SHORTWAVE RADIO

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The Soviet jamming system and the future of jamming

IN ORDER TO MAKE A REASONABLE PREdiction of the future course of jamming, it is first necessary to have a closer look at the system, and how it worked. Over the past fifty years, the Soviet Union and its European satellites developed the most elaborate system ever conceived solely for the purposes of disrupting foreign broadcasts to the Soviet Union.

The Soviet jamming system was administered by a secret department in the Ministry of Communications. Privately, the department was known as the Krestyaninova Section, after Natalia Krestyaninova, who organized and headed the department for more than twenty-five years.

Reportedly now disbanded, the Section was responsible for about 5,000 people, and more than 2,000 jamming transmitters. Most of the personnel responsible for the operation of the intricate web of transmitters were highly skilled and trained technicians. That's because jamming demands swift communications, quick decisions, careful coordination, and constant monitoring in order to block the programs which they consider most objectionable to their own interests. Here is how the system was set up:

- Each city with a population of more than 250,000 had its own local jamming network. In general, local jammer complexes consisted of about fifteen jamming transmitters, each having from 5 to 50 kilowatts power. Although that was the norm, large population centers such as Moscow had more than seventy-five jamming transmitters serving them.
- Each local jamming station had a monitoring station associated with it, located about twenty kilometers from the transmitters. The local jamming-transmitter site and the monitoring station were connected by dedicated line. The monitoring station constantly scanned the shortwave bands checking schedules of transmissions directed toward its target area. If a frequency was penetrating the jamming screen, the monitoring station called upon the transmitter site for additional jamming.
- Both the transmitter site and the monitoring station operated twenty-four hours per day. The monitoring station had at least two people working per shift, as did the transmitter site.
- Each monitoring station also reported by dedicated line to a larger regional monitoring station. If the local transmitter site was overloaded, then the regional station was responsible for calling in additional jammers via sky-wave propagation.
- The sky-wave stations used high-power transmitters, up to one hundred kilowatts each. The sky-wave stations were situated at

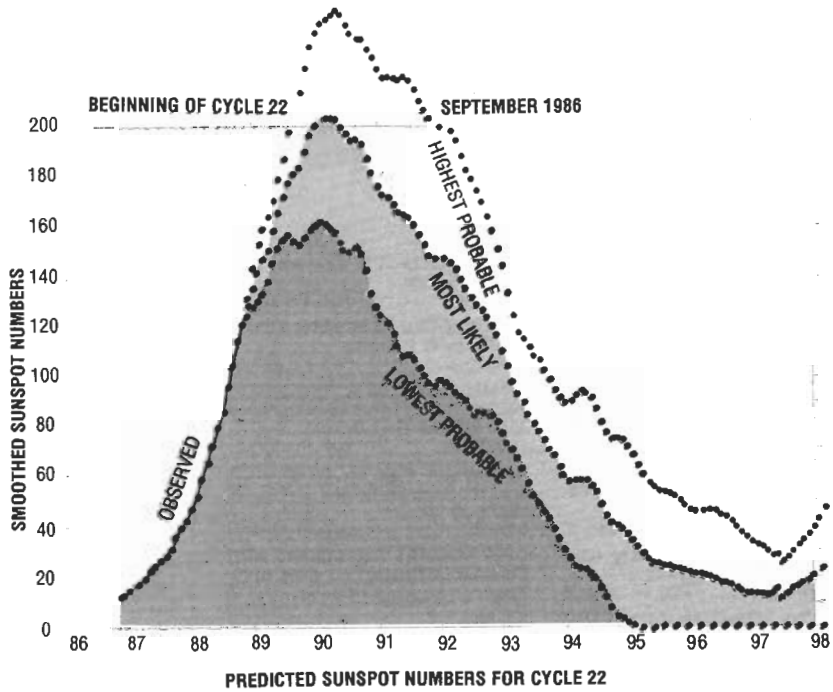

FIG. 1

various strategic locations throughout the USSR, and were located about 2500 kilometers away from densely populated areas.

- For sky-wave propagation, 2500 kilometers is the optimum distance for one-hop propagation. Each sky-wave site had as many as fifty transmitters associated with it.

The current situation

Since the cessation of jamming directed against Radio Free Europe, Radio Liberty, Radio Israel, and Deutsche Welle (Radio Germany) at the end of November 1988, there has been an increase of approximately fifty percent in the number of shortwave broadcasts of Radio Moscow, as well as the regional shortwave outlets of the USSR.

It is clear that a major shift away from formal jamming operations has taken place, and that recent stories in *Pravda* to that effect are true. It must be pointed out, however, that the core of the jamming system—the transmitters—has been kept in place, at the ready, and that its use, albeit for broadcasting, represents a different form of jamming. The high-frequency broadcasting spectrum is already overcrowded by a factor close to three, and the redeployment of hundreds of transmitters from the jamming service to the broadcasting service constitutes a somewhat modified version of harmful interference.

It is clear, from those recent developments, that in the event that full-scale jamming is required, the re-scheduling of the transmitters now in the broadcasting service, as well as those transmitters that have been mothballed, can be accomplished quickly. There is little doubt that if the political climate in the USSR should change drastically, then the raucous, irritating racket that the noise jammers produced would be back with us in a matter of days or weeks.

Although the production of noise for the sole purpose of obliterating unwanted broadcasts has ended, it does not appear that jamming, in the broader context, has entirely disappeared.

General conditions

In the equinox months (March and September) during years of high sunspot activity, periodic ionospheric disturbances occur, which may disrupt shortwave communications for one to three days. During those disturbances, signals can be all but blacked out, particularly in the higher bands. The disturbances are usually preceded by massive flares on the sun, which produce SID's (*S*udden *I*onospheric *D*isturbances). The immediate effect is a period of one to two hours, in the daylight portion of the world, during which much of the shortwave spectrum is severely disturbed. The SID is caused by a burst of radiation from the sun, which takes approximately eight minutes to reach Earth. After a SID, conditions return to normal relatively rapidly. Twenty-four to forty-eight hours later, particles emitted by the sun during the period of the flare, start reaching the ionosphere, causing the prolonged disturbance.

When a severe radio storm occurs, it is often accompanied by a display of northern lights, or aurora borealis. Sometimes, shortwave, VHF, or even UHF signals will propagate off the aurora borealis, making FM and/or TV DX possible.

During normal periods, DX will be good. During daylight hours all bands from 19 to 11 meters will be possible; at night DX will be possible from 49 to 16 meters.

Sunspot cycle progress

Figure 1 indicates how Sunspot Cycle 22 is progressing. It still appears that this cycle will be the highest ever observed. The solid line shows actual observed smoothed sunspot numbers. The dotted lines indicate the range of predicted values for the remainder of the cycle. The upper curve indicates the highest probable numbers, the lower curve gives lowest probable values. The center curve gives the most likely smoothed numbers.

Inasmuch as the highest smoothed number ever observed was a little over 201, it can be seen the Cycle 22 is shaping up as a probable record-breaker. **R-E**