

News of the arts

Computer calculation for satellite crash sites

If the orbit of the Soviet satellite *Cosmos 954*, which crashed in the Northwest Territories in January 1978, had lasted a few minutes longer, scientists say the radioactive debris could have landed in a densely populated area like Toronto. *Skylab*, the 77.5-tonne United States space station launched in 1971, is expected to fall somewhere on earth this summer. Uncertainty about space-craft landing sites has resulted in a demand for improved satellite tracking networks and closer international co-operation in handling such emergencies, writes Phil Kinsman in the Ottawa *Citizen* (April 12, 1979).

Dr. S.C. Garg and a team of University of Toronto scientists working on contract with the Department of Communications, have completed an exhaustive review of the literature on satellite orbit lifetimes and patterns of re-entry in the atmosphere as a first step in the development of a computer model that would predict impact to within 16 kilometres and a few minutes' notice. Existing technology allows for only about an hour's warning and a possible deviation of hundreds of kilometres in the landing spot.

Atmosphere drag

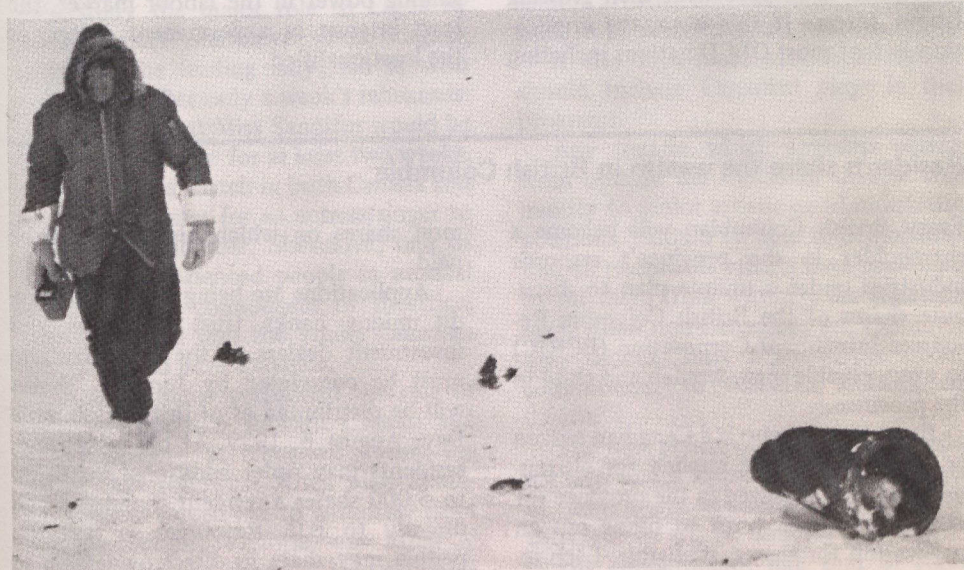
The main reason a satellite decelerates and eventually plummets is that it enters the atmosphere at some point and becomes caught in what scientists call atmosphere drag. The difficulty in predicting a craft's trajectory and location of impact lies in the number of variables in-

involved. Incomplete information on air density at high altitudes, the existence of air pockets which vary in behaviour according to chemical composition, sunspot activity and shifts in the atmosphere related to the earth's rotation, complicate the task of tracking a falling satellite. Moreover, the shape and size of the craft influence the pull exerted by the atmosphere.

Advance information necessary

Researchers are trying to design a computer model of a satellite's motions using known mathematical formulae for predicting orbits and a probability factor for the behaviour of the atmosphere at a given altitude. Data on the size, shape and speed of the craft must be available. As well, scientists will need sufficient time to program the computer before a satellite's orbit begins to decay. Garg adds that the most critical calculation scientists must make is "predicting precisely which orbit is the last one. If you can predict the last orbit, you can...specify within a radius of 30 miles; you can also predict time within a few minutes".

Although an estimated 6,000 pieces of space debris have fallen to earth and there are yet over 4,000 man-made objects travelling above the skies, it is a truism in the aerospace industry that an individual's chances of being struck by a piece of satellite are only slightly greater than the probability of being knocked down by a pig with wings. Relax, Chicken Little.



Scientist approaches debris from *Cosmos 954* on Great Slave Lake, N.W.T.

French-speaking mayors pledge close co-operation

The founding congress of the International Association of French-speaking Mayors ended a two-day meeting in Quebec City May 2 with a pledge by the 20 participants to exchange experts and information on such topics as urban planning, housing, public transit, traffic and industrial pollution.

"Such initiatives will help maintain and strengthen the French-speaking world," declared Jacques Chirac, the mayor of Paris, who was elected president of the association.

Quebec City mayor Jean Pelletier was elected vice-president.

The meeting drew representatives of 13 cities in Africa and four in Europe, as well as Beirut, Lebanon, Montreal and Quebec City.

At a news conference following the meeting, the mayors said they would consider holding international conferences to study common problems and allow municipal officials to make extended working visits to other French-speaking cities.

They also promised to study cultural questions and those related to youth, such as teaching, delinquency, unemployment, amateur sport and drugs. They excluded youth exchanges and tours by performing groups because of high costs.

College enrolment increases

Figures from Statistics Canada show that community college enrolment last autumn was up 3.7 per cent and university enrolment was down 1.8 per cent over the previous year's figures.

The preliminary figures released on April 23 show 244,423 students enrolled last autumn in community colleges, while there were 324,447 undergraduates enrolled full-time in university programs.

The only province reporting increased university enrolment this year was Quebec, where a 3.3 percent rise in undergraduates was reported. The province also reported a 1.9 percent increase in community college enrolment.

Several provinces reported large increases in community college enrolment this autumn, especially Alberta with an 11.2 percent increase over last year's enrolment and New Brunswick with a 10.4 percent increase.