation and communication system components.
- Assist economies to implement GNSS as supplemental and/or primary means of air navigation.



# Asian-Pacific

- Assist economies to implement test reference station to encourage data collection and analysis and share the results
- provide analysis on the current status of GNSS across all transportation modes and determine opportunities to utilize GNSS technology
- Encourage the share use of GNSS facilities and services whenever economically and operationally beneficial
- Promote collaborative research projects in all related to evolving GNSS technology



# Asian-Pacific

- Facilitate an incremental approach for use of GNSS for multimodal transportation as validated by cost benefit analysis of satellite navigation and communication system components.
- Assist economies to implement GNSS as supplemental and/or primary means of air navigation.
- Assist economies to implement test reference station to encourage data collection and analysis and share the results





***The Recommendation on Transportation  
from GNSS Workshops yet to be  
implemented,***

- The expert meeting of December 2002 in Vienna considered the various recommendations of the regional workshops came up with a programme of actions to be undertaking to enhance the awareness level of managers of the transportation industry and establishments on the potential benefits of GNSS application for safe, efficient, reliable and sustainable transportation systems.



# Rec. awaiting implementation.

- The outline of the recommendation involves: -
  - Production of introduction brochure for decision makers
  - Establishing National GNSS group
  - Establishing regional GNSS group

This recommendation estimated to cost about \$280,000.00 is yet to be implemented by OOSA

# Rec. awaiting implementation.

- The need for skills development and capacity building through an institutionalized and organized training programme particularly canvassed for by participants from developing countries has not been addressed.



## ***Observations.***

- From the survey reports and feedbacks, it was observed that;
- The regional workshop has stirred up a lot of activities in the area of promoting the application of GNSS technology to enhance safe and reliable transportation system.



# Observations.

- The Aviation industry remains in the forefront with respect to user segments in the transport sector, followed by the maritime sector with relatively low activities in the road and rail transportation systems.
- The activities of ICAO, IATA, and FAA in the Aviation industry on GNSS application as advocated by UN/OOSA have been quite commendable; others similar international organization can be encourage to do same in enhancing GNSS applications in the area of marine, road and rail transportations.





# Observations.

- Institutional training academy through established structures remains a key demand of the developing countries.
- Cost constraints has remained a major impediment towards actualization of various initiative proposed by the participants of the workshops particularly from the developing countries where the awareness and the appreciation of the potential benefit of the technology is still low.

# Observations..

- Expected spate of activities and communications between OOSA and participants was not achieved because the focal points from each regions were not integrated into one organized committee or action team to enhance the need for a follow up initiative.





## ***Suggestions on Pilot Projects Implementations.***

- The recommendation at the Vienna expert meeting for a national and regional GNSS group on transportation at a proposed cost of \$280,000.00 can be integrated with the proposed IGO with task and programme managers and coordinators appointed to oversee the implementation of the recommendation.





## *Suggestions..*

- The key mandate of the transportation applications in the proposed IGO should dwell on the need to integrate and harmonize all the national and regional activities on GNSS applications in the transportation sub-sector by standardizing policies and procedures, setting guidelines and monitoring implementations benchmarks and targets on the programmes and activities of the IGO.



## *Suggestions...*

- The need for training and capacity building is a cross-cutting recommendation which should be coordinated by the existing Space Agencies and UN regional training centres as recommended, to be supervised by the proposed National and Regional IGO coordinators. An annual grant for training support at regional level of amount \$250,000 per region is estimated for consideration.



# *Suggestions*

- Emphases should be given to the fleet management systems using the GNSS technology through pilot project support to promote the exploitation of the social–economic benefits accruable to both the user segment and service providers. An estimated grant of \$150,000.00 each is suggested for such pilot projects and six of such project is being suggested to be distributed among the Africa, Asian and South America Continent. This fund will be managed and disbursed through the IGO to be put in place.



## *Suggestions..*

- WGS-84 is a key and fundamental requirement for transportation application using the GNSS technology. It will be necessary therefore to assist developing countries through counterpart funding of project in this direction. A suggested amount of \$500,000.00 could be set aside for this purpose. Africa, South America and Asia could be considered as the potential beneficiaries.