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Aerospace Review
ISR Technologies Submission
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Brief Company Background

ISR Technologies is a Montreal-based high-technology communications company specializing in innovative software defined radios (SDR). The company was founded jointly between the university “École de technologie supérieure” (ETS) and a team of six of its professors in 2002. Over the past 10 years ISR has executed a number of successful military SDR and satellite programs in collaborations with Canadian companies for both domestic and export customers. Our focus over the past three years has been on satellite communications for environmental monitoring.

As a small Canadian company, we would also like to use this opportunity to comment and present our perceptions on the Aerospace Review research and analysis questions, with a focus on satellite communications and related technologies.

Canada’s Aerospace sector is endowed with a highly talented workforce and solid expertise and experience, making Canada a world leader with much to be proud of. Our current position of prominence was enabled by significant past government investments in the aerospace sector. While government support will still be required to maintain our position going forward, such support must now be accomplished in a much more targeted and strategic manner in recognition of the current fiscal challenges. Government support for space should be strategically focused on projects that provide practical and tangible near-term benefits to Canada, including the creation and maintenance of high quality jobs that provide high economic returns to Canada in terms of both domestic taxation and international export. In the past, massive government expenditures were required for large and expensive projects like the Canadarm that were considered important in its time. Today’s fiscal realities demand a new approach to government support for space, one that focuses its resources on smaller and more cost-effective projects that provide proportionally greater practical benefits to Canadians. An exciting technology that promises to provide responsive and cost-effective space solutions for Canadian industry, government and academia are microsattellites. Our specific interest lies in the use of these cost-effective microsattellites for environmental monitoring. Environmental monitoring is a crucial tool to efficiently manage natural resources in the context of sustainable economic development and the protection of strategic natural infrastructures. The task of monitoring environmental changes is, however, particularly challenging in vast and distant regions such as the Canadian North since they are not generally well covered by conventional terrestrial communication systems.

Our proposed system would consist of a mesh network of ground terminals that collect and communicate environmental data to one or more microsattellites in Earth orbit. Each Sensor Node within the mesh network could be equipped with one or more environmental sensors that would read the sensor data at prescribed times. The Sensor Nodes would relay the collected data via a Coordinator Node to the orbiting microsattellite.

The application potential of the described microsattellite-based environmental monitoring system is significant as it allows data collection from any region of Canada or the world and the monitoring of a wide variety of environmental parameters of economic and social importance. It could, for example, be used to measure water quality and levels, river and stream flows, air quality, ice cover, and carbon dioxide levels. Combined with advanced statistical analyses, the system could also be used to forecast floods, predict the formation of blue-green algae, and monitor pollution spread and other events and their environmental impacts. Other applications of this system could include remote



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intrusion detection and migration tracking using ground based electronic tag detectors that relay the data to the microsatellite.

Such a system, which could be economically developed and tailored for use in Canada, would serve to monitor Canada's remote regions (including the Arctic), and would provide valuable information about Canada's North. It could provide an early warning system for changes in water level or quality that could result in the fouling of drinking water for our Northern communities. It could also be used to monitor the impact of human activities such as mining and forestry on Canada's remote lakes and rivers. The early deployment of such a system would allow the establishment of baseline measurements and the monitoring of the effects over time relative to the baseline. Also, through its presence in the remote regions Canada can also assert its sovereignty, particularly in the North. We consider that government investments in this area can return numerous valuable benefits to Canada.

With regards to the comparative advantages of Canada's Aerospace Sector, we view it a mature and technically astute, but perhaps in need of a more strategic and focused role for government. A model that combines private funding with indirect public funding for space projects with practical utility may provide the best long term solution while keeping government costs down and high technologies in-country. While this model exists in Canada at a smaller level, our observation is that many of the current programs that are government funded are directed to the larger Canadian aerospace businesses for expensive technological projects like the Canadarm. However, we are of the opinion that in light of the current fiscal challenges government funding should be directed to smaller programs with immediate practical benefits to Canadians that can be undertaken by smaller companies such as ours, either autonomously or in concert with partners. We would like to see an aerospace technology and development roadmap produced by the Canadian government with inputs from various agencies and private aerospace companies, both small and large, and which would be backed by consistent and strategically targeted government funding.

We also would like to express our support for the Canadian Space Agency which we believe should be viewed as a profit center for Canada in that the funding it receives from government results in large numbers of high technology jobs in this vital sector. While understandable in light of the current fiscal challenges, we were nevertheless disappointed by the recent budget which announced cuts to CSA funding. We believe that the CSA's budget should be gradually bolstered in a fiscally responsible manner during these challenging financial times, and that funding should be strategically targeted at projects that provide near-term practical benefits to Canadians. Maintaining and enhancing strategic investments in the CSA and other aerospace initiatives will allow Canada to be ready with innovative new technologies when the global economy recovers.

We hope that our comments and suggestions will provide useful inputs to the Aerospace Review. We also extend an offer to participate in open discussions on this subject of national importance.

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