Date: March 25, 1997
To : EISCAT data representatives
From : Peter Collis
Subject : Common Program Result Tapes

Results from the experiments listed below will shortly be sent to you. These will be exact copies on DAT of the original 6250 bpi tapes, produced using the UNIX utility dd. A similar copy of the results sent out previously (covering May to October 1996) will also be included for completeness. (The earlier DAT copies were produced using ddncar.) Enclosed are plots of transmitter power and system temperature from these later runs, together with some notes on the operations. The periods marked 'pool' represent part of the CLUSTER pooled time allocation.

	1996		
CP-4-B	6 November (1612 UT)	to	7 November (0759 UT)
CP-1-K	14 November (1640 UT)	to	15 November (1556 UT)
CP-7-F	14 November (1726 UT)	to	15 November (1554 UT)
CP-1-K pool	16 November (0616 UT)	to	16 November (0900 UT)
CP-7-F pool	16 November (0538 UT)	to	16 November (0900 UT)
CP-1-K pool	17 November (1800 UT)	to	17 November (2200 UT)
CP-7-F pool	17 November (1800 UT)	to	17 November (2200 UT)
CP-1-K pool	18 November (2120 UT)	to	19 November (0100 UT)
CP-7-F pool	18 November (2111 UT)	to	19 November (0100 UT)
CP-1-K pool	21 November (1954 UT)	to	21 November (2400 UT)
CP-7-F pool	21 November (1541 UT)	to	21 November (2400 UT)
CP-1-K pool	22 November (2000 UT)	to	22 November (2356 UT)
CP-1-K pool	9 December (0401 UT)	to	9 December (0836 UT)
CP-1-K	10 December (1000 UT)	to	11 December (1400 UT)
CP-6-B	17 December (1118 UT)	to	18 December (1004 UT)
	1997		
CP-1-K pool	1 January (1735 UT)	to	2 January (0814 UT)
CP-2-E	6 January (1106 UT)	to	10 January (1600 UT)
CP-1-K	10 February (1300 UT)	to	12 February (1600 UT)
CP-2-E	11 March (1041 UT)	to	12 March (1600 UT)
CP-4-B	11 March (0908 UT)	to	12 March (1600 UT)

NOTES

1. CP-4-B, 6-7 November, 1996.

No reported problems with the experiment, but there is a gap in the results from 0338 UT to 0448 UT due to an error in reading the raw data from tape.

2. CP-1-K, 14-15 November, 1996.

This is a good, complete data set, with no reported problems The Sodankyla results are rather noisy between about 0400 and 0630 UT due to low F-region electron densities.

3. CP-7-F, 14-15 November, 1996

There was a short break after 0350 UT when the transmitter tripped to power-off. Otherwise, no reported problems.

4. CP-l-K pool, 16 November, 1996

No reported problems.

5. CP-7-F pool, 16 November, 1996.

This was a single-klystron operation with an unparalleled capacitor bank. No reported problems.

6. CP-1-K pool, 17 November, 1996.

No reported problems.

7. CP-7-F pool, 17 November, 1996.

No reported problems.

8. CP-1-K pool, 18 November, 1996.

There was a break of several minutes after 2145 UT due to the need to reboot the ND process computer in Tromso, otherwise no reported problems.

9. CP-7-F pool, 18 November, 1996

As (8) above.

10. CP-1-K pool, 21 November, 1996.

No reported problems.

11. CP-7-F pool, 21 November, 1996.

This experiment started at 1540 UT but there were some receiver problems at the start. At 1600 UT the correct filter was put in channel 4 and the LO2 value in channel 6 corrected. At 1624 UT the filter in channel 6 was changed from Butterworth 50 kHz to 20 kHz. Antenna panels 1 and 2 were disconnected at 1730 UT as a result of investigating an apparent recovery effect in the data. A two-klystron operation.

12. CP-1-K pool, 22 November, 1996.

Weak signals at all sites due to very low electron densities. The data from Sodankyla are of little use because of the low snr.

13. CP-1-K pool, 9 December, 1996.

Very weak signals for the first couple of hours due to low ionospheric electron densities. There are short breaks after 0454 UT, 0704 UT and 0724 UT due to crowbars. A further crowbar at 0830 UT terminated the experiment when a water leak was discovered in the klystron.

14. CP-1-K, 10-11 December, 1996.

The recorded transmitted power levels are unreliable for the first 15 minutes of this operation. There is a gap of about 40 minutes in the Kiruna data just after 08 UT on 11 December due to a data recording error (the disk set did not change automatically). The remote site results are rather noisy between 13-17 UT (Dec 10) and 05-08 UT (Dec 11) due to low snr, as well as at other times in the night at Sodankyla.

15. CP-6-B, 17-18 December, 1996.

This was a single-klystron, half-antenna operation. The experiment was stopped prematurely due to technical problems indicated by high system temperature (>3000 K).

16. CP-1-K pool, 1-2 January, 1997.

This was an interesting way to start the new year. The real-time clocks in Kiruna and Tromso thought it was already January 2nd and needed to be set to the 1st (Sodankyla had made the change earlier). On starting the experiment there was no sign of any signal at the remote sites and almost nothing in Tromso. No faults could be found so the low snr was put down to lack of ionosphere. However, when the F-region did pick up later in the night, the remote sites still saw nothing. The reason turned out to be that the right-most thumb-wheel on the RT clock in Tromso had been left on "1" rather than "0" when it was reset, resulting in a delay of 64 ms and no signal at the remotes.

17. CP-2-E, 6-10 January, 1997.

The common volume height was reduced to 220 km at 1336 UT on 6 January and kept there to the end of the experiment.

The following significant breaks occurred:
6 January :
1756 UT new countdown after UPC hanging.
1836 UT new countdown after UPC hanging.
2308 UT new countdown after UPC hanging.
January 7 :
0150 UT crowbar.
January 8 :
A few brief breaks due to crowbars and HRPs.
January 9 :
1207-1406 UT: The antenna was lowered to empty it of snow. At the same time, it was noticed that the antenna rails were seriouly compacted with snow, resulting in a longer break to clean them. (Heavy snow and strong winds all week.)

On January 10, the real-time analysis showed hard precipitation in the late morning and large convection velocities around midday and into the afternoon. Vector velocities were missing between 22 UT (9 Jan) and 0830 UT (10 Jan) due to a computer problem in Sodankyla that stopped the experiment. These geophysical events were the signature of the coronal mass ejection, that occurred on January 6, reaching the Earth. Sodankyla also suffered a similar loss of data between 0906 UT and 0940 UT on 9 January.

18. CP-1-K, 10-12 February, 1997.

This was a scheduled dual radar operation with CP-6 but the VHF system was unavailable due to burned cables and connectors at the antenna (discovered in January). The CP-1 data set is continuous apart from a few HRPs.

Sodankyla measurements over the previous few days had shown an apparent offset of about -5 kHz in the long pulse for CP-1 type experiments. This also seemed to be the case at the beginning of this operation. However, there were clearly large ionospheric velocities present also, detected by the Doppler shift in Kiruna, together with high F-region ion temperatures (and non-Maxwellian spectra) at Kiruna and Tromso and E-region heating in the Tromso alternating code results. Sodankyla staff worked on the receiver, the experiment there eventually restarting at 16 UT. The Sodankyla spectra then looked more normal, but the severe ionospheric conditions had also tempered in the meantime.

The ionospheric disturbance detected at the start of this run was due to a coronal mass ejection that was observed on February 7, and which reached the Earth two days later.

In the excitement of investigating the large Doppler shifts and non-Maxwellian nature of the spectra at the start of the experiment, the fact that the LO2 in channel 3 (one of the 2 long pulse channels) needed to be set manually had been overlooked. It was corrected at 1652 UT. The reason it needed to be changed from its set value of 149.0 Mhz to 150.0 Mhz was because this version of CP-1-K had all the frequencies shifted up by 1 Mhz. This change had been implemented to enable the transmitter to operate at higher output power levels.

This frequency change may explain why it was necessary to make a substantial adjustment to the system constant in the data analysis. The earlier run of CP-1-K on 16 October 1996 was found to give good agreement with the dynasonde with a system constant of 1.18, a value that had been determined in the CP-1 in June 1996. The adjusted value for the present experiment was 1.85.

19. CP-2-E, 11-12 March, 1997.

This version of CP-2 used the new selection of frequencies (all + 1 MHz) as first employed in the CP-1 in February. The experiment was started at 1048 UT but there were several EROS-related problems and the data were not being recorded to the sparc. Everything was stopped at 12 UT and EROS was exited. The command RT EROSCL was then given before restarting EROS. The experiment was restarted at 1224 UT. The operation suffered from most of the same breaks as the VHF mentioned below, specifically 1725-1740 UT on March 11, then on March 12 at 0405-0416 UT, 0435-0450 UT and 1300-1330 UT. Raw data were not recorded between 0651 UT (after the ND reboot) and 0817 UT when this was noticed. No data were dumped to the sparc between 0312 and 0818 UT. Integrated data are available for this period. At 1035 UT a sudden UHF receiver error appeared, which was tracked down to a faulty power supply. It is probable that some of the earlier

problems were related to this fault. The system was available again at 1147 UT.

Sodankyla had many difficulities and data gaps (including most of the night hours) due to an adc problem that recurred every couple of hours. Kiruna had no problems.

The common volume height was set to 220 km. This has been put in the CP-2 experiment files, along with the new field-aligned pointing direction (azimuth 183.0^{o}, elevation 77.1^{o}, for 250 km altitude) and the new frequency settings.

The Tromso CP-2 data were analysed with Guisdap in real time, as well as on the ND (CP-4 on the ND too). The CP-2 densities came out about 25% too high in an initial analysis using the same system constant that gave good agreement with the dynasonde in February (1.85). The data were reanalysed using a value of 1.44, producing good agreement.

20. CP-4-B, 11-12 March, 1997.

CP-4 was tested early on 11 March; no problems were found so it was started (early)at 0905:01 UT. The transmitter tripped at 0927 UT and needed considerable work to get it functioning again. The experiment was restarted at 1215:01 UT. At 1725 UT the transmitter tripped to power-off (maybe due to a brief power break?), enforcing a new countdown and restart at 1750 UT. There were a couple of breaks between 04-05 UT on 12 March related to UHF receiver problems. The final restart was at 0450 UT. At 0537 UT another trip necessitated a new countdown. At 0646 UT the ND computer was rebooted due to problems with data recording; restart at 0651 UT. More data recording problems occurred at about 13 UT, followed by a reboot of the ND computer and successful restart of the experiment at 1330:01 UT. There were also a few brief HV trips at other times during the experiment.