POLICY,
RESEARCH AND DEVELOPMENT
(FOUO 10/79)

3 AUGUST 1979

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Worldwide Report

TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

(FOUO 10/79)

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WORLDWIDE REPORT

TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

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TOKYO PAPER INTERVIEWS PRC SPACE DEVELOPMENT OFFICIALS

Tokyo ASAHI SHIMBUN in Japanese 8 Jul 79 Morning Edition p 4 OW

[Interview with Xu Ming and Chen Fangyun, respectively head and deputy head of a visiting Chinese space technology observation delegation, conducted by reporter Yasuyuki Kishiro on 7 July]

[Excerpt] [Question] What course has China been taking in developing space?

[Answer] "China first started in 1958 with the development of rockets for observation. The first one was a single-stage, liquid fuel rocket with a 46 cm diameter. But since then we have developed three other kinds of observation rockets. One of them was a rocket using solid fuel for the first stage and liquid for the second stage; it reached altitudes of between 60 and 200 km. The second one, which used liquid fuel for the first stage and solid fuel for the second stage, weight 330 kg and reached an altitude of 70 km. These three rockets were used for meterological observations."

"Later, we decided to independently launch satellites, and the program progressed smoothly under Premier Zhou Enlai's guidance. In 1968, we founded the 'China Space Technology Research Institute,' and in April 1970, we launched our first satellite."

[Question] There is a considerable length of idle period between the No 2 satellite (1971) and the No 3 (1975).

[Answer] "Research fell behind drastically because of the gang of four. From 1975, however, we quickened the pace of our development again and launched six satellites. The eight satellites we have launched so far were used in observing the ionosphere and solar particles. We have experimented in recovering a satellite."

[Question] Ordinarily, the recovery technique is used for retrieving a film from a photo reconnaissance satellite. Was not your satellite a reconnaissance satellite?

[Answer] "In light of the capacity of the rocket, Americans would certainly see it that way. That satellite, however, is not intended for reconnaissance purposes but for study of future manned flights."

"In the beginning we used CSS-2 rockets (with a range of between 2,400 and 4,000 km, according to U.S. estimates), and recently, CSSX-4 (with a range of 11,000 km, according to the same estimates). We plan to launch the ninth satellite with a CSSX-4."

[Question] How many people are working in the space field?

[Answer] "There are as many as 2,000 at the launching site in the Jiuquan area (located at Shuangchengzi in Gansu Province and the only launching site in China). You may be surprised to hear the number of people involved, but the launching site is in the Gobi Desert and the staff personnel and their families make up a self-contained town. There are 200 persons at the central control center near Sian (formerly Changan) and 50 to 60 each at the 8 tracking stations. In addition there are a countless number of personnel at factories and/or research centers."

[Question] Sino-U.S. cooperation is growing extensively in various fields. How is it in the space field?

[Answer] "We will soon launch a broadcasting satellite through mutual cooperation. This is for countrywide television broadcasting and needs 2,000 to 3,000 ground receiving stations equipped with small parabola antennas. The United States is taking the initiative in designing and manufacturing the satellite but it will use Chinese technology in some areas. We are arranging for the United States to launch this satellite."

[Question] Will the cooperation go beyond that?

[Answer] "No. That will be all for the time being. China wants to launch communications satellites independently by about 1985. As far as satellite communication technology is concerned, we are now conducting experiments with Europe using the European communications satellite 'Symphony,' and we have a certain degree of technology."

[Question] According to your remarks, China seems to be placing emphasis on practical satellites.

[Answer] "You are quite right. We will continue with our scientific satellites but we believe practical satellites (broadcasting, communications and meteorological) are more important from now on. We can launch stationary sattellites (practical) with the present rockets. We do have plans for manned flights but they have not yet taken a concrete shape."

[Question] In what areas do you think cooperation with Japan is feasible?

[Answer] "Japan started out late but it is advancing fast. It stands out in the dissemination of computer technology and data processing. The future for cooperation is bright."

CSO: 5500

INDIA

'INDIAN EXPRESS' ORDERS 1 BILLION YEN NEWSPAPER FACSIMILE

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 7 Mar 79 p 13

[Text] According to information obtained from industrial circles on the sixth, Matsushita Electronic Transmission Equipment Co. (President, Oyayuki Kino) has received an order from India's largest newspaper, the INDIAN EXPRESS, for a newspaper facsimile costing upwards of 1 billion yen. Delivery will take place after an import license is issued by the Indian Government, but it is not clear when this will be. This company is the largest manufacturer of news facsimiles and reportedly has a very large market not only in Japan but in the U.S., the USSR and China. However, this is the largest single order ever made by a foreign newspaper.

India's newspaper world, under the aegis of the INDIAN EXPRESS, encompasses 16 local newspaper companies (separate newspapers) covering almost all of India. Since there are many nationalities and languages, the newspapers are printed with this differentiation in mind. The INDIAN EXPRESS in New Delhi is connected by a facsimile network with 16 local papers, and has planned to produce these papers with greater efficiency and speed.

According to sources in industry, the Indian company first approached Matsushita, conducted negotiations and recently made a formal order. India has a national policy of producing domestically most of its machinery, but does permit the importation of high-level technology such as computers and facsimiles. Once the government issues the license, Indian Telephone and Telegraph will be responsible for everything from inspection to maintenance.

For this reason, the INDIAN EXPRESS has applied for a permit to import the newspaper facsimile and Matsushita will ship the order as soon as it is issued. The facsimile that was ordered is a "Laser Press Fax." It makes a negative of a single page size of a newspaper transmitted by facsimile from the main office by developing film in the receiver using a laser beam. It then prints the page on a raised or flat surface. At the present time this Laser Press Fax is already employed at each newspaper company.

Matsushita reportedly has a sales record of 400 facsimiles, including deliveries of 200 in Japan and 200 overseas. Overseas deliveries include those made to the USSR 10 years ago for PRAVDA and IZVESTIYA, those for the RENMIN RIBAO in China, and for large U.S. newspapers.

6093
CSO: 5500

JAPAN

'COMMUNITY TELEVISION' NETS MAY SPREAD ACROSS NATION

Tokyo ASAHI EVENING NEWS in English 13 Jul 79 p 3

[Text] Ikoma, Nara Pref. (REUTER)--An experiment in two-way television is taking place in this quiet residential area in central Japan.

By punching buttons on a keyboard attached to their television sets, viewers make direct contact with a local television station and can appear in insets on the screen and hold conversations with the announcers.

The topics of these conversations so far seem rather dull--mainly about shopping--but the idea is attracting popular attention and could become a trend-setter for worldwide local television channels.

In the television station in the eastern Ikoma residential district, a girl announcer sat behind a studio table loaded with glassware, teacups and such things, all obtainable from local shops.

It was the afternoon shoppers' guide program.

Inside the television station, code numbers appeared on a monitor screen, showing that about 30 of the 158 households in the experiment were watching at that moment.

Suddenly, one of the number codes turned red, indicating that a viewer wanted to talk. A technician held a pointer to the screen which brought the householder on to the public television circuit. A middle-aged housewife appeared in an inset in the corner of the screen, with the announcer in the main screen, and they chatted about the products which had been displayed.

In the surrounding community, the viewers could see one of their neighbors on the screen--and this is why the scheme is known here as "community television."

The households in the scheme are sent a weekly leaflet showing the times when they can tune in to the experimental community network and what facilities are available.

A viewer can select specially made programs such as language lessons, cooking instruction or sport lessons, or can obtain local services like lists of train times, hospital and doctors on call, and so on.

Alternatively, the viewer could call up a two-way chat program on a particular subject introduced by announcers.

The two-way shows are made possible by small cameras built on top of television sets, and movable microphones.

It is all worked by a central computer, which opens the possibility that community networks may spring up all over Japan, each one able also to link up with main channels, or with stored information that a viewer may want.

So a viewer may be able, then, to choose from local programs, local two-way chat shows, a list of community services such as train timetables, and the main national channels, plus a "bank" of background information constantly brought up to date.

Technicians at the local station here have estimated that each community network could include a maximum of 10,000 households. Beyond that, the "local" nature would be lost.

Final analysis on the experiment will be done next spring, to see if it is viable for mass introduction.

CSO: 5500

JAPAN

BRIEFS

DATA COMMUNICATIONS SERVICE--Nippon Telegraph and Telephone, in a move to wipe out deficits being incurred in public data communications service (DRESS, DEMOS-E), for the short run is going to try to attract subscribers by allowing use of terminals not provided by NTT, including minicomputers and office computers, and for the long run is cutting the 600 billion yen data communications investment planned for the Sixth Plan period by 10 percent to reduce excess capacity. At the end of JFY 1977, there were 1,147 DRESS users with 3,475 terminals and 1,061 DEMOS-E users with 1,305 terminals. During JFY 1978, service to them brought in 101 billion yen but cost 138 billion yen to provide. Cumulative deficits on the service totaled 160 billion yen. [Tokyo NIKKAN KOGYO SHIMBUN in Japanese 30 Jun 79 p 10]

FLATS COMPUTER--The Institute of Physical and Chemical Research is developing a numerical formula processing computer (called FLATS) intended for general use in performing massive amounts of technical calculations such as for VLSIs, fusion reactors and such. The budget for JFY 1979 is 63 million yen, expected to rise to 150 million yen in JFY 1980. The hardware and part of the software will be completed in JFY 1980, and operational use is expected to start no later than during JFY 1981. Joint research on the FLATS computer is in progress at universities in Cambridge, Utah, and Hawaii in the United States, but plans for on-line data exchange with them have been shelved due to obstacles facing the "Venus Program" now being planned by the Ministry of Posts and Telecommunications. [Tokyo NIHON KOGYO SHIMBUN in Japanese 3 Jul 79 p 5]

C-MOS PRODUCTION--Nippon Electric intends to increase its share of the C-MOS standard logic market by doubling production to 1.8 million chips a month by fall 1979. [Tokyo DENPA SHIMBUN in Japanese 2 Jul 79 p 1]

GAAS WAFER PRODUCTION--Mitsubishi Metal has established mass production technology for circular '100' crystal orientation GaAs wafers. The CZ process used provides stable electrical characteristics, the yield is higher, and handling of the wafers is greatly facilitiated. For the immediate future, 1,000 2-inch wafers (10 million yen worth) will be produced monthly at the Omiya plant, and plans have been laid to produce 3-inch wafers in the future when market trends justify it. [Tokyo NIKKAN KOGYO SHIMBUN in Japanese 2 Jul 79 p 14]

IMAGERY INFORMATION PROCESSING SYSTEM--Nippon Electric has commercialized a computerized imagery information processing system combining the functions of facsimile and optical character recognition. The system is composed of minicomputer distributed processors, high-speed serial printers, facsimile equipment, and graphics readers. Data compression is effected as with facsimile for high-speed transmission. [Tokyo NIKKAN KOGYO SHIMBUN in Japanese 7 Jul 79 p 7]

METAL TAPE SPECIFICATIONS--The Electronics Industries Association of Japan has settled on basic specifications for metal tape for audio recording and expects to propose specifications to the IEC as an international standard this fall. The guidelines call for magnetic strength (Hc) of 1,050 Oersted, residual magnetic flux (Br) 3,000 to 3,500 Gauss, and magnetic layer thickness 4 microns. [Tokyo NIHON KOGYO SHIMBUN in Japanese 11 Jul 79 p 2]

CSO: 5500

MAURITIUS

BRIEFS

CCCE TELECOMMUNICATIONS AID--On 27 June the Central Fund for Economic Cooperation [CCCE] granted Mauritius 17.5 million French francs to finance 60 percent of its telecommunications program. In 1975 and 1976, the CCCE had loaned Mauritius a total of 34 million francs to launch the program. [Paris MARCHES TROPICAUX ET MEDITERRANEENS in French 13 Jul 79 p 1998]

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USSR

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TRANSMISSION SYSTEMS WITH FREQUENCY DIVISION OF CHANNELS

Moscow ELEKTROSVYAZ' in Russian No 3, Mar 79 pp 62-64

[Review]

[Text] Communications networks in a number of countries in Europe -- Hungary, the GDR, Italy, the Netherlands, France, the FRG and others -- continue to operate balanced cable communications lines along with coaxial cable lines successfully. There is a trend not only toward preserving the existing balanced cable line network, but also toward an increase in its efficiency by increasing the number of transmission system channels with frequency division of channels (ChD). This review describes the general trends in this development, and the special features of transmission systems with ChD for 60 and more channels, organized over balanced cables.

General development trends of transmission systems with ChD. An increase in the number of channels of transmission systems with ChD is achieved mainly by raising the upper limit of the transmitted frequency range.

The organization arrangement of the systems being developed is tied in with the existing network and, in the majority of cases, is designed so as not to disturb the existing systems. In this case, the line routes of the new transmission systems with ChD are autonomous and do not depend on other systems, while the voice frequncy channels (TCh) meet MKKTT [International Telegraph and Telephone Consultative Committee] recommendations.

The electrical characteristics of multichannel transmission systems with ChD, organized over balanced cables, are comparable to similar characteristics of systems with ChD organized over coaxial cables.

Balanced cables used in European countries for transmission systems with ChD differ in design as well as in the insulation of the conductors. For example, in the FRG, cables with styroflex insulation of conductors 1.3 mm in diameter are used, while in the Netherlands transmission systems are organized over 12x4x1.3 cables with paper insulation. In Italy, transmission systems are being developed which use multipair cables with paper-cordel' insulation and copper conductors 0.9 and 1.2 mm in diameter, and cables with plastic insulation and 1.3 mm diameter copper conductors.

In some countries (France, Italy), lump loading is removed from cable quads to expand the spectrum of the transmitted frequencies.

As a rule, new transmission systems with ChD are designed for balanced cables on which systems with few channels are already operating. In some cases, however, systems are also developed for multiplexing balanced pairs for coaxial cable, for example, tne MX270/60 transmission system (Italy).

Arrangements for organizing communications transmission systems with ChD are different and depend on concrete conditions in existing communications networks. Thus, in the FRG, Netherlands, the GDR and Hungary, two-cable communication systems are used, while Italy and France use the one cable system. Marconi (Italy) uses individual cable pairs for transmitting in different directions which eliminates the use of directing filters. For the 300-channel system developed in France, one pair of a quad is used for the line route and the other pair -- for the service channel.

The line route of multichannel transmission systems is built without disturbing the action of the existing network. In this case, the possibilities of balanced communications cables are utilized most efficiently. All transmission systems have, besides two terminal OP [Terminal point], intermediate repeaters of two types: attended -- OUP [Attended repeater station] and unattended -- NUP [Unattended repeater station].

As a rule, the OUP includes the following equipment: line equalizers and amplifiers, artificial lines, correctors, automatic gain control (ARU) devices for monitored frequencies, devices for remote power supply to the NUP and remote servicing devices. When transmitting and receiving over one pair of conductors, the OUP also includes directing filters.

The OUP equipment is placed in bays, standard for a given country, in aboveground heated buildings in which the temperature is maintained within + 10 to + 40°C. As a rule, the OUP is always attended. However, in the Netherlands, the OUP are attended only when necessary of for preventive maintenance.

The NUP equipment for various transmission systems, unlike the OUP, is differen and depends on the complexity of the system. The more complex NUP contain: variable line qualizers; line amplifiers; devices for automatic level control (in the majority of cases, in accordance with the changes in ground temperature or resistance of cable conductors); devices for receiving remote power; and remote servicing devices. The equipment of less complex NUP is limited to devices for constant correction and amplification as well as devices for receiving power and for remote servicing. The NUP, as well as the OUP, may have directing filters.

Table

Country	Type of apparatus	Maximum no. of channels	Line frequency spectrum, kHz	Arrangement of Communications	Nominal length of repeater section, km
FRG	V60/120	120	12-552	2-cable	18
The Netherlands	-	120	12-552	2-cable	8
Italy	MX270/60	60	60-552	2-band, 4 conductor, 1-cable with spectrum transposition	4500-8800*
Italy	MX270/120	120	312-1416	same	2745-5400*
Italy	MX270/240	240	1556-3776	same	1450-2900*
Italy	MX270/360	360	1556-4768	same	1375-2745*
Italy	MX270/480	480	312-4524	same	1375-2745*
France	-	300	312-3284	2-band, 2 conductor, 1-cable with spectrum transposition	No data available
Hungary	BK-60-2	60	10-252	1-band, 4 conductors, 2-cable	13.7 - -14.35* [5]
GDR	V-60-E	60	12-252	1-band, 4 conductors, 2-cable	19 [6]
GDR	-	60-	12-252	same	No data available
		-120	12-252		No data available

*Length of repeater section depends on the type of cable used.

The containers in which the NUP equipment is located are either cylindrical or rectangular. As a rule, the functional units are sealed and the containers themselves are waterproof. In some cases, hydropneumatic protection is used. The NUP containers are placed directly in the ground or in concrete wells. Sometimes, the wells are thermally insulated (for example,in Italy).

Remote power to an intermediate NUP is most frequently supplied from the OUP or OP over phantom circuits of cable pairs or quads by DC. In this case, the "conductor-conductor" circuit for remote power supply is preferred.

The distance between two feed points is frequently rather small (up to 100 km) and, therefore, the feed voltage is comparatively low (in the order of 70 to 250 volts).

The technical data of multichannel transmission systems with ChD for balanced cables which were developed in various European countries is shown in the Table. Special features of some of the considered systems are cited below.

A V60-120 transistorized system for transmitting over up to 120 channels was developed by Siemens (FRG) [1]. The distinguishing feature of this system is the possibility of operating it jointly in a cable with similar systems with electron tubes. The V60/120 systems operates over a cable with styroflex insulation and copper conductors 1.3 mm in diameter. The line route of the system is equipped with devices for monitoring and automatically correcting the channel characteristics which change due to changes in the temperature of the cable.

The quality of the channel exceeds the recommendations of the MKKTT.

A transmission system for 120 channels was created in the Netherlands [2]. Special work was done on balanced cable lines to increase the protection between circuits and to expand the spectrum of transmitted frequencies to 552 Hz. This made it possible to create a new system for 120 channels. As a result, the transit capacity of the 12-quad cables previously equipped with a 48-channel system increased from 1152 to 2880 channels, i.e., more than doubled.

The line route of the system is built on pairs of 12-quad cable with paper insulation and a conductor 1.3 mm in diameter. A special feature of this system is the presence of remotely fed station -- NUP of two types. The first type is designed for repeater sections (UU) 8 km long, and the second -- for UU 5.5 km long. When necessary, the NUP of the second type may be installed for repeater sections up to 7.7 km long without additional adjustments.

Repeaters of the first type allow a change in the output level corresponding to the spread of the repeater section lengths of ± 200 m. If this spread is greater, a repeater of the second type, adjusted to a 5.5 km cable length is installed. As a rule, these repeaters are installed between the NUP of the first type.

The uncompensated NUP " misalignment" of the frequency characteristic of cable attenuation is eliminated by the line equalizers which feed the OUP repeater. Temperature changes in cable attenuation are compensated for by the automatic gain control (ARU) devices of intermediate repeaters. A bridge circuit at the NUP is used for this purpose and reacts to the resistance change in the phantom circuit of the cable.

The condition of the route channel is monitored at terminal stations (OP) by monitoring frequencies. Moreover, frequency identification oscillators are installed at the NUP that, when necessary, allow the damaged NUP to be determined from the OUP or the OP.

A number of transmisssion systems for balanced type MX-270 cables for 60, 120, 240, 360 and 480 channels was developed by Marconi (Italy) [3].

As a rule, these systems, with the exception of the MX270/60 for 60 channels, are used in cables where multichannel transmission systems are already in operation. The MX270/60 system is intended basically for multiplexing balanced pairs of coaxial cables. All systems of the series use only one quad of a multipair cable. The communications circuit is a 2-band, 4 conductor one with a separate pair used for each transmitting direction.

The basic charccteristics of the MX-270 series are as follows. The line frequency spectrum of all systems of the series lie within 60 to 4768 kHz. Each transmission system occupies a certain frequency band (see Table).

All systems have intermediate repeaters of two types -- OUP and NUP. OUP repeaters have automatic gain control over two line monitoring frequencies. To maintain the output level of the NUP within given limits, the amplification is regulated in accordance with the change in ground temperature, i.e. the NUP are provided with ground ARU. The totality of regulations on the regulating section, on an OUP-OUP section (40-95 km), makes it possible to compensate cable attenuation changes for ground temperature deviations at the depth of cable burial of + 10°C from an average value of ± 10°C.

The 300-channel transmission system developed in France was designed to increase the transit capacity of the existing mains of the balanced cable, multiplexed by 12+12 transmission systems, in correspondence with which the line frequency spectrum was selected to be 312 to 3284 kHz [4]. The system operates on one quad of a multipair cable without coil loading. The communications circuit is single cable, 2-band with frequency band transposition. The lower frequency band of 312 to 1548 kHz is formed by secondary groups 2-6, recommended by the MKKTT, while the upper band of 2048 to 3284 kHz -- by transforming these groups by carrier frequency of 3596 kHz. The spectrum between the lower and upper frequency bands is allotted for transmitting telemonitoring frequencies.

Three monitoring frequencies for automatic gain control are introduced in each transmitting direction. One -- the basic one -- is located at the middle of the band and the other two -- at the extremes.

To equalize the noise power of both transmission directions of the channel, a frequency band spectrum transposition is used in the system at a special intermediate repeater, called transposition repeater. This repeater is located at the middle of the repeater between two OP. The carrying frequency needed to transpose the spectra is generated at the transposing repeater and is transmitted to both OP. As a result of changing places on the frequency scale of the upper and lower transmitting directions, the noise power in various transmission directions of the channel is equalized.

The line route of this transmission system contains two terminal stations and up to 50 intermediate repeaters fed remotely over phantom circuits of the cable. The maximum distance between two terminal stations is about 90 km.

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2291
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USSR

STABILIZING FREQUENCY SCHOOL FOR YOUNG SCIENTISTS

Moscow ELEKTROSVYAZ' in Russian No 3, Mar 79 p 49

[Article by A. Dem'yachenko]

[Text] Schools for young scientists are an efficient form for disseminating new data, exchanging data and raising the skills of the young specialists. A second such school on the frequency stabilization problem was conducted by the Moscow Power Institute and the Moscow Institute of Radio Equipment, Electronics and Automatic Systems with the participation of the All-Union Institute of Interindustrial Information in Kosovo, Ivanovo-Frankovskaya Oblast, in October 1978. The school was organized with the help of the USSR Minradioprom [Ministry of the Radio Industry], the USSR RSFSR Minvuzov [Ministry of Higher and Secondary Education] and the Central Administration of the NTORES [Scientific and Technical Society of Radio Engineering and Telecommunications imeni A. S. Popov]. It was attended by over 200 people from 100 organizations in 35 cities of the country.

Eighteen lectures, problem-solving and review reports were given which were basically directed toward stabilizing frequencies, and 45 reports were made on particular questions. The greatest interest was evoked by the lectures of M. V. Kapranov on "Synchronizing oscillators by the phase control method" and by V. N. Kuleshov on "Functional unit noises." Representatives of industry Yu. I. Alekhin, A. N. Bruyevich etc. were attracted to giving lectures along with workers in higher educational schools.

A new form of collective creativity was tested at one of the seminars. A plant worker posed a practical problem before the students. Several ways to solve it were proposed right there. Versions of joint work were outlined. The organization committee plans, in the future, to utilize widely such a form of solving urgent industrial problems. A special issue of school materials on "Stabilizing frequencies" was published.

School participants noted the increasing urgency of the frequency stabilization problem and proposed that the school meet biennially (the next one is planned for the fall of 1980), expand its subjects somewhat; include the consideration of auxiliary frequency stabilization units; give special attention to the use of digital techniques; microprocessors; solid state oscillators and new technologies; as well as automatic design of frequency stabilization devices.

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USSR

BOOK ON COLOR TELEVISION PUBLISHED

Moscow ELEKTROSVYAZ' in Russian No 3, Mar 79 p 49

[Book by A. K. Kustarev, A. M. Shenderovich: "Distortions of Color Television Pictures." Moscow, SVYAZ', 1978, 184 pages, illustrations, 30,000 copies, 75 kopecks]

[Text] The purpose of this book is a systematic presentation of information on the most important distortion in color TV pictures, on the nature of their manifestation and what causes them. A separate chapter is dedicated to the description of a full color signal. The basic data on color and colorimetry is cited. Color distortions are considered that destroy the accuracy of the color transmission in the reproduced picture, and the effect of fluctuating noise is shown. Specific distortions which originate when the color TV signal is transmitted and the distortions due to imperfect operation of the color receiver and its reproducing device are described. A special section is devoted to monitoring the quality of the TV picture.

The book is written for engineers and technicians who service color TV equipment and radio mechanics who repair and tune color TV receivers. It may also be useful for a wide group of trained radio fans, VUZ and tekhnikum students.

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CSO: 5500

WRAC PREPARATIONS, AIMS OUTLINED

Paris ARMEES D'AUJOURD'HUI in French Jun 79 pp 11-21, 83

[Article by (navy) Capt Jean Descotes-Genon: "The 1979 World Radiocommunications Administrative Conference"]

[Excerpts] In Geneva on 24 September 1979, nearly 2,000 delegates representing the 154 member countries of the International Telecommunications Union (ITU) will meet for the opening of the World Radiocommunications Administrative Conference (WRAC 79), which for 10 weeks will carry out a complete revision of the regulations governing radiocommunications and of the distribution of the spectrum of radio frequencies.

The first world conference for 20 years, it will be fundamental for the development of radiocommunications between now and the year 2000. The military positions (fixed service below 1 GHz [gigahertz], radio direction-finding or radar service, etc.), still strong in 1959 after the World War, will be difficult to defend this time because of the requirements of the civilian administrations to meet commercial, social and cultural needs.

The International Telecommunications Union is the United Nations institution charged to establish the international regulations governing all forms of communications. Created in 1865 under the name International Telegraphic Union, it is the oldest intergovernmental organization. Apart from world conferences, it has permanent organisms such as:

--the International Radio Advisory Committee (IRAC), which expresses opinions of high scientific value in preparation for the administrative conferences;

--the International Frequency Registration Board (IFRB), which maintains an up-to-date file of all the frequencies used throughout the world and decides whether the frequencies that the countries ssign to their stations are in conformity with the radiocommunications regulations.

But it is the world administrative conferences that fix the doctrine and general policy of the ITU.

Object of the 1979 World Conference

The object of the 1979 Conference is the revision of the regulations governing radiocommunications, so as to utilize in the best way possible, by applying the latest refinements of technology, the limited natural resources constituted by the frequency spectrum and the orbit of the geostationary satellites.

The regulating involves first of all the table of assignments of the frequency bands, which is the basis of the international and national regulations. The assignments are made to the various services carried out by means of radiocommunications, the immense area of application of which is illustrated by the following list:

--amateur radio;
--amateur radio via satellite;
--radioastronomy;
--space operations (telemetry, remote control);
--exploration of the earth by satellite;
--fixed services (radiotelegraphy, radio waves, etc.);
--fixed services via satellite;
--intersatellite communications;
--radio direction-finding;
--auxiliary meteorological services;
--meteorology via satellite;
--mobile services (land, air, sea);
--mobile services via satellite;
--radionavigation (air, sea);
--radionavigation via satellite;
--space research;
--radiobroadcasting (audio and visual);
--radiobroadcasting via satellite;
--standard frequency;
--standard frequency via satellite;
--time signals;
--time signals via satellite.

The table, adopted for the first time in 1906, presently extends from 10 kHz [kilohertz] to 275 GHz, and represents 110 pages on normal-format paper, with nearly 400 reference citations.

For assignment of frequencies, the world is divided into three regions, and specific geographical zones are also defined (European radiobroadcasting zone, European maritime zone, tropical and African radiobroadcasting zones).

The assignments to the radiocommunications services are made on a "primary," "permitted," or "secondary" basis, both on the world level and on the regional level, for one or several countries of a region.

The table is based on the following principles:

--width and position in the spectrum of the bands assigned corresponds to the recognized or foreseeable needs of the service or services concerned;

--to meet the requirements of a "newcomer" whose rights are justified on the technical and operational level, it is necessary to adjust the services already operated within the band, with status of equality or a lower status granted, or sometimes with elimination of an assignment;

--except for those cases in which it has been possible to decide on different assignments in the various ITU regions in accordance with the technical characteristics or propagation characteristics, the general rule is to assign the same band to the same radiocommunications services for the entire world; the services that share the same band are generally those whose comparable technical characteristics facilitate this;

--it is usual for the security and other services, such as radiobroadcasting, to receive exclusive assignments, preferably on a world-wide level;

--in the bands between 2 and 27.5 MHz [megahertz], the propagation conditions require the use of a family of frequencies of several orders of magnitude, in order to maintain a connection for 24 hours a day all year long; the assignments are then spread over 6 bands or more.

In association with the table (Article 5 of the regulations), there are other provisions which also require adjustments or alterations:

--Article 1 contains the definitions of the various terms used in the regulations, including those of the services, the stations, the orbits, and the types of space missiles;

--Article 2 contains the classification of transmissions and the designation of these transmissions with the band widths necessary;

--Article 3 deals with the general rules for assignment and use of frequencies;

--Article 4 states how the members of the ITU can make individual agreements;

--Article 6 lists special provisions relating to the assignment and use of frequencies;

--Article 7 specifies the conditions, for certain services, designed to facilitate use of the same bands with avoidance of mutual interference;

--Articles 9 and 9A state the procedures to be followed by the administrations for coordination and notification of frequency assignments in the international file, both for services on the earth and for space radiocommunications services.

In summary, the table and the associated provisions of the regulations constitute the international legislation which governs the use of radio frequencies and the orbit of the geostationary satellites.

It is always a compromise reached after long and extremely complicated negotiations among the member countries of the ITU.

Preparation for the Conference on the National Level

The National Organisms

Assignment of frequencies to various "services," as defined in broad outline on the world level on the basis of long-distance propagations and the problems of compatibility at the borders, is refined at the national level. In France, the Telecommunications Coordination Committee (CCT) distributes the frequencies higher than 27 MHz in accordance with various statuses (exclusive, priority, coordinating) in a national table (Fascicle II. A/CCT/73) among the following organisms:

--civil aviation;
--amateur radio;
--National Center for Space Studies (space services);
--national education (radioastronomy);
--armed forces;
--interior;
--national meteorology;
--lighthouses and beacons;
--posts and telecommunications (for its own needs or for other users);
--French national broadcasting.

This committee, created in 1945 to oversee the state's interests in the matter of telecommunications, has no equivalent in any other country. Its chairman or its vice chairman must be a general officer; and on the other hand, its direct connection to the prime minister enables it to:

--regulate, through the intermediary of the Frequency Assignment Committee (CAF), the allocation of frequencies to the various users;

--prepare the French position in the international radiocommunications conferences.

Actually, except in cases of dispute necessitating arbitration, it is the Mixed Commission on Frequencies (CMF) of the CCT, meeting in plenary session or broken up into working groups, that elaborates the French proposals. Within it and in all its groups are representatives of the general staffs (EMA [Armed Forces General Staff], EMAT [Army General Staff], EMM [Navy General Staff], EMAA [Air Force General Staff]) and of the directorates (DGA [expansion unknown], DGJM [Gendarmerie and Military Justice Directorate]), as well as of the civilian administrations; the military position has been discussed and decided on beforehand in the Interbranch Commission on Frequencies (CIF), under the aegis of the National Military Frequencies Bureau (BMNF).

The French Proposals

Worked out by the process of broad consultation just described, coordinated with certain foreign countries (European Radiobroadcasting Union for TDF [expansion unknown], European Posts and Telecommunications Conference for PTT [posts and telecommunications], ICAO [International Civil Aviation Organization] for civil aviation, a specialized NATO agency for the military), and after arbitration by the prime minister on disputed points (especially when the interests of the armed forces were underestimated by the civilian administration), the proposals of France, in the form of a thick document of 200 pages, were sent by the PTT administration to the headquarters of the ITU in Geneva in February 1979. Synthesizing our frequency needs for the next 20 years, they are roughly along the lines of those of other big industrialized countries, but differ from them on a multitude of points of detail. Their general tendency is as follows:

--hectometric and decametric waves (1600 to 27500 kHz): reasonable extension of mobile, maritime, PTT and radiobroadcasting (short-wave transmissions) service, to the detriment of fixed services (interior and armed forces radio networks);

--metric and decimetric waves (30 MHz to 1 GHz): extension of civilian mobile services (private radio networks and public land-based radiotelephone) and of radiobroadcasting (for a fourth television network, and a fourth FM radio program), with safeguarding of the armed forces' tropospheric and line-of-sight radio beams in fixed service;

--from 1 to 15 GHz: extension of service via satellite (fixed and mobile), especially in the paired bands 4/6 GHz, 7/8 GHz, and 11/14 GHz, either on an exclusive basis or with sharing by the fixed and mobile services; development of the exploration and space research services, without harming radio direction-finding;

--above 15 GHz: development of space research and radioastronomy. Above 116 [as published] GHz, the assignments are provided for by categories which do not represent a formal sharing but rather [illegible].

Development of the Conference - Post-WRAC Period

All measures have been taken for the material organization of this immense forum, which may hold four commission meetings simultaneously and which will use 9 million printed pages in each of the three working languages.

One cannot prejudge the decisions of the Conference, which on many points will be different from the French views. The developing countries will have a comfortable majority for the first time, and it is known, for example, that they are showing little enthusiasm for decreasing, in the short waves, the fixed service which they continue to make heavy use of.

But at each phase of the negotiations, heavy with consequences for the development of our telecommunications, the 60 French delegates, led by an ambassador and the secretary general of the CCT, will participate in the 8 commissions planned. Among them, the frequency specialists of the general staffs (officers and civil servants) will provide five on-duty teams, relieving one another, to make sure, from day to day and at all levels, that the military interests are respected.

Next, it will be necessary, after the signing of the final documents, to prepare, within the framework of the CCT, the instructions for application of the new regulations in France--instructions which in the case of the frequencies higher than 30 MHz (and consequently of limited propagation) may differ from the international table. As of the present, precautions have been taken by the prime minister in his preparatory arbitration in order for certain essential military installations (tropospheric and tactical radio beams) to be safeguarded for a long transitional period. These provisions will obviously have to be reflected in the national table.

Thus, 1979 marks the beginning of a new era for radiocommunications in general as well as for the military radio installations, which are "required to observe as much as possible the regulations concerning frequencies." General staffs and technical departments are called on to take this constraint into account henceforth in the designing of new equipment and the working-out of operating rules.

Capt Jean Descotes-Genon, who entered the Navy School in 1943, is a qualified transmissions officer. He has done field service in Indochina and in Africa, has held the post of chief of transmissions service in the Pacific and in the 1st Maritime Region, and commanded the BE's [expansion unknown] "Dague" and "Duperre." After being chief of the infrastructure bureau of the Navy general staff, he has been chief of the National Military Frequencies Bureau since March 1978.

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ITALY

DETAILS OF COMMUNICATIONS SATELLITE TRACKING STATIONS

Paris AIR & COSMOS in French 2 Jun 79 pp 41, 43

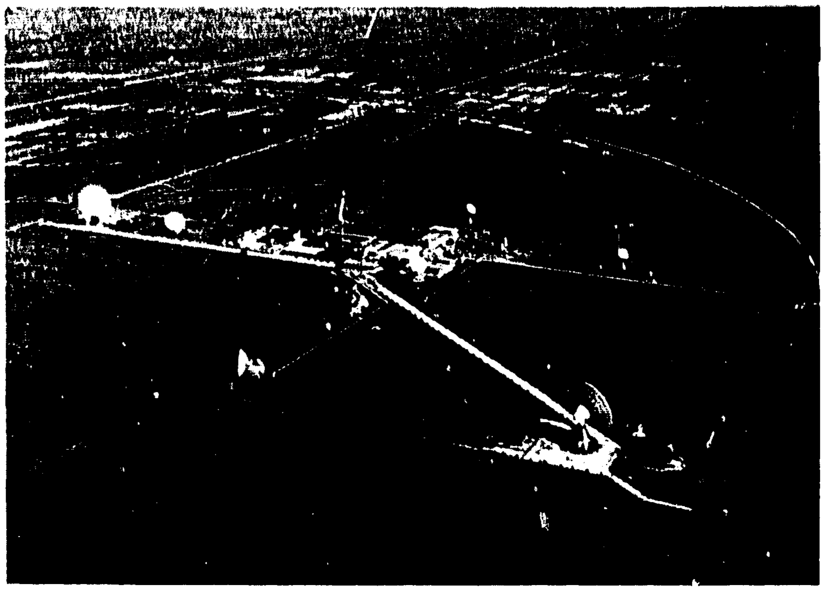
[Article by Pierre Langereux: "Telespazio Is in the Forefront of Space Telecommunications"]

[Text] The Italian space telecommunications company, Telespazio Spa, was established 18 October 1961 for the purpose of utilizing the first American communications satellites (Relay, Telstar, and Early Bird). Then on 12 February 1965, it was officially appointed the P and T's [Postal and Telecommunications Service] exclusive agent for the development and operation of communications satellites in Italy, employed as both national and international means of communication.

Telespazio's capital stock totals about 35 million francs, ownership of which is shared equally by three stockholders: STET [Telephone Finance Corporation], a communications holding company; RAI (Italian Radio Broadcasting and Television Company); and ITALCABLE (Italian Telephone Company). Telespazio actually has several functions. It is an operating company which furnishes commercial communications facilities via Intelsat satellites (more than 1,000 circuits with 54 countries). It is a service company which furnishes technical support--telemetry and telecommand--for various communications satellites: Intelsat, Marisat [Maritime Satellite], Sirio 1 [Italian experimental satellite] and OTS-2 [European Space Agency pre-operational satellite]. It is a consultant firm for national agencies (National Research Council) and such foreign countries as Oman, Liberia, Argentina, Sweden, and Bolivia. It is also a testing firm which operates experimental communications satellites (Sirio 1 and OTS-2) and earth resources satellites (Landsat).

Europe's Largest Telecommunications Center

To conduct its various activities, Telespazio has more than 300 persons employed in its main office in Rome and its two space telecommunications centers. One such center is at Fucino, near Avezzano, some 120 kilometers from Rome. The other is at Lario in the Pian di Spagna, near Lake Como, some 100 kilometers



Aerial view of Fucino center with its nine antennas. From left to right: Intelsat 27.5 meters, Sirio SHF 17 m, OTS 17 m, OTS 3 m, Marisat 10 m, Intelsat 13.4 m, Landsat 10 m, Sirio VHF, and Intelsat 30 m.

from Milan. These centers are equipped with 12 antennas. Nine of these are in the larger center, Fucino's Piero Fanti Center. The other three are in the more recently (1976) established Lario center.

Its number of antennas and the service it provides make the Fucino center currently Europe's--and perhaps even the world's--largest space telecommunications center. We were told this by two Telespazio executives, Pietro Masarati, assistant general manager, and Giorgio Salvatori, director of international relations, at the International Symposium on Telecommunications Systems for the 1980's in Europe conducted in Venice by the Giorgio Cini Foundation with the cooperation of the European Space Agency (ESA).

The Fucino center functions as operator-user of the Intelsat, Sirio 1, and OTS-2 satellites and furnishes technical support for these spacecraft plus the Marisats. It also receives and processes images from the American remote-sensing Landsats and the European Meteosat-1 weather satellite.

Fucino is equipped with two large antennas of 27.5 meters and 30 meters in diameter for links with the Intelsat 4A communications satellites in synchronous orbit some 36,000 kilometers above the Indian Ocean and Atlantic Ocean. These satellites operate in the 4-6 GHz band. A third antenna of 32 meters in diameter is under construction and will become operational in late 1979 or early 1980 to supplement service with the Atlantic Ocean Intelsat 4A satellites. Telespazio also has a 5-year contract--until 1980--for use of the Indian Ocean and Atlantic Ocean Intelsat spacecraft. An antenna of 13.4 meters in diameter is currently in service and a new 32-meter diameter antenna will be completed in late 1979. In addition, an antenna of 6 meters in diameter, now under construction will be employed to control Intelsat satellites in the 11-14 GHz band.

The control center for the Italian Sirio 1 communications satellite is also housed at Fucino. It has two antennas: a parabolic antenna of 17 meters in diameter for SHF analog and digital links (telephone and TV transmission-reception) and propagation experiments; and a dipole antenna (VHF) for telemetry-telecommand operations. The designed service life of the Sirio 1 satellite, launched 26 April 1977, was 1 year. But it is still functioning normally and its current experimentation will be continued until at least June 1979, at which time a decision will be made on its further use.

Fucino also operates and uses the European OTS-2 experimental satellite with two antennas: one of 17 meters in diameter for operational links, such as the one achieved with Venice in early May, and the other of 3 meters in diameter for propagation experiments. Several other European countries, including France, have similar facilities for operating with OTS-2. The OTS-2 contract awarded Telespazio in 1978 covered 3.5 years with possibility of extending the service to 5 years. It should be noted that the Fucino OTS-2 communications station will eventually be transformed to become part of the operational European Communications Satellite (ECS) system expected to become operational in the early 1980's.

Lastly, the Fucino station has an antenna of 10 meters in diameter for telemetry-telecommand-control operations with the Marisat maritime communications satellites managed by the American Comsat General Corporation. Telespazio was awarded a 5-year contract in 1977 for technical support of Marisat satellites orbiting above the Indian Ocean and Atlantic Ocean.

Fucino is also equipped to receive images taken at an altitude of 900 kilometers by the American Landsat earth resources satellites. The TERRA (Techniche di Elaborazione e Rilevamento delle Resorce Ambientale) center, opened in December 1975, has a receiving antenna of 10 meters in diameter and a computerized data processing unit for processing Landsat images for Italian and European users, including France. Fucino is also one of the stations in the ESA Earthnet system.

The center is also equipped for direct reception of images from the European Meteosat 1 weather satellite launched on 23 November 1977. These images are preprocessed by the European control center in Darmstadt, Germany, and then received at Fucino for distribution to Italian weather services.

As for future developments, Telespazio plans to install a second Meteosat image receiving station equipped with an antenna of 10 meters in diameter (PDUS), and improve the Landsat image receiving station's equipment, particularly for reception of data from the American Landsat D satellite scheduled to become operational in 1981. Consideration is also being given to construction of a second Landsat receiving station to serve as a backup facility.

Telespazio is also planning to build an additional station for "live" reception of images from the new American Tiros N/NOAA series of weather satellites, the first of which is already in a polar orbit. In addition, Telespazio expects to obtain an ESA contract for installation of a telecommand-telemetry-control station in Italy to service the new Sirio 2 experimental satellite now under development as a collaborative European project sponsored by Italy.

Aerial view of Lario center with its three antennas. From left to right: Intelsat 32 m, 4-meter antenna for propagation experiments, and Siro SHF 17 m.

Lario Center

The Lario ground station has only three antennas: a 4-meter diameter one for propagation experiments, a 17-meter diameter one for experimental links with Sirio 1, and a 32-meter diameter one for commercial links with Atlantic Ocean Intelsat spacecraft which have some 100 circuits terminating in Italy.

There are plans to enlarge the Lario station, particularly with the installation, in the near future, of a second Intelsat Standard A (30-32 meter) antenna for use with Indian Ocean links when a new satellite becomes operational in that region whose satellite communications capacity has already reached the saturation point.

Italy is also preparing to participate in the operation and use of the future Intelsat 5 spacecraft. The latter will require establishment of nine telemetry and telecommand stations throughout the world during the period 1980-1984.

In addition, Telespazio is preparing to operate and use future communications satellites operating in the very high frequency bands--20 to 30 GHz--with an on-board switching system known as satellite-switching time-division multiple-access (SS/TDMA).

Telespazio officials are also convinced Italy must have a direct broadcasting television satellite--experimental or pre-operational--in 1984-1985 in order to cope with competition from the French and German national systems that will probably be operational by that time. In fact, the medium-term Italian space plan approved by the Ministry of Research, the Ministry of Telecommunications, and the Interministeral Committee for Economic Planning (CIPE) calls for such a satellite.

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END