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CONFÉRENCE DES STATISTICIENS EUROPÉENS

Cinquantième réunion plénière
(Paris, 10-12 juin 2002)

RAPPORT DE LA RÉUNION DE TRAVAIL COMMUNE CEE/EUROSTAT DE SEPTEMBRE 2001 SUR LES QUESTIONS MÉTHODOLOGIQUES TOUCHANT L'INTÉGRATION DES STATISTIQUES ET DE LA GÉOGRAPHIE

Note du secrétariat

1. La réunion de travail commune CEE/Eurostat s'est tenue du 25 au 28 septembre 2001 à Tallinn (Estonie). Elle a été accueillie par l'Office estonien de la statistique. Y ont participé des représentants des pays suivants: Allemagne, Danemark, Estonie, ex-République yougoslave de Macédoine, Fédération de Russie, Finlande, France, Hongrie, Irlande, Italie, Lettonie, Lituanie, Norvège, Pays-Bas, Pologne, République tchèque, Roumanie, Royaume-Uni, Slovaquie, Slovénie, Suède et Suisse. La Commission européenne était représentée par Eurostat. Plusieurs membres d'instituts de recherche et d'établissements universitaires ont également pris part à la réunion, à l'invitation d'Eurostat.

2. La réunion a été ouverte par M. Rein Veetõusme, Directeur général de l'Office estonien de la statistique, qui a souhaité la bienvenue aux participants et a émis le vœu que leur travail soit fructueux et leur séjour à Tallinn agréable.

3. L'ordre du jour a été adopté.

GE.01-32465 (F)

4. Mme Inge Nael (Estonie) et M. Daniel Rase (Eurostat) ont été élus Coprésidents et M. Rainer Humbel (Suisse) a été élu Vice-Président.

ORGANISATION DE LA SESSION

5. Les thèmes de fond ci-après ont été abordés:

i) Nouvelles possibilités offertes par la coopération et le partenariat;

ii) Nouvelles solutions technologiques, y compris celles fondées sur l'accès en ligne aux données;

iii) Analyse spatiale;

iv) Normes et métadonnées.

6. En outre, deux ateliers ont été organisés sur les thèmes suivants:

a) Statistiques relatives à des points et statistiques relatives à des zones;

b) Analyse spatiale.

7. Les participants suivants ont animé les débats: M. Daniel RASE (Eurostat) pour le thème i), Mme Marja TAMMILEHTO-LUODE (Finlande) pour le thème ii), M. Alistair CALDER (Royaume-Uni) pour le thème iii), et M. Alessandro ANNONI (Centre commun de recherche de la Commission européenne (CCR Ispra) pour le thème iv). Les ateliers ont été animés par: M. Lars BACKER (Suède) pour l'atelier a) et M. Alistair CALDER (Royaume-Uni) pour l'atelier b).

8. Les thèmes ont été examinés sur la base des documents et exposés présentés par les pays et organisations ci-après: Canada, Estonie, Finlande, France, Allemagne, Italie, Pays-Bas, Norvège, Pologne, Espagne, Suède, Royaume-Uni, États-Unis, Yougoslavie, Eurostat, CEE, CCR Ispra, Imperial College of Science, Technology and Medecine du Royaume-Uni, Fraunhofer Institute AIS (Allemagne) et OpenGIS Consortium/Université Jaume I (Espagne).

9. Les pays et organisations ci-après avaient été sollicités pour établir des communications:

– Thème i): EUROGI et rapport commun de la Finlande, de la Suède et du Royaume-Uni;

– Thème ii): Finlande, Fraunhofer Institute AIS (Allemagne) et Imperial College of Science, Technology and Medecine du Royaume-Uni;

– Thème iii): Finlande et rapport commun d'Eurostat et du CCR Ispra;

– Thème iv): CCR Ispra et OpenGIS Consortium.

10. Étant donné l'importance croissante des projets régionaux et multinationaux et des problèmes y relatifs, les participants ont estimé qu'il était essentiel de réaliser des progrès plus visibles dans l'intégration des statistiques et de la géographie aux niveaux national et international. Une coopération doit donc s'instaurer de manière plus systématique entre les instituts de statistique nationaux et les organismes de cartographie pour ce qui est du développement de l'infrastructure en matière de données géographiques. Les participants ont prié la CEE et Eurostat d'étudier comment appuyer ce processus. Toute proposition de leur part sera soumise au Bureau de la Conférence pour examen.

TRAVAUX FUTURS

11. Les participants ont recommandé de tenir la prochaine réunion en 2002 ou 2003.

12. Les thèmes de fond ci-après ont été proposés pour examen à la réunion de 2002/2003:

i) Besoins d'infrastructure en matière de géostatistique: besoins des utilisateurs de statistiques, modèles de données, qualité des données, infrastructure des données spatiales, sensibilisation des statisticiens en tant que communauté d'utilisateurs, problèmes de confidentialité par région géographique.

ii) Coopération entre les instituts nationaux de statistique et les fournisseurs de données géographiques: exemples concrets de problèmes de tarification dans les différents pays et de droits de propriété intellectuelle, etc., questions relatives aux droits de propriété intellectuelle, problèmes d'actualisation des données, autres sources de données (télédétection).

iii) Solutions visant à répondre aux besoins des utilisateurs: analyse spatiale, cas d'application, exemples fournis par des instituts nationaux de statistique ou autres instituts.

iv) Géocodage et géoréférencement des fichiers utilisés en matière de statistique dans les différents pays: problèmes rencontrés et moyens d'améliorer les méthodologies, méthodologies axées sur les registres/les zones, problèmes rencontrés et améliorations possibles.

13. Les participants ont recommandé que soit organisé, immédiatement après la réunion de travail, un atelier d'une journée sur les problèmes des pays qui souhaitent adhérer à l'Union européenne. Eurostat fournira des précisions sur le programme de cet atelier dans le cadre des préparatifs de la réunion de travail.

QUESTIONS DIVERSES

14. Les participants ont rendu hommage à l'hospitalité offerte et à l'excellente organisation assurée par l'Office estonien de la statistique et ont chaleureusement remercié les organisateurs.

15. Le rapport a été adopté à la séance de clôture.

16. Un compte rendu plus détaillé des débats figure en annexe au présent rapport (en anglais seulement).

ANNEX

SUMMARY OF THE MAIN CONCLUSIONS REACHED AT THE WORK SESSION

I. New opportunities for GIS applications created through cooperation and partnership

1. The Work Session considered the usefulness and diversity of the possible ways of cooperation and partnership in GIS related projects. Many successful examples of cooperation were presented at both national and international levels. At the national level, the creation of multidisciplinary teams can be an efficient tool for the solution of methodological problems, addressing specific thematic questions, adopting common standards, etc. It is desirable to encourage the creation of consortia or work groups in fields such as: understanding the users' requirements, creation of applications, research, spatial analysis, and selection of standards. At the international level, partnership between the more advanced countries in the field of geographic information (GI) and the less advanced ones increases the level of GIS services on a global scale.

2. The discussion concentrated on ways of improving and strengthening cooperation at all levels in order to encourage and promote national associations and the creation of compatible geographical information infrastructures. This question is related to the various components of the geographical infrastructures: coordination mechanisms, reference data and metadata, data policy and the political dimension.

3. The objectives, ideas and results of the Tandem project carried out in cooperation between the statistical offices of Finland, Sweden and Untied Kingdom were presented. The aim of the project has been to define a "basic statistical area". The increasing amounts of information collected with point-based strategies have led to a growing need to agree on a common system of grids and to increase the comparability of point- and area-based statistics. The project aims to find a solution to fulfill the requirements of both types of uses: statistics according to administrative areas and systems of small area statistics for the analysis of spatial distribution pattern. The project is an important step forward in finding a common geographical base to compare statistics across Europe.

4. The elements of the common strategy of geographic information in Europe were presented based on the activities of the EUROGI – the umbrella organisation for more than 20 national and pan-European GI associations, representing over 3000 different organisations and 20 countries. The objectives of the GI strategy on European level are: encouraging greater use of GI in Europe, raising awareness of the possibilities of GI technology, promoting the development of strong national GI associations, and improving the European GI infrastructure. Many elements of the infrastructure are in place in different countries. What is lacking are effective mechanisms to promote greater harmonisation and interoperability between countries. Some general measures are required to encourage greater use of GI, i.e. disseminating information about applications and stimulating investment in research and development activities.

5. Information was given on the activities of the UN Geographic Information Working Group (UNGIWG). The aim of the group is to promote the use of GI in the UN system and in member states for better decision-making, identification and implementation of protocols for sharing,

maintaining and ensuring the quality of GI, and to develop a common geographic database. Seven Task Groups have been formed working on metadata and clearinghouses, framework data (administrative boundaries, etc.), remote sensing, satellite imagery, cartographic guidelines, field operations, and training. One of the tasks is to set up a publicly accessible Second Level Administrative Levels Boundaries (SALB) data set for the world. More information on the project can be obtained from the Website: http://www.un.org/Depts/Cartographic/ungis/ungis.htm.

6. The integration of statistics and geography is ongoing at two levels: within statistics and in the framework of government initiatives. Geographic information plays an important role in the Government Information Age programmes in many countries. It forms a part of the hard and soft infrastructures to enable the e-government, e-business and e-citizen. Geographic information provides some of the core datasets that enable transparent and effective government based on integrated data on e.g. land property, land use, topography, environment, infrastructure and transport. For this purpose, supra-governmental organisations might be needed to focus on other related fields in addition to statistics and geography. The cooperation between national agencies needs to be well coordinated to avoid random activities. Often it should be settled at a governmental level via contracts and laws to regulate the related pricing, copyright, etc. issues.

7. Setting up a GIS system requires cooperation between many different national agencies. Countries demonstrated several examples. Very often the need to work together derives from the lack of spatial data covering the whole country, especially with a uniform base geography on a sufficiently large scale. For example, in Spain, Poland, the Netherlands and France the statistical agency has cooperated in order to set up its GIS system with the national mapping agencies, national geographical institutes, municipalities, communes, and many other agencies that may supply digital cartographic data.

8. In many cases collaboration has taken place according to formal agreements specifying the conditions of the use of the digital spatial data and the dissemination of the product. The aim is to standardise these agreements as much as possible because the number of potential cooperation partners can be very large. In other cases, cooperation takes place in a less formal framework using the agencies' readiness to provide the statistical office with basic cartographic data.

9. Another project on the integration of statistical and administrative data with land cover information was demonstrated by Eurostat – a joint effort on creating agri-environmental indicators. The initiative for this project has been drawn by the EU commitment to integrate the environment and sustainable development. The indicators must present a sufficiently accurate picture of the underlying processes and relationships that link human activities with the environment.

10. The problem often is that the statistical office is not responsible for geographical data and it is very difficult for them to influence the national spatial data policy, the technical architecture and standards. On the other hand, statisticians are in a good position to demonstrate the benefits of systematic handling of spatial data policy and spatial infrastructure. The importance of national borders is decreasing and statisticians need to be able to provide information for phenomena that cross administrative borders, e.g. natural catastrophies, emergency situations. It would be a good

idea to develop a scenario on how to react to emergency situations beforehand in order to react quickly using geospatial data, which is expensive and time consuming to develop.

11. The business world and commercial users have significant influence on speeding up development in this area. There is an increasing demand for geocoded statistical data from businesses. They might be more efficient than the statistical system in pushing the creation of national data infrastructures, implementing common spatial data standards, etc.

12. The GIS projects are often quite complex because of the diversity of data sources and the high demand for resources. Therefore, in cooperating with different agencies at local and national levels, the administrative structure of financing and decision-making plays a significant role. Without the driving force of politicians and decision-makers, it is difficult to ensure the success of the projects. Often the key questions in such projects are the pricing and copyright issues. Frequently the funding and political support for the building register, for example, is found in connection with the population census. Using administrative procedures to update the data (e.g. building permissions to update the buildings register) sometimes solves the questions of copyright and pricing.

13. Statistical offices should take a more active role in formulating their demands towards the mapping agencies and not see themselves as merely one of the clients of the mapping agencies. It is particularly important to agree on common data models for the statistical institutes and mapping agencies. The importance of metadata and of the culture of providing metadata in this process is essential. The definition of a common data model for the spatial data infrastructure is a very important research topic for the future. The important role of research and development in this context was highlighted.

14. It would be desirable to first of all define the subject, specify the related data models and create the GIS infrastructure accordingly. Then methods of cooperation of relevant institutions should be specified. The need for a very clear division of tasks, formulating clear objectives, contracts and for good project management was specifically highlighted as a critical factor to ensure the success of the joint projects.

II. New technological solutions including those based on online access

15. The session looked at new technological solutions for data collection, analysis, and dissemination of statistics. It considered experiences in dissemination via Internet and mobile technology, as well as experiences to modernise database infrastructures for geographic information and some pricing problems. The issue was discussed from the viewpoint of how relevant the new technologies are towards statistical needs.

16. Location-based services and personal navigation as part of mobile multimedia services can have a significant influence in future. The application areas include: mobile work, shopping and delivery, hobbies and sports, tourism, culture, public transport, safety, and many others. Personal navigation services use as a key element the positioning of an individual, offering the selection and finding of a desired location, and guidance to the location on the basis of different modes of transport. For example, in Finland, the whole value chain, i.e. hardware and software

manufacturers, telecom operators, media companies, public authorities, universities and other research institutes as well as venture capital take part in the Personal Navigation Programme launched by the Ministry of Transport and Communications.

17. Location-based services open up new possibilities of producing statistics based on the location and movement of customers. For example, by combining the location of user to his/her register information, statistics could be produced about the movements of the purchasing power in general, or of a certain type of customer segment. Applications include planning public transport, seeking good market places, etc.

18. Regulation has an important role in guiding the development of location-based services. Personal data is handled through the privacy protection and data security acts. The monitoring and surveillance of a person is also subject to interpretation of the criminal law concerning domiciliary peace and electronic surveillance. Law on the protection of privacy in working life is valid in certain cases. Other legal questions concern direct marketing, ordering of services and consumer protection, data confidentiality, copyright of data used in the production of services, protection of databases, trademarks and patents.

19. The statistical community needs to find its place in the system of providing geo-information services. Competition in this area is rapidly increasing and the role of official statistics as provider of public goods might require reconsidering.

20. A project linking the capabilities of GIS with exploratory data analysis (data mining) was presented. Traditional GIS has limited capabilities to visualise attribute interaction on a map with many dimensions. The task of integrating GIS and data mining systems has become highly topical. Various public and private sector organisations possessing huge databases with thematic and geographically referenced data have begun to realise the huge information potential hidden there. A prototype has been developed under SPIN research project which combines data mining and GIS. The applications include e.g. urban planning, analysis of distribution of illnesses, census data dissemination, etc.

21. A project to match demand to data and information supply concerning spatial information was presented based on the case study of the use of Earth Observation (EO) data for policy support in the EU. The project analysed the obstacles of using spatial data for decision-making in Europe. The conclusions can be considered valid for the use of geo-spatial data in general.

22. The GIS technologies have an enormous potential to provide source data for research and policy-making. However, these data do not often achieve their full potential, partly because of the technical limitations and complexity of the data but more often because of organisational problems. These include the low level of expertise and awareness of potential users, and the poor understanding of user needs of data providers and the GIS service sector. Sometimes the specialists form an “elite” group and do not attempt to learn users’ needs or encourage their involvement in product development. Despite the growing power and availability of information technology, not all policy-makers have an information-based approach to their responsibilities. To resolve these problems, it is necessary to improve the exchange of experience and knowledge transfer, make the data more responsive to users´ needs, to develop more flexible, user-friendly

and integrated tools for processing and analysis, and to recognise the validity and value of these data in policy and legislation. The role of research and development in this area is indispensable.

23. Statistical offices should be proactive towards software developers explaining their requirements. There appears to be sufficient market for specific geo-statistical applications. It is important to specify for the technology providers what kind of quality is expected from the output of the product. The problem with technology driven applications is that they are often aimed at a mass market and do not respond (fully) to statistical needs. It was recommended to focus the dialogue on these software producers who specialise in statistical tailor-made software.

24. Some participants pointed out the need for a continuous forum for sharing experience gained using new GIS technologies and for an overview of available software. It was pointed out that there are many good applications as stand-alone packages. The attempts to include this functionality into the commercial GIS software packages (like ESRI) have not been fully successful. Therefore, it was recommended to organise these tools into a statisticians' library of tools that could be commonly used.

25. The Norwegian statistical office presented a user-friendly mapping tool PX-Map to produce statistical thematic maps. The software is available free of charge (information on http://www.ssb.no/px-map). The boundary files for several countries are included as ESRI shape files (e.g. Nordic countries on the municipality level, European countries on NUTS2 and countries level). PX-Map can be used as an integral part of the Swedish product PC-Axis or as a stand-alone tool.

26. A dynamic and interactive software CommonGIS for Web mapping was presented (developed by Fraunhofer Institut AIS, Germany). The software has been developed over 7 years and has been extensively tested. It has been provided free of charge for research institutions. The developers are currently looking for partners for commercialisation. Closer cooperation with the statistical community would be useful.

III. Spatial analysis

27. The opportunities and issues arising from the increased use of spatial analysis were discussed. Applications of spatial analysis in the area of residential differentiation studies, using land cover information to map population densities, delineation of urban and metropolitan areas and visualisation of disease surveillance data were demonstrated.

28. In connection with the presented residential differentiation studies by GIS in Finland, the issue of sensitivity of spatial analysis was raised. In addition to the confidentiality problem there is the question of policy implications of the data. Spatial analysis might pinpoint politically sensitive (social) problems. Disseminating these data raises problems related to policy issues. For example, disseminating the results of residential differentiation studies can stigmatise some regions and negatively influence their development. In providing results from spatial analysis, it is important to try to understand the phenomenon. The problems revealed by spatial analysis can then be addressed using other methods.

29. Spatial analysis needs to be based on very clearly defined case studies and a clear request from users to guarantee the relevance of results. The disseminated information should be accompanied by adequate, clear metadata to avoid misinterpretation and misuse of results. Often both the user and the analyst need to understand the theory behind spatial analysis in order to evaluate the usefulness of results. Knowledge in spatial techniques, statistics and subject-matter areas is needed and it is best to build a team in which all these skills are present.

30. A project of using land cover information to map population density was presented. Population data are available across EC at the level of the commune. This resolution may be insufficient in many cases for planning or modeling purposes. CORINE land cover data gives useful geo-referenced information that is spatially more detailed than the commune limits. An algorithm was developed to estimate reasonable weighting coefficients for each land cover class. The project showed that the land cover data can be used for mapping population density with a sufficient quality.

31. Applications were presented using spatial analysis methods to delineate statistically meaningful areas that do not coincide with administrative areas, such as urban, rural and metropolitan influence zones. Different ways of defining urban influence were analysed based on distance, adjacency, accessibility, commuter flows and place of work. The best results were obtained using place of work commuting data that provided an interpretable geography with clearly defined criteria. These zones are a valuable addition to the spatial infrastructure revealing the diversity of non-metropolitan areas.

32. Establishing a grid net for Finland was demonstrated. A grid net is a tool for comparing and analysing statistical grid data. The grids have the advantage of being stable over time. Examples of gridnet application include comparisons of inhabited and uninhabited cells in different time periods. In some countries there can be seen a re-emerging interest in grids which are a good basis for comparison between countries.

33. There is an issue in the use of spatial analysis when targeting policy. The final aim of the spatial analysis is often support for decision-making systems. Problems are related to the quality and official characteristics of the data. Political decisions can not be based on data which does not have an official value.

34. Spatial analysis is also needed for monitoring the effectiveness of policies. For policy monitoring, complex methods of spatial analysis can be applied. To reply to simple questions, simple and easily explainable methods should be used. Complex phenomena should be analysed using complex methods of spatial analysis and it is important to pay attention to political acceptance. On the other hand, the methods must be ready when a request comes from politics based on an educated guess of what spatial analysis methods can be used for. A good way is to produce examples of how results of spatial analysis could be used to educate users on the potentials of spatial analysis.

35. Spatial analysis helps to produce better data sets with large resolution. To carry out spatial analysis efficiently requires harmonisation of data across national borders. There is great variation from country to country regarding what kind of statistics it is possible to map to the

geographic data. The variation of geography itself is neither the only or the most important problem.

36. The homogeneity of statistical information systems has changed because of the rapid changes in information and communication technologies. In some areas, like social statistics, the partners in statistics production cross the borders of the traditional statistical system. The role of statistical methodology in this process is very important; it should be an integrated part of statistical information systems, taking into account all new developments in statistical practice.

IV. Standards and metadata

37. The Work Session considered the need for standards for collection, storage and dissemination of statistical and geospatial data both inside and outside statistical agencies. The specific topics focused on standardisation of data models, tools and methodologies in the collection, evaluation and dissemination of data. The lack of standards and consistent metadata is one of the main reasons why geo-spatial applications are not more widely spread.

38. The advantages of standardisation are obvious: interoperability, accessibility and sharing of data and resources, avoiding duplication and repetitive procedures for data harmonisation. However, we should also look at the problems in application of standards in order to understand why their development and adoption is not going as smoothly as could be expected. It is not enough to adopt technical standards, these should be accompanied by policy harmonisation (e.g. concerning access, copyright, pricing issues).

39. The content standardisation (of data and metadata) was considered at three levels of complexity. First, concerning standardisation of data models, reference systems and metadata (core elements). The second level of complexity concerns understanding semantic differences, human language, common data model and standard metadata for specific areas (communities´ profiles). It is important to model not only data but also processes. The most complex, however, is to achieve standardisation of organisational issues, like data quality requirements, updating and maintenance procedures, institutional dependencies (protocols, memorandums of understanding) and inter-sectoral collaboration. The first two levels deal with data policy. The third level deals with policy issues and can not be solved by statistical offices alone.

40. OpenGIS Consortium (OGC) presented the framework for geospatial and statistical information integration that aims to overcome these obstacles. The OGC is a global consortium of geoprocessing technology providers and users. OGC has made important progress toward interoperability between geoprocessing systems over the last seven years. It employs practical testbeds and a consensus specification development process to arrive at open specifications for standard interfaces and protocols that can be used for particular user communities. It is based on an open technology platform that encompasses certain universal software design approaches employed by OGC and other consortia, such as Object Management Group (OMG), W3C and ISO. Simultaneously, data coordination efforts worldwide have made progress towards semantic interoperability based on standard data dictionaries, metadata profiles and geospatial data modeling schemas. More information about the activities of OGC can be found at: http://www.openGIS.org.

41. The OGC technical Committee has followed the lead set by ISO Technical Committee (TC) 211 in the use of Unified Modeling Language (UML) as their primary method for providing descriptions of software object classes. The use of UML was recommended generally as a common language for describing statistical objects and processes. The Work Session was encouraged to cooperate more closely with OGC to define needs relevant to statistics.

42. The ISO TC211 recently issued a geographic information metadata standard ISO/CD 19115. It provides common schemas for describing the so-called framework layers: transportation, hydrography, cadastral and administrative boundaries, elevation, digital imagery and geodetic control which provide the base to collect, register, integrate and analyse statistical data.

43. The impact of geographic standards in the European Commission was considered. The Eurostat Joint Research Centre (Ispra) is actively involved in the creation of the European Spatial Data Infrastructure as well as in activities related to the conception, creation and harmonisation of Pan-European spatial databases in various thematic fields. Several geo-spatial standards (coordinate reference systems, projection systems, reference data definition, metadata) have already been adopted, or are expected to be adopted soon by the Commission. More information about the geographic standards for EU can be found at: http://www.ec-gis.org.

44. The field of statistics needs to be organized as a user community in order to specify their requirements and to transfer these to relevant parties (OpenGIS, software providers, etc.). The statistics community is ready to work toward consensus on analytical methods that employ geospatial information and to collaborate with other communities to reach agreement on data dictionaries and metadata schemas. Statisticians should not remain as just customers but should be active participants in setting up geo-spatial standards. Concerning the integration of statistics and geography, statistics should act visibly to influence the cooperation of national statistical and mapping agencies. This includes influencing the management of statistical offices to strengthen the cooperation between statistics and geography. Currently, these issues are not being treated systematically in the programme of many statistical offices.

45. It is important to liaise with standardisation bodies (like ISO, OGC, CEN) and with industry influencing development through a collaborative framework. Transparency is important in this respect, using standard metadata to document software procedures. It is also important to understand technology development, since the market leaders in technology have a significant influence on the development of standards.

46. Sometimes the role of the national statistical institute in defining geo-standards at state level is not clear; often statistical offices are not entitled to influence standards that should be adopted by the government. In some countries these institutions are united, but in many countries geographic issues are not the responsibility of the statistical office, and government initiatives are needed to develop geo-standards.

47. In the conditions of rapidly developing and ever-changing technology, it is important to focus not on specific standards for technology and data but on integrating the different standards and on interoperability. In future, it would be reasonable to focus on tandardization of services,

their usability and accessibility through catalogs, user interfaces, common models, functionalities and policies.

V. Workshop on point-based and area-based statistics

48. The Workshop focused on the problem of finding a common geographical base for geo-referenced statistics. Two main systems are used in countries: point-based statistics (aggregated to grids) and area-based statistics (aggregated on administrative areas). The challenge is to define a common base that would permit the transfer of data from one system to another and to create comparable small area statistics. The Tandem project is being carried out to this end, financed by the Commission through Eurostat/Gisco and ealized by a consortium consisting of experts from Statistics Sweden, Statistics Finland and the Office of National Statistics (UK). The aim of the project is to agree on common ways to describe patterns of distribution using both area- and point-based techniques, and methods to use point-based and area-based statistics in combination (aggregations and disaggregations from one to the other). The results of the Tandem project and the feasibility of defining a common geographic base for statistics across the European Union were considered.

VI. Workshop on spatial analysis

49. The workshop discussed spatial analysis in its widest sense: covering a wide range of tools from analysis based on simple spatial operations such as data overlay and buffering to sophisticated interpolation and modelling techniques. It provided an introduction to key techniques of spatial analysis, and an overview of information sources and available tools in standard GIS packages. Several examples of using spatial analysis in statistical offices were provided.

VII. Future work

50. The meeting recommended organising a 1-day Workshop focusing on the problems of the EU accession countries back-to-back with the Work Session. The content of the Workshop will be specified during the preparation of the Work Session.
