would be involved. The Canadian Centre for Arms Control and Disarmament summarized these arguments in a report released on August 19, a few days before the Joint Committee's interim report. The Centre calculated that only 2,034 jobs would be directly created and another 6,366 indirectly, assuming that one per cent of the SDI budget was spent in Canada during the five-year research program: such figures were "marginal to Canada's high technology sector and negligible to the economy as a whole."[15]

The question of other economic benefits from the high technology emphasis of SDI research was more closely argued. Industry groups made the case that Canada could not afford to ignore these benefits. The Aerospace Industries Association of Canada (AIAC), representing 156 companies with 45,000 employees, contended that the research would create "a tremendous technological surge" which would have significant spin-offs in the civilian sector, it being generally accepted within the international aerospace community that 90% of research and technology were common to civil and military aeronautics. In conclusion, the AIAC warned that failure to participate could precipitate a "brain drain" effect since Canadian companies would not likely be permitted to share in SDI work unless some technology was unobtainable either in the U.S. or in another participating country. It also warned that "such a rebuff . . . could add difficulty to Canada in retaining, let alone gaining more, access to the U.S. market so vital to our economy."

Some doubt was cast on the uniformity of industry opinion by an August 10 Ottawa *Citizen* report of a confidential study prepared for the federal cabinet by Spar Aerospace. It suggested that industry privately expected few windfalls from SDI and that the only way Canada could reap major benefits would be to launch its own Canadian Defence Initiative to complement the American program. Although Spar had not appeared before the Committee, its report received wide attention.

2) *Technical Reliability*

Many of those opposed to participation cited evidence from the Union of Concerned Scientists and other American organizations or research which threw grave doubts on the technical reliability of Ballistic Missile Defence. Within five weeks of the U.S. invitation, 780 Canadian scientists and engineers signed a declaration opposing participation and refusing to cooperate if the government decided to accept. Computer scientists were among the most outspoken; forty members of the University of Toronto's computer science department, for example, sent a letter to the government stating that the computer capabilities required by SDI were "beyond any current or reasonably foreseeable computer science techniques."[16]

While proponents of SDI involvement held that such views were prejudging what was, after all, a research program, computer science David Parnas of the University of Victoria argued forcefully that the breakthrough required would be "a revolution in mathematics" and that no such miracle could be expected. Parnas, who had resigned from a SDI Organization panel on computing research in support of battle management, provided the committee with a devasting critique of the software engineering aspects of SDI and of the SDI Organization itself.[17]

3) *Arms Control Issues*

The central issue as defined by most submissions to the Joint Committee was the effect of SDI on the arms control process and East-West relations. It was over this issue, too, that the debate became most doctrinal in its orientation. While peace groups asserted that the research program was simply another step in the alarming proliferation of weapons of all kinds and a major stumbling block in any arms talks between the superpowers, organizations such as the Canadian Institute for Strategic Studies maintained that U.S. efforts were nothing more than an essential antidote to advances in Soviet research.

Chemistry professor John Polanyi of the University of Toronto disputed the latter view, however, pointing out that neither the Pentagon nor the Scowcroft Commission set up by President Reagan with full access to intelligence reports saw any need for accelerated research into ABM systems. He also cited a U.S. Defense Department study which compared U.S. and Soviet achievements in 13 technologies required for advanced ABM deployment: it concluded that the U.S. was ahead in twelve and that the two sides had equivalent capabilities in the thirteenth, namely directed energy devices.[18]

On the other hand, former Deputy Minister of National Defence C.R. Nixon argued that the principal purpose of SDI research was to resolve whether BMD would work and that effective BMD systems would complement existing deterrence by denial. If uncertainty remained after extensive research, that uncertainty would in itself act to deter and assure both sides: a potential aggressor could neither be certain of its ability to succeed in a preemptive strike nor could it rely on its own defensive systems to shield it from retaliation.[19]

The Canadian Centre for Arms Control and Disarmament urged Canada to seize the "high ground of arms control" by working actively to ensure that reasonable boundaries were maintained around SDI research. This would mean monitoring possible