Progress Report for PolarDARN radars – Oct. 25/2010

During the 2008/2010 period, the two PolarDARN radars at Inuvik and Rankin Inlet proved to be two of the best radars in the entire SuperDARN network because the sunspot cycle was in a 3-year minimum in the 2007, 2008, and 2009. As a result, the majority of radar echoes were at the high latitudes seen by the Inuvik and Rankin Inlet radars. There have been some signs of the startup of the new sunspot cycle 24 in 2010 and increased echo activity has been seen by the auroral zone radars at King Salmon and Kodiak, Alaska, and Prince George and Saskatoon, but the PolarDARN radars have continued to be very good radars for echo occurrence. The quiet sunspot period provided an ideal situation for our group to formulate a new "reconnection" model that predicted the patterns of motion that the PolarDARN radars would see during periods when the Interplanetary Magnetic Field (IMF) carried by the solar wind from the Sun to the Earth has a northward polarity. A new cycle called the "interchange cycle" was proposed and the PolarDARN and SuperDARN radars were used to check whether the predicted patterns were observed. The project was very successful and we attach to this report the PDF versions of five major papers that have been published in the 2008-2010 period. A recent trip to Baffin Island by SuperDARN Engineer to Jan Wiid has identified a site at Clyde River where the third PolarDARN radar is planned for 2012. This radar will not only support the Inuvik and Rankin PolarDARN radars but also a new Incoherent Scatter Radar RISR-C being built at Resolute Bay. As can be seen, the PolarDARN initiative continues to thrive and grow.