Date: December 19, 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. Enclosed are plots of transmitter power and system temperature from these runs, together with some notes on the operations. A list of the contents of the DAT tape is also enclosed.

	1997		
CP-2-E	21 October (1000 UT)	to	23 October (2000 UT)
CP-6-B	4 November (0908 UT)	to	5 November (1600 UT)
CP-2-E	2 December (1500 UT)	to	4 December (0800 UT)
CP-6-B	9 December (1000 UT)	to	10 December (1600 UT)

NOTES

1. CP-2-E, 21-23 October, 1997.

A CP-2-E operation was scheduled from 10 UT on 21 October to 20 UT on 23 October (58 hours). This was a World Day interval and part of a longer UARC campaign period.

The experiment was tested actively for a good hour on the morning of 21 October with no apparent problems, except that the alternating code signals at the remote sites were being received slightly early. These should be centred in gate 4 (of 7) but were in typically gate 3 in Kiruna and gate 2 in Sodankyla. The signals were re-centred by adjusting the offset ppd from -422 to -432 μ_S in Kiruna and rom -415 to -450 μ_S in Sodankyla.

The experiment started on schedule at all sites. After a while it was realised that the data transfer to the sparc in Tromso was not running (the recording on the ND was OK). After various investigations the transfer was eventually restarted with the usual EROS commands "SP-TR Y" followed by "NEW-FILE". Data recording started at 1046 UT.

The 40 μ_S power profile data, measured on channels 1 and 2, showed some deviant behaviour. In the south antenna position, and sometimes in the south-east position, the data showed excess noise in the first few gates, though not in every scan. This feature fell off from a maximum in the first gate to approximately normal values by about gate 12. That it constituted a hardware problem, and not e.g. Clutter (and certainly not an ionospheric signal) was confirmed by its absence in the 21 μ_S power profile data. Channels 1 and 2 were alternately attenuated out between 1046 and 1108 UT on 22 October to investigate this problem. Channel 2 turned out to be much the worse, even showing an effect in the $B_{//}$and vertical positions. But even with channel 2 attenuated out (63 dB), channel 1 continued to display similar characteristics to the combined data. The experiment continued from 1108 UT with only channel 1 for this power profile. Investigations after the experiment showed the problem to be a power splitter in the receiver rack, affecting both channels 1 and 2, but channel 2 being the worse. The faulty component was replaced.

The ND analysis ran smoothly. A comparison of long pulse electron densities with dynasonde (and digisonde) critical frequencies showed the EISCAT densities to be about 15% too low (using a system constant of 1.44- this was last set in March with a dynasonde calibration). The calibration factor was changed to 1.656 for the final analysis. [Note - klystron SN103R has been in socket since 30 September.]

The Kiruna site experienced some software problems during the first night. Raw data was not recorded between 2136 UT on 21 October and 0016 UT on 22 October. The experiment was stopped at 0016 UT and restarted at 0030 UT. The integration program on the ND ran throughout, so the only gap in analysed data is from 0016 to 0030 UT.

No problems reported from Sodankyla.

Gaps in Tromso data:

971022	0423-0433 UT	emptying snow from dish
	0450-0455 UT	HV trip
	0910-0923 UT	UPC problems
971023	0120-0130 UT	Crowbar

Geophysical conditions : pretty quiet - normal daytime ionospheres and a little precipitation each night around magnetic midnight. More activity and some aurora visible through the falling snow on the last evening, just before we closed down.

2. CP-6-B, 4-5 November, 1997.

A CP-6-B operation was planned from 10 UT on 4 November to 16 UT on 5 November. Good signals (down to 75 km) were observed during tests on the morning of 4 November so the experiment was started early, at 0908 UT. The increased D-region densities turned out to be related to a moderately weak PCA event and the ionisation fell off quite rapidly, having disappeared altogether by about 12 UT. (The proton fluxes at geostationary orbit remained enhanced for the whole experiment, but evidently at levels not large enough to give measurable increases in electron density).

With CP-6 under way, an attempt was made to start SP-EI-CP6BV-NS (i.e. CP-6 pointing at elevation 75.2^0 to the north, on the E half of the antenna). The data appeared poor, with many spikes and other noise making the ionospheric signal hard to see. Despite prolonged investigations during the day, the source of the problem could not be located and the UHF side was stopped at 1440 UT. The configuration was then changed from separate, to combined, beams and CP-6 started using the full antenna. (The UHF side would anyway be needed after a few hours for an SP-NO experiment in support of a rocket countdown.) The tests were complicated by many crowbars during this period, a phenomenon that came and went irregularly with no apparent reason.

The peak power was recorded and displayed correctly (e.g. By RTGraph) at the beginning of the experiment but became zero after a crowbar around 1030 UT. The peak power for the B-side (position 101 in the parameter block) continued to be recorded so this was used in the data analysis.

At 0343 UT on 5 November a crowbar was followed by a problem with the cooling water supply. This took a while to fix and the experiment was eventually back on the air at 0658 UT. The transmitter was turned off at 0758 UT for a final check on the water problem, with a restart at 0840 UT.

No raw data could be copied to the 6250 bpi tapes because of a hardware fault with the ND tape drive. At 1059 UT on 5 November the last free disk set was filled and all data recording stopped (even to the sparc). A disk set was re-initialised (all earlier raw data had been recorded on the sparc) and recording restarted at 1122 UT. The tape drive was repaired by a serviceman in the afternoon.

3. CP-2-E, 2-4 December, 1997.

CP-7 (2-klystron) had been scheduled for this World Day interval but a burned cable at the antenna (B-side) was discovered on 1 December, probably requiring several weeks to repair. CP-2 was scheduled in its place, to start at 16 UT, or earlier if possible, on 2 December. The experiment was started at 15 UT, though the staff in Sodankyla, who had already left, had not been aware of the change in the schedule and the wrong post-detection filters were in place. The on-duty person was post-detected some 200 km from the site, but after a string of unanswered calls and answering machines speaking Finnish a local willing soul was found and the correct filters put in by 1545 UT.

Shortly after the start, the post-intergrated long pulse background and calibration spectra in Sodankyla were seen to be asymmetric, with more power on the high frequency (right) side. Inspection of individual 5-sec dumps showed this to be due to typically 1 to 3 individual peaks changing more-or-less randomly in time, frequency and amplitude. This behaviour may have been correlated with the antenna scanning, though the randomness of the variations made this hard to determine. Alternately attenuating out the two long pulse channels (3 and 4, on F9 and F10 respectively) showed F10 to be the main culprit. This feature disappeared after a while, but re-appeared the next day (3 Dec) at about 1240 UT. This time, however, there were no individual peaks in the spectra, just a linear increase of power from the left side to the right side, even at 5-sec resolution. Tests with a frequency analyser in Sodankyla showed that there was wide-band noise (several Mhz) above some point between F10 and F11. This interference was strong and caused overflows in the ADC. After various tests lasting about an hour, the experiment continued with only F9 being received. The ionospheric signal was weak or non-existent for most of the experiment at Sodankyla and the data should only be used after careful checks. Subsequent investigations identified the interfering source as a nearby military radio link.

In Tromso there was a short gap between 1005 and 1013 UT on 3 December following a crowbar. At 1747 UT another crowbar caused the UPC to begin a new countdown. On restart at 1808 UT, a few minutes of data were taken before another crowbar at 1812 UT, after which it was impossible to obtain pulsing from the UPC. A restart was possible at 1954 UT. A further crowbar at 0205 UT (4 Dec) necessitated a new countdown, with restart at 0226 UT and experiment end at 0800 UT. The transmitter high voltage was deliberately kept low because of HRPs above about 89 kV. Because of this, together with the low solar zenith angle and only weakly disturbed conditions, the signals in Tromso and Kiruna were also at times poor. A system constant of 1.656 gave good agreement with dynasonde foF2 critical frequencies (same value as in October).

4. CP-6-B, 9-10 December, 1997.

This was a l-klystron (TX and RX on A-side) CP-6 operation, starting at 10 UT on 9 December and

ending at 16 UT on 10 December. Clutter in the first five gates was stronger than is usually observed in CP-6 (whether using full antenna or split-beam operation). This had some value in at least showing that the experiment was nominally working - no recognisable ionospheric signals were detected until after about 9 hours operation, and then for only about 15 minutes. Nothing more was observed until after 12 UT on 10 December, with patchy precipitation until the end of the experiment, coinciding with increasing magnetic activity.