7 September 1972

MEMORANDUM FOR: Chairman, COMIREX

SUBJECT : Report on Travel to Ottawa and Montreal, Canada, 31 July to 18 August 1972

1. Purpose of Travel. From 31 July to 18 August 1972 I participated in the 22nd International Geographical Congress (IGC) and its associated activities in Canada. The purpose was to keep abreast of recent developments in the fields of geography and cartography, including the collection and processing of data by remote sensing techniques and the development of geographic information systems. My time was about equally divided between the UNESCO/International Geographical Union Second Symposium on Geographical Information Systems in Ottawa, and the official sessions of the IGC and the International Cartographic Association in Montreal. My stay in Ottawa also provided an opportunity for [redacted] 25X1C

2. Activities and Findings. The Ottawa part of the program was especially rewarding. It afforded an excellent overview of the current state of technology for geographic data gathering, storage, manipulation, and display, as well as some (albeit far too inadequate) discussion on the economics of the various approaches. These unclassified techniques generally parallel or follow behind those used on classified systems.

3. The first color photographs from NASA's ERTS-A satellite were quickly put on display for this international group of approximately 200 scientists from countries all around the world. During the course of the seminar the opportunities and problems in

using the ERTS materials were discussed. Individual reactions varied widely. At one extreme were the enthusiastic representatives of the small group of geographers who were working on U. S. Geological Survey contracts to test the feasibility of remote sensing techniques. The ERTS photography of the San Francisco area gave several of them an opportunity to describe their work in some detail. A great deal of enthusiasm about the resolution was also evident among the personnel of the Canada Centre for Remote Sensing who were processing the first ERTS photography obtained by the Prince Albert, Saskatchewan, ground station. A photographic supervisor indicated that they had been able to enlarge the imagery of one airfield sufficiently to discern an airplane. At the other extreme, there were numerous words of caution concerning the limited resolutions of the photography and the lack of clearly defined programs for its systematic exploitation. Professor D. Marble of Northwestern University, one of the U. S. geographers most directly involved in remote sensing, stressed the point that great masses of ERTS data will never be exploited. After citing his own experience of stopping NASA plans to send his university 50 magnetic tapes of ERTS data a week, he estimated that NASA will process only about 1-2 percent of the total take, and will make available only about 0. 1 percent.

4. Throughout the week it was clear that the collection and processing capabilities would be far outstripping the analytical capabilities to use the materials to good advantage. Time after time speakers emphasized that users had to be found and their specific requirements formulated carefully and then satisfied. This major weakness of current geographic information systems will probably prevail--given the resolutions of the current unclassified remote sensors.

5. Another major problem that was evident was the strong tendency for the U. S. specialists in the various fields of collection, hardware, software, analytical and data display techniques to go their individual ways. One principal objective of the symposium of getting them to talk to each other was far from fulfilled. Even

within a specific field, there appeared to be considerable duplication of research effort that could have been minimized by more effort to learn about the past experience and findings of others.

6. Aside from the Chairman of the symposium, Roger Tomlinson of Ottawa, two individuals stood out with respect to their overall grasp of the problems of developing geographic information systems in conjunction with remote sensing data. One was Dave Simonett, the Australian geographer who is now with Earth Satellite Corporation in Washington, D. C. The second was A. R. Boyle, an English engineer who has been working at the University of Saskatchewan for the past seven years. I subsequently learned the latter has been tapped to be a consultant for OBGI's advanced cartographic systems. His unusually strong grasp of automated hardware systems should make him a highly useful asset.

7. Most of the representatives from foreign countries seemed to be trying hard to develop an understanding of these modern techniques and their potential application to their domestic problems. Mr. T. W. Plumb, a member of the Australian National Committee on applications of earth satellite imagery, admitted privately that other than providing ground truth on some sugar growing areas, he was still uncertain about what other uses they could make. Only two countries, Canada and Brazil, had any well defined programs for utilizing data from remote sensing. Canada has embarked upon an especially energetic program, which appears to put it ahead of most other countries. Not only has it invested $7,000,000 in the remote sensing program, but it is systematically tying together census data with urban plans and aerial photography and is using automated techniques for hydrographic surveying and for topographic mapping. The Brazilian delegates to the International Society of Photogrammetrists, which ran its conference concurrently in Ottawa, sent over an impressive new film on "Project Radam," that showed how Brazil had utilized radar imagery to map vast areas of the Amazon Basin as an initial step toward its economic development.

They have completed 87 maps at 1:250,000 and the program has now been expanded to 210 map sheets. The amount of money invested in the program was confidential, but the film made it clear that it was a multi-million dollar effort. Apparently, the Brazilian Government hired the Goodyear aircraft with the advanced radar equipment. According to Simonett, who has a consultant to the project, the radar mapping project has already discovered a sizable mineral deposit, which he was not at liberty to disclose at the time--it may have been the large uranium deposit that was subsequently reported by the Brazilian Government in mid-August.

8. Professor Kardono Darmojuwono, an important Indonesian topographer, was very much interested in using the radar technique for mapping his country, which is situated in the equatorial cloud belt. He was actively talking over the prospect with Dave Simonett, who invited him to call upon the Earth Satellite Corporation for technical advice.

9. Other miscellaneous observations from Ottawa. The identification and precise positioning of the Canadian-acquired ERTS photography was glossed over in the formal briefing at the Centre for Remote Sensing as a simple task--however, direct inquiries of the individuals who were actually doing the task indicated that it was a frustrating and difficult task--until a library of control points is laboriously developed on a complete set of ERTS photography. In addition to Canada, Sweden and several U. S. states have recently developed land information systems that are integrated to various degrees with census data, the tax systems, planning, or new construction, but not with remote sensing. One problem that has arisen in some of these systems is maintaining the confidentiality of data on individuals and commercial enterprises. According to the photographic supervisor at the Centre for Remote Sensing, the group of Russian photogrammetrists who visited the facility the day before were greatly interested in the degree to which the Canadian ERTS materials were to be available to any Canadian or even any

foreigner. The one Russian representative to the symposium, Vladimir Annenkov of the Institute of Geography of the Academy of Sciences of the USSR, kept pretty much to himself. He appears to be only in his 30's but he was nominated as a replacement for the well known Professor B. V. Vinogradov of Leningrad University. His geographical-cartographical knowledge seemed deficient on such a basic point as how a photograph can be converted into a map at another scale. Nevertheless, he did attend the sessions regularly and listened attentively.

10. The program in Montreal was especially heavy generally with a number of sessions running concurrently. As usual, the quality of the papers was uneven, and the Soviet participants continued their practice of cancelling scheduled papers at the last minute and presenting several unannounced papers. Both the USSR and the European satellites continued to play prominent roles in any activities that pertained to collecting or standardizing geographic or cartographic data on non-Communist parts of the world.

11. On 11 August I had a 15 minute conversation with Ted Shabad, who flew in from his Moscow post for the New York Times specifically for the Congress. He thanked me for the assistance we had previously given him on political-administrative boundaries for his recent book on the geography of Communist China. He passed on some information concerning the availability of a just-issued political-administrative map which is available at the Chinese Government headquarters in New York City. He also indicated that his first information concerning the CIA Atlas of Communist China was from a U. S. publisher who requested Shabad to evaluate a minor political-administrative boundary change shown in the Atlas.

12. I asked Ted what reactions to the Soviet scene he had developed since he began his second tour in September 1971. Aside from the obvious points on more extensive housing construction and

better clothing, he found it difficult to make comparisons--despite the passage of a decade since his first Moscow assignment, he felt he had never been away long enough to become really detached. One definite reaction was that the consumer queues had not diminished even after all this time. In answer to my question about the climate of his professional contacts with Soviet geographers, he indicated that despite all his efforts to translate and publish Soviet geographical articles, Professor I. P. Gerasimov, the head geographer at the Academy of Sciences, was still as cool as ever. In contrast, there was the consistently warm attitude of the leading climatologist, F. Davitaya. He mentioned Gerasimov's new assistant, Vladimir Annenkov (mentioned above in paragraph 9), as also being on the cool and formal side. I passed on the observations we had made at Ottawa about Annenkov's gaps in understanding the transformation of map and photo scales, and we agreed that he was bright but definitely the political type.

13. With reference to the Soviet map distortion policy, he provided the following comment. A geographical lecture that he attended one evening in Moscow was devoted to the topic of overcoming the inadequacies of Soviet tourist maps. Members of the audience made a number of references to the security constraints, which apparently even included the representation of specific contour lines. Obviously, with such a severely restrictive policy, the tourist maps will not be improved very much and the maps that are issued for the orienteering sports groups, which require cross-country traverses using detailed contour lines, will continue to be grossly inadequate. It was quite ironical to hear a radio newcast two days later reporting a statement by the Canadian Arctic specialist, Trevor Lloyd, citing the imminent Hungarian issue of the Soviet-initiated 1:2,500,000 map sheets covering Canada as being better than anything currently available.

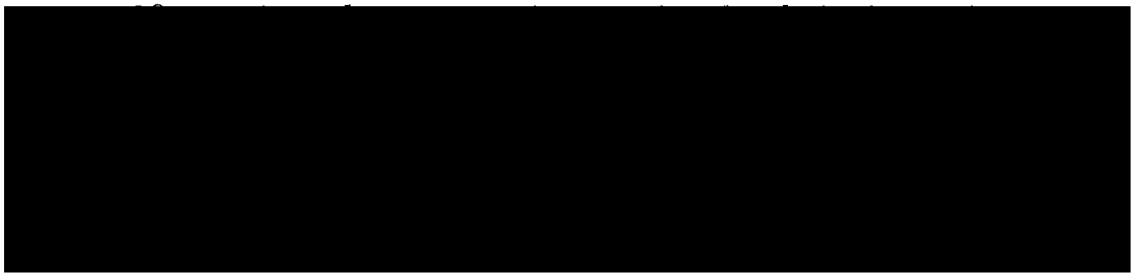
14. One other notable feature of the Montreal Congress was the presentation of the British Aircraft Corporation film on their Earth Resources Rocket, which had its first test in Australia

in March 1972. After pointing out the difficulties that earth satellites have in obtaining coverage of persistently cloudy areas and raising questions about the geopolitical aspects of one state taking photographs over territory of other states, the film showed the first test flight of the rocket. Once set up, the rocket can be launched to take advantage of even infrequent breaks in the weather. Its current sensors are rated at about 100 meters resolution. The rocket assembly costs only $125,000 if retrieved without damage. The UK group is currently planning a joint survey with Argentina to promote agricultural development.

15. Commitments. I promised to send Ted Shabad detailed information concerning the identification of the Agency Atlas on Communist China so that he can order it from the GPO.

16. Problems. None

17. Conclusions and Recommendations. The Ottawa and Montreal sessions were extremely worthwhile from the viewpoint of professional development. They provided me with a better understanding of ERTS potential and the technological problems in developing geographical information systems. They also provided me with additional insights into the potential sovereignty problems involved in releasing high resolution satellite photography.



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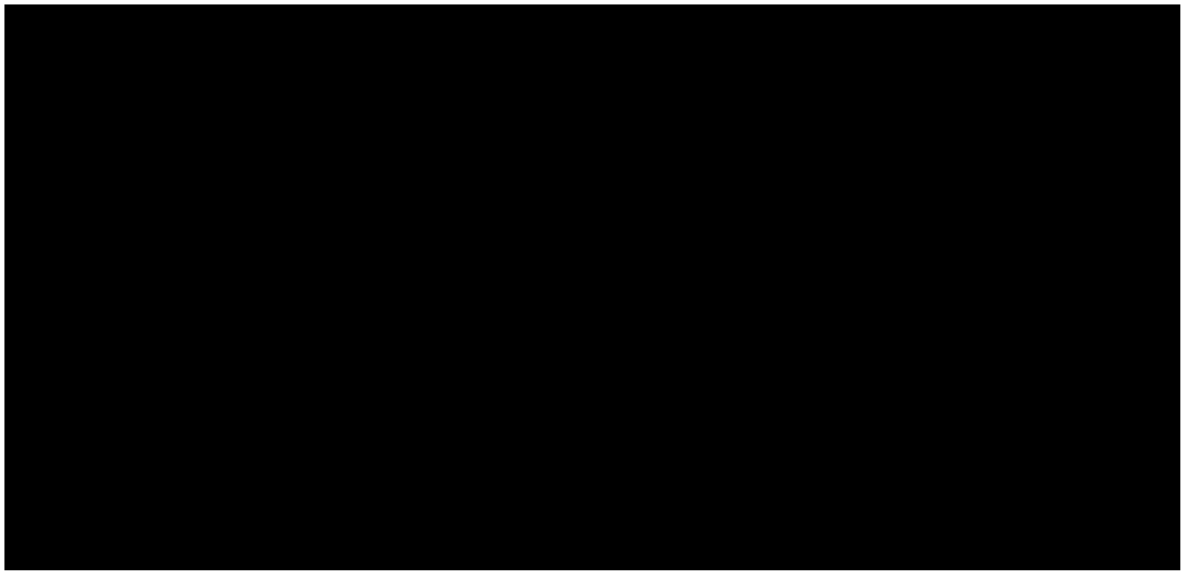

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