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The Right Hon. Stephen Harper
Prime Minister of Canada
House of Commons
Ottawa, Ontario
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Canada

Cessation of operations of the Very Long Baseline Interferometry System

Dear Mr. Prime Minister,

The International DORIS Service (IDS) has recently learned of the planned closure by the Canadian Government of the Very Long Baseline Interferometry (VLBI) program, managed by the Natural Resources Canada (NRCan). We wish to communicate our concern regarding this decision both for the future accuracy of the International Terrestrial Reference Frame and for the DORIS stations collocated at the VLBI stations of Yellowknife and St. Johns.

The worldwide network of 58 DORIS (Doppler Orbitography and Radio Positioning Integrated by Satellite) stations is used to support precision orbit determination for low Earth orbiting remote sensing satellites, such as the SPOT series of satellites (managed by the French space agency, the Centre Nationale d'Etudes Spatiales or CNES), and ocean radar altimetry satellites such as TOPEX/Poseidon and Jason-1 (managed by NASA and the CNES), ENVISAT (managed by the European Space Agency), and future missions such as Jason-2 (managed by NOAA/EUMETSAT/CNES/NASA), Altika (joint with CNES and the Indian Space Research Organization), and Cryosat-2 (a European Space Agency ice-mapping mission). The synoptic mapping of the world's oceans from altimeter satellites, and the use of these data to determine the global change in mean sea level, place stringent demands on all aspects of the altimeter measurement system, including the global reference frame within which these global mean sea level rates are determined. Using the precision measurements from satellite laser ranging (SLR) and DORIS, as well as the reference frame realized from the joint analysis of SLR, Global Positioning System (GPS), DORIS and VLBI data, we have determined the TOPEX/Poseidon orbits to an accuracy of 2 – 2.5 cm, and the orbits of Jason-1 to an accuracy of 1 cm. These precise orbits and the reference frame in which they are produced allow us to determine global rate of change of mean sea level to 3.2 mm/year, using altimetry data from both TOPEX and Jason-1. The largest source of error in these sea level rates (~0.4 mm/yr) is the lack of knowledge of the absolute vertical rates at the tide gauge sites used to calibrate the global altimeter measurements. An equal contribution must come from the present inaccuracy of the current reference frame realizations. Thus, we are gravely concerned about what the closure and loss of the data from the Canadian VLBI stations might portend for the accuracy of the terrestrial frame. What ultimately is at stake is the following:

- (1) the ability to determine (sooner rather than later) if there is an acceleration in the global rise in mean sea level;
- (2) the ability to adequately intercalibrate altimeter data from different satellite missions (e.g., TOPEX/Poseidon, Side A vs. TOPEX/Poseidon, Side B, vs. Jason-1, vs. the future Jason-2),
- (3) the ability to close the mass budget and sort out on a regional basis in the oceans how much of sea level rise is steric (driven by thermal expansion or heating of the oceans), and how much is driven by added mass (cf. Ice or glacier melt).

We note that the global determination of mean sea level is one example of the many applications that require a precise terrestrial reference frame. The Institut Géographique National (IGN) and the CNES have worked hard over the last decade to renovate the DORIS network to improve the stability of its stations. These efforts at network renovation and improvement are underway for all the space geodetic techniques (SLR, VLBI and GPS), with the motivation to support precise geodesy on a global basis at the mm level in order to address important scientific questions. To support this goal, we require that all the geodetic networks have a balanced geographic station distribution. In this context, the closure of the Canadian VLBI program would make the achievement of this goal, much more difficult.

We have been extremely grateful to the host agency, NRCan, for supporting the placement of the DORIS stations in Canada at Yellowknife and St John's (and formerly at Ottawa before the decommissioning of that DORIS station). The DORIS station at Yellowknife has one of the longest occupations in the DORIS system, with the first beacon being installed on June 6, 1989. The DORIS stations were placed at these locations to provide adequate orbit coverage for the user satellites, and to provide a satisfactory connection with other geodetic techniques such as VLBI and GPS. We intend to connect the beacon at Yellowknife to the atomic clock supported by VLBI, so that it would become a time beacon contributing to the reference time of the DORIS system. If these occupations are imperiled, we will lose the benefit of a long and stable geodetic time series.

We respect the decision of the government of Canada with respect to its national priorities and budgetary exigencies. While we are disappointed and concerned at the closure of the Canadian VLBI network, we hope that a future time, it will be possible to reestablish the Canadian VLBI program.

Yours sincerely,



Gilles Tavernier
Chairman



Frank Lemoine
Analysis Coordinator



Hervé Fagard
Network Representative

Copies to:

Gary Lunn, Minister of Natural Resources Canada (NRCan)
John Baird, President of Treasury Board
Jim Flaherty, Minister of Finance
Josef Verner, Minister of International Cooperation
Cassie Doyle, Deputy Minister of Natural Resources of Canada
Bill Graham, Acting Leader of the Liberal Party
Jack Layton, Leader of the New Democratic Party
Gilles Duceppe, Leader of the Bloc Québécois
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