Chapter 2

Contents of the Project

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2-1   Basic Concept of the Project

2-1-1   Primary Goal and Project Objectives

Based on the policies of "Development Programs relating to Information Communication and the Mass Media in National Development Programs (2000-2004)" outlined earlier in item 1-1-2 ("Development Planning"), TVRI has declared a long-term goal of broadcasting appropriate news programs on a stable basis and has been making various efforts to improve in order to fulfill its responsibilities as a public broadcasting corporation.   However, our survey revealed that TVRI faces various problems as outlined below:

- Almost all of the equipment in the News Division is deteriorated and urgently needs to be upgraded in order for TVRI to provide news programs to the people of the country on a stable basis.
- Frequent equipment breakdowns result in the interruption of news broadcasting. The risk of losing timeliness because of such interruptions is increasing every day.
- Since the start of its broadcasting, TVRI has been accumulating films and analogue tapes, some of which now possess important historical value.   However, the images stored on such films and tapes are deteriorating.
- As more and more of the in-house LAN network becomes digitized, it is essential that cameras, editing equipment, and other production equipment at TVRI be replaced with digital equipment to ensure compatibility and efficiency.

In order to solve these problems, the primary goal of this project is to provide appropriate news programs to the Indonesian people on a stable basis, in line with the government's National Development Programs for supplying information and related services according to the needs of the nation.   The project objective is to stabilize the production and broadcast capability of TVRI's News Division by replacing and upgrading its equipment.

2-1-2   Outline of the Project

To achieve the above objectives, the goal of this project is to replace and upgrade the news production equipment of the News Division of the Jakarta Station (to be called "input" on PCM) by installing new equipment and providing soft components, including instructions

and training for equipment operation and TV news program production (to be called "activities" on PCM).

These activities are expected to bring about various benefits ("output" on PCM), such as reduced production time, enhanced capabilities to produce and broadcast programs, and better preservation of archival news tapes.

In the abovementioned activities, the goal of our cooperative scheme is to procure and install production equipment for the News Division.

(1) Input

Japanese Side	Indonesian Side:
[Equipment] 　A　1-to-1 Editing System　　　　　5 sets 　B　A/B Roll Editing System　　　　1 set 　C　Non-Linear Editing System　　　1 set 　D　On-Air VTR System　　　　　　5 sets 　E　Foreign Program Recording System　3 sets 　F　Camera Shooting System,　　　19 sets 　　　Camcorder & Peripheral Equipment 　G　Studio Recording VTR System　3 sets 　H　Character Generator/CG System　2 sets 　I　Broadcast Tape Storage System　1 set 　J　Repair Parts　　　　　　　　1 set	[Facility/Equipment] 1) Securing of space and renovation of ex-RTF building for installing new equipment. 　• Partition walls in the equipment rooms on the 1st and 2nd floors. 　• Announcer booth with simple sound insulation 　• Installation of power distribution box in each room where new equipment will be set up. 　• Installation of several air-conditioners for the broadcast tape storage system. 　• Relocation of analog tape VTR players to the broadcast tape storage room for digitization of existing material on tape. 　• Relocation of existing equipment to be put to other uses.
[Personnel] 　• Instruction to be given by Soft components (instruction on TV program production) : 3 persons (2 months and 10days)	[Personnel] 1) Operation & Maintenance Staff for News Production Equipment 　• Camera crew 　• Editing staff 　• News program producers 　• Maintenance staff 2) Operation & Maintenance Staff for Broadcast Tape Storage System 　• Videotape format conversion and tape registration staff 　• Service maintenance staff

(2) Activities

    1) Replace the deteriorated production equipment of TVRI's News Division.

       Examine the optimum plan and project scale, and perform a basic design.

    2) Secure equipment operators and maintenance staff.

       Train the equipment operators and maintenance staff.

       Secure budget for equipment operation and maintenance.

    3) Secure TV production staff.

       Train the news production staff.

       Secure budget for production.

    4) Establish a broadcast tape storage system.

       Prepare an equipment inventory.

The following results are expected through the implementation of the above inputs and activities:

(3) Outputs

With the measures taken by the replacement and expansion of news program production equipment, the following effects can be expects;

    1) The production time needed for one program will be shortened.

    2) Program production and program transmission capability will be improved.

    3) Preservation of historical news material by means of digitized tape will be improved.

2-2   Basic Design of the Requested Japanese Assistance

2-2-1   Basic Design Policy

2-2-1-1   Design Policy

(1) Components of the Project

The major components of this project are aims to replace and improve the deteriorated equipment of TVRI, and the basic design will be drawn up based on the following points:

- Replace and supplement the existing analog equipment with the latest digital equipment.
- Determine the scale of the news program production (quantity, grade, etc.) proportionate to the production capacity of the News Division and keep system requirements to a minimum.
- Examine the most effective way to introduce the non-linear editing system by taking into account how widely the system is in use among commercial TV stations in Indonesia, so as to avoid creating any digital divide between Indonesian TV stations.
- As this project will cover only the procurement of equipment, renovation of the building and other preparatory work on the site shall be carried out by the recipient country.
- To ensure proper interfacing with the existing equipment, new equipment shall in principle conform to broadcast-specification equipment.
- The broadcast tape storage system shall be so designed as to incorporate the alternative plan proposed by TVRI keeping in mind the possibility of future expansion.

(2) Installation Site of the Equipment to be Procured

Existing equipment is now installed in the existing News Division Building (see Fig. 2-2-1: Project Site at TVRI headquarter), the rooms of which are old and not large enough to install new equipment.   After examining three possible sites for installing the equipment, TVRI selected the 2-story ex-RTF Engineering Center (see Fig. 2-2-1).

We have inspected the ex-RTF Engineering Center Building, and our study has shown that the structure and the floor area of the building are sufficient for installing the equipment.   However, the following points need closer examination and review:

     (a)   Detailed examination of the renovation work and cost of this work

(b)   Review of electrical and air-conditioning systems

(c)   Discussion with TVRI regarding to the floor layout of the project equipment.

(3)   Close Examination into the Requested Quantity of Each Component

The following sections briefly examine the current status of existing equipment, and gives reasons for what have been considered appropriate quantities.
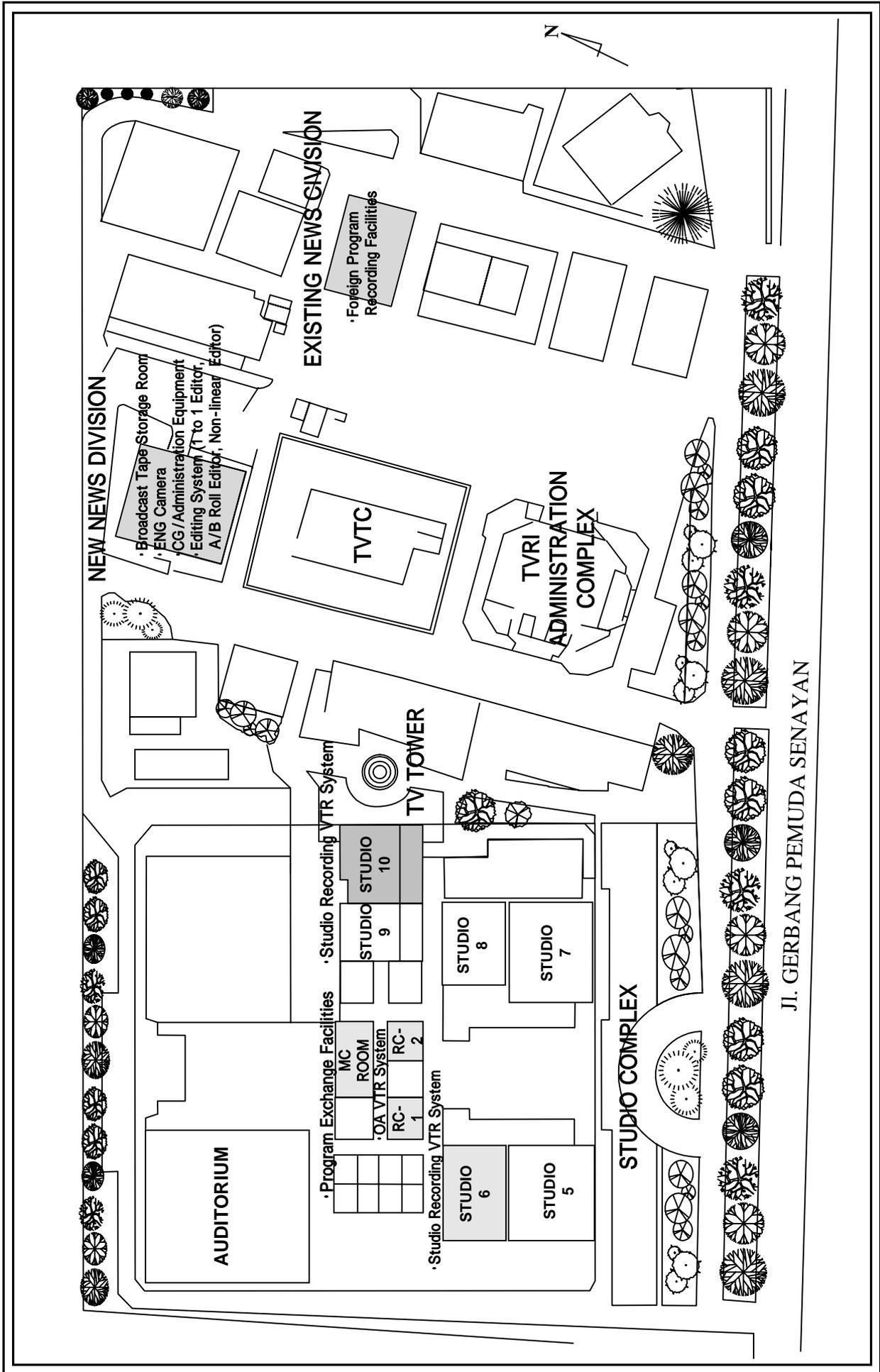
Fig. 2-2-1 Project Site at TVRI Headquarter

(4) Short summary of Examination into Each Component

　　1) Camera Shooting System, Camcorder & Peripheral Equipment　25 sets　　19 sets

System Configuration
This camera system is for news gathering and composed of a camera unit, a digital VTR and battery.　It records color digital pictures on 30-minute tape. 　　The standard equipment comes with a 21: 1 power zoom lens, in addition to which a wide-angle lens and a telephoto lens will be needed as accessories.
Current Status of Existing Equipment
During our survey on existing equipment, we observed that TVRI owned 36 cameras and 2 CCD camera heads (a component-type with the VTR recorder removed).　One of the 36 cameras was for consumer use and used Hi8 tape.　Since five cameras were broken or unusable, 31 cameras were registered and being used in daily shooting. 　　Many of these cameras were overused and severely deteriorated because of a basic shortage of cameras and omission of proper periodic maintenance, as they often needed to be used to keep up with the shooting schedule. 　　The operating condition of each camera seemed to change from day to day.　Failures were occurring frequently because of inadequate periodic inspections, etc.　In fact, we examined how the cameras were used in a 1-week period and observed no trace of inspection.　In many cases, cameras were properly functioning one day, and suddenly malfunctioning the next (18 cameras were functioning at the time of survey).
Basis for Appropriate Quantity
(1)　Parameters 　　　　No. of cameras becoming 10 years old before the handover (delivery) date: 　　　　　　　　　　　　　4 out of 31 　　No. of analog cameras:　　　　28 out of 31 　　No. of nonstandardized cameras:　14 out of 31 $$\frac{4+28+14}{3} \doteq 15 \text{ cameras}$$ (2)　Omission of periodic maintenance is largely responsible for the low operation rate of existing cameras.　In order to ensure periodic maintenance, with each of the 15 cameras inspected once every two weeks, an additional 1 camera will be needed. (3)　To report important news promptly from several different sites (accident site, police station, hospital, ministry concerned, etc.), at least a total of 4 (four) cameras will be needed.　(Since only one camera is allocated for such reporting, three cameras need to be added.) 　　Therefore, 15 ＋ 1 ＋ 3 ＝ 19 digital cameras are considered appropriate.
Equipment Overview
  Camera/VTR　　　Wide-angle/telephoto lens　　　Tripod　　　Battery
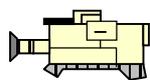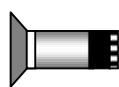
Table 2-2-1   Current Status of Existing Cameras

No.	Model name	Functioning (as of Sep/10/2001)	Year of production	Becomes 10 yrs. old before delivery (handover) date	Broadcasting/ Professional/ Home use	Analog or Digital
1	R1- (ISTANA)		1998		B	
2	R1-	×	1992		B	
3	BTS-1		1995		B	
4	BTS-2	×	1995		B	
5	BTS-4	×	1994		B	
6	BTS-5	×	1994		B	
7	BTS-6	×	1994		B	
8	BTS-7	×	1994		B	
9	BTS-8		1994		B	
10	BTC-PUTIH		1997		B	Analog
11	BTC-4	×	1995		B	
12	WAPRES		2000		B	
13	BTC-10	×	1992		B	
14	BTC-11	×	1992		B	
15	BTC-MO1	×	1995		B	
16	THOMSON-		1997		B	
17	JVC-A		1998		P	
18	JVC-B	×	1998		P	
19	JVC-C		1998		P	
20	DVCPRO-A		1997		P	
21	DVCPRO-B	×	1997		P	Digital
22	DVCPRO-C		1997		P	
23	PANASONIC-	×	2000		P	
24	PANASONIC-		2000		P	
25	PANASONIC-		2000		P	
26	PANASONIC-IV		2000		P	
27	PANASONIC-V		2000		P	Analog
28	PANASONIC-VI		2000		P	
29	PANASONIC-VII		2000		P	
30	PANPASONIC-VIII		2000		P	
31	BTC-3		1992		B	

2) 1-to-1 Editing System　5 sets　　5 sets

System Configuration

The system is composed of 1 digital VTR player, 1 digital VTR recorder, 1 editing controller, 1 color monitor, speakers, and accessories.　It allows gathered news material to be selected and clipped (using a combination of one VTR player per VTR recorder) and edited into a news program.　It is usually used for high-speed news editing.　There are two types of 1-to-1 Editing Systems: one is for editing video only (type A), while the other can also be used for audio dubbing (type B).

Current Status of Existing Equipment

At the time of our survey, 5 sets (3 analog and 2 digital) for 1-to-1 editing were operating fully. 4 systems were being used for 1-to-1 editing for a total of 54.3 hours/day, and one of them was operating as long as 19 hours/day.　1 system was used for tape format conversion.

This is because the extended airtime of TVRI is mostly being allocated to news programs (see Appendix-5: Usage of VTR Editing Equipment).

Basis for Appropriate Quantity

- Based on the average operating hours per day of the 1-to-1 editing system, the number of necessary systems is estimated at 7.
- Based on the maximum operating hours, the number of systems required is calculated at 10.
- Two existing systems can be transferred to operate at a new site.

  Based on the above, the appropriate quantity is: $7 - 2 = 5$ systems.
- Editing work for 2 of the 10 systems (maximum requirement) may be done using the A/B roll or non-linear editing system.
- While 5 type-B (with audio dubbing function) 1-to-1 editing systems were requested, procuring 3 type-A systems and 2 type-B systems is considered more appropriate, judging from the way the existing equipment (2 audio dubbing systems) are being used.

System Diagram

<Type A>: 3 sets　　　　　　　　　　　　　　　<Type B>: 2 sets
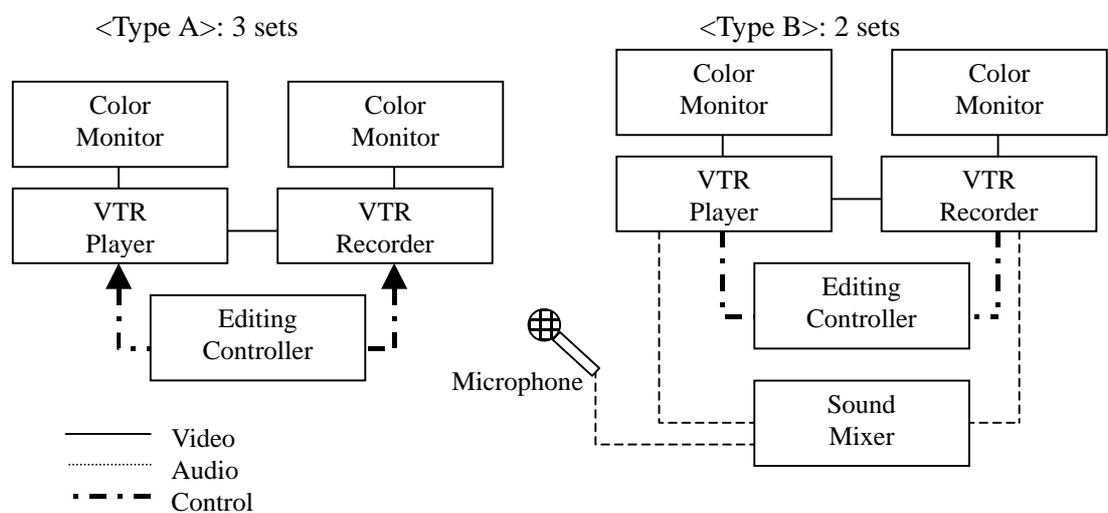
3) A/B Roll Editing System   2 sets   1 set

System Configuration

The A/B roll editing system is composed of 2 digital VTR players, 1 digital VTR recorder, an editing controller, a computer display, a video switcher with digital special effects, one sound mixer, and accessories.   This system can mix and edit video material from two video sources.

Special effects, as well as computer graphics and 3D titles can be added to the video by combining the system with a computer graphics /character generator.

Current Status of Existing Equipment

An old system in use for over 10 years and another relatively new system (under repair) were operating.   According to field interviews, these 2 systems were used day and night at a high operation rate.   However, our survey confirmed that they were being used for an average of 3.4 hours a day and up to 6 hours a day.

Basis for Appropriate Quantity

TVRI's News Division uses the A/B roll editing system to produce weekly sports digests, public announcement programs, and daily-life information programs.   2 systems were requested initially. However, after studying the current status of the existing VTR editing systems, we confirmed that 1 system could be repaired and reused upon relocation.   Therefore, we determined that providing 1 new system to replace the old one that has been in use for over ten years would be appropriate.

System Diagram
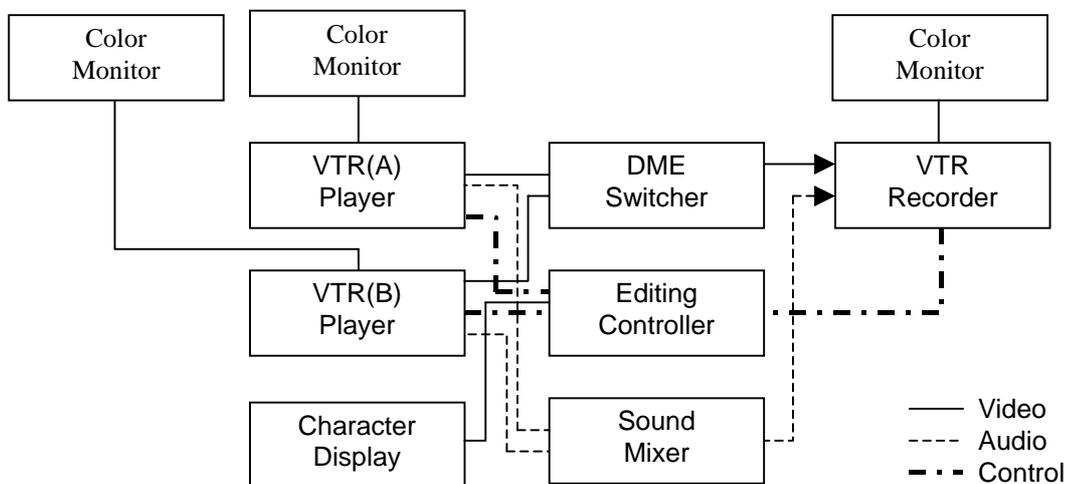
4) Non-Linear Editing System 2 sets   1 set

System Configuration
- The non-linear editing system is composed of 1 digital VTR (player/recorder), 1 computer unit (with frame memory, 3D-lighting/trail-effect board, etc.), 1 color monitor, and other components.
- Works powerfully for mixing multiple video signals.
- Can add special effects to news pictures.
- Can generate attractive 3D moving titles.
- Can store many events and long hours of news coverage, thereby allowing the editing of news programs for one week.

Current Status of Existing Equipment
- One system was being repaired (to be sent back from Singapore at the end of September).
- To handle emergency situations, the News Division would borrow the same system from a regional station (Bandung TVRI) on a temporary basis.
- We surveyed the usage situation of the non-linear editing system at 3 commercial TV stations, and found that they owned 3 ~ 4 sets with which they produced news programs for 2 ~ 3 hours news program per day.

Basis for of Appropriate Quantity
- News programs account 10 hours of the total daily airtime 19 hours of TVRI. Of the above, 8 news programs are 30 minutes to 1 hour long, indicating an increasing demand for the non-linear and A/B roll editing systems. The non-linear system with its high storage capacity is particularly useful for editing weekly news digests, sports specials, the recent coverage on the terrorist attacks on the US, and other material that tend to accumulate. It increases efficiency and thereby reduces editing time.
- Once all the equipment at TVRI is digitized in the near future, the non-linear editing system will take over from the A/B roll editing system as the workhorse of editing work.
- Appropriateness of quantity: According to TVRI's current program timetable, 8 news programs are 1 hour or more in length.   Switching from the linear-type (1-to-1 and A/B roll) to the non-linear type system will facilitate the editing operation and thereby lessen the load on the 1-to-1 system. To achieve this, at least 2 non-linear editing machines will be needed. As one existing machine will be repaired and sent back, procuring 1 system will be the appropriate choice.

System Diagram
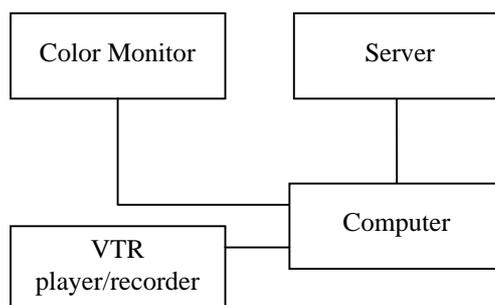
5) On-Air VTR System   3 sets   5 sets

System Configuration

- On-air VTR systems are used for broadcasting news programs.   This project will procure 3 sets of this system (same as the requested quantity), of which 2 will be installed in Continuity Studio-1 (for nationwide broadcasting) and one in Continuity Studio-2 (for the metropolitan area) to broadcast news programs (digital).
- 2 VTR sets were added: 1 for distributing news to Asian countries and 1 for sending to TVRI's regional stations throughout Indonesia.

Current Status of Existing Equipment

At the time of survey, a few analog VTRs were in use, as listed below:

- Continuity Studio-1 [1] (for airing news) 2 sets   *1   Master control room for National channels
- Continuity Studio-2 [2] (for airing news) 1 set   *2   Master control room for Metro channel
- Program Exchange

  For receiving from and sending to Asian countries   1 set
  For receiving from and sending to TVRI's regional stations 1 set

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Basis for of Appropriate Quantity

- As the cameras and editing systems of the News Division have been replaced with digital systems, its on-air VTR systems too will have to be replaced with digital ones.
- The VTRs for sending news programs to others regional stations were missed out of the list of TOR at the time of submitting the request, but we considered they need to be digitized as well.
- It is necessary to provide total 5 sets VTR in total.
  - National program   2 sets
  - Metropolitan program   1set
  - Reception / transmission device for the Asian countries   1set
  - Reception / transmission device for regional stations   1 set

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System Diagram

See Fig. 2-2-2

6) Studio Recording VTR System　3 sets　　3 sets

System Configuration
- VTR systems for studio recording are used both for recording the news programs produced at each studio and for playing back, in the studio, tapes that have been edited in the editing machines.
- News programs are being produced at the following two studios:
Studio No. 10 (News production studio)
Studio No. 6 (News/talk-show production studio)
- Along with the introduction of digital cameras and editing systems, VTR systems will be also replaced with digital types.

Current Status of Existing Equipment
- Studio No. 10 was equipped with three analog and two digital VTR systems.
- Studio No. 6 was equipped with two sets of VTRs for recording/playback.

Basis for Appropriate Quantity
- Since Studio No. 10 was being used as the main news studio, we were assuming that the requested 3 VTR systems would be used in Studio No. 10.　However, during the survey, we realized that only 1 would be installed in Studio No. 10 and that 2 sets had been requested for Studio No. 6.
- Studio No. 10 was equipped with digital VTR players.　Thus, installing 1 digital VTR recorder will create an integrated digital flow, of camera　editing equipment　studio (playback/recording).
- Studio No. 6 is used more frequently for news production compared to the time before ex-News Studios No. 1, 3 and 4 were destroyed by fire.
To create an integrated digital flow of camera　editing equipment　studio (playback/recording) in Studio No. 6, 2 sets of VTRs for recording and playback will be needed.

System Dia　Studio No. 10　　　　　　　　　　　　　　Studio No. 6
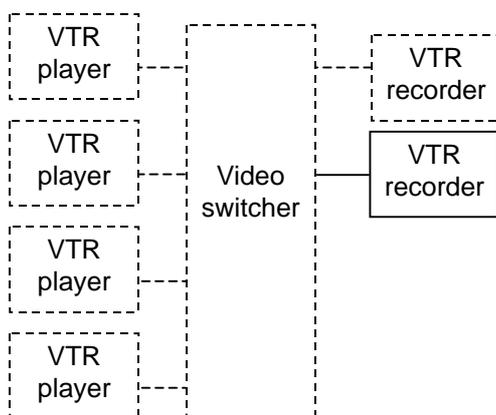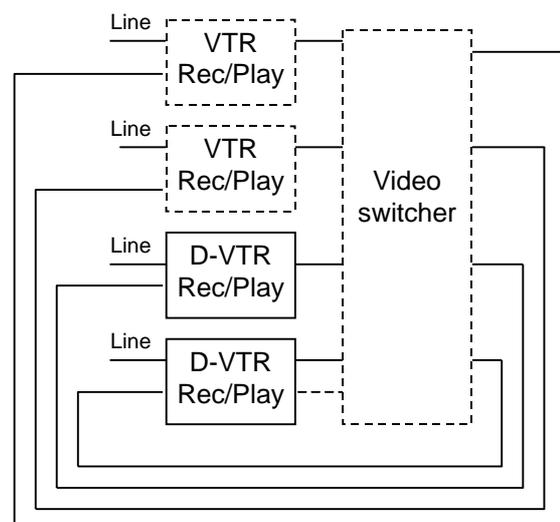
7) Foreign Program Recording System   4 sets ➔ 3 sets

System Configuration

- 4 digital VTRs were requested for recording foreign programs transmitted from 4 separate signal sources.

📡	Receive CNN	Digital VTR-1
📡	Receive APTN	Digital VTR-2
📡	Receive REUTERS	Digital VTR-3
📡	Receive AVN	Digital VTR-4
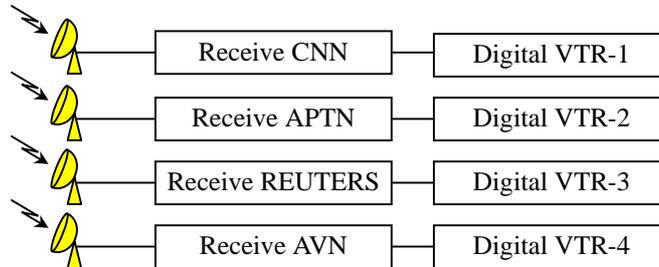
Current Status of Existing Equipment

- The existing system switched between the signals from different foreign broadcasting stations which were then recorded on one analog VTR.

📡	Receive CNN		
📡	Receive APTN	Switcher	Analog VTR
📡	Receive REUTERS		
📡	Receive AVN		
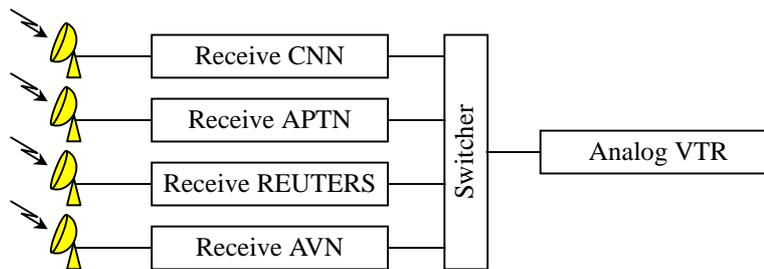
Basis for Appropriate Quantity

- Looking at how many foreign programs were being recorded, we found 31 items/day of foreign news programs (12% of total news time). Considering that broadcasting hours will be extended by 30 minutes this October, and that the share of news programs will be increased by 20% in the near future, 3 VTR sets will be necessary.
- According to the foreign-program recording schedule, 3 programs are being received concurrently between 14:00 and 16:00. Thus, installing 3 VTR systems and will be both sufficient and appropriate.

System Diagram

📡	Receive CNN		Digital VTR
📡	Receive APTN	Switcher	Digital VTR
📡	Receive REUTERS		Digital VTR
📡	Receive AVN		
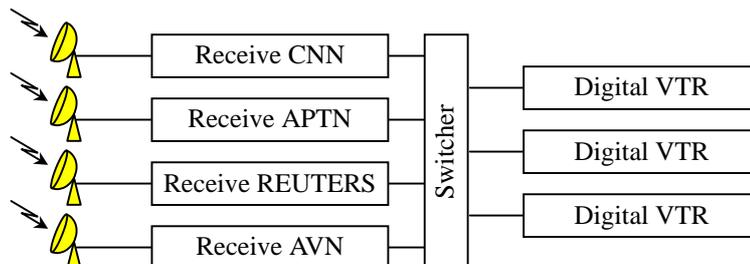
Table 2-2-2　Daily Time Schedule of Foreign Program Recording System

	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1	2	3	4	5	6	7
REUTERS																								
APTN																								
CNN																								
AVN																								
Number of necessary VTR　Recording	1	2	2	2	2	1	3	3	3	1	1	0	0	1	1	1	2	2	2	2	0	2	2	

Legend

☐ News

■ Sports

8) Character Generator/Computer-graphics System   3 sets   2 sets

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System Configuration

- The Character-generator (and computer-graphics) System can insert characters into picture to form superimposed characters by connecting to editing and recording systems.
- It also generates computer-graphic pictures and superimpose generated characters on a computer-graphics screen.

Current Status of Existing Equipment

- Each of the 2 existing A/B roll editing machines was connected to an old-type character generator that could only generate simple characters.

Existing A/B Roll Editing Machine	Existing A/B Roll Editing Machine
Attachment Character Generator	Attachment Character Generator
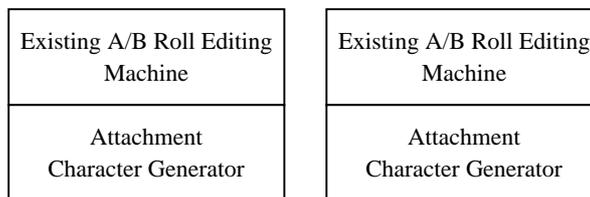
- Studio No. 6 was installed with 1 character-generator/computer-graphics system.

Basis for of Appropriate Quantity

- 2 character generators (with computer graphics) were requested for the A/B roll editing systems for inserting subtitles, captions, and graphics.
- Although the request was for 3 character generators including 1 character generator for the VTR recording system of Studio No.6, we determined the existence of the above equipment at studio No. 6.   Thus installing 2 character generators will be appropriate.

System Diagram

Existing

A/B Roll Editing System	A/B Roll Editing System	Studio No.6 VTR Recording System

Existing

Character Generator Computer Graphics	Character Generator Computer Graphics	Character Generator Computer Graphics

—— New Equipment
---- Existing Equipment
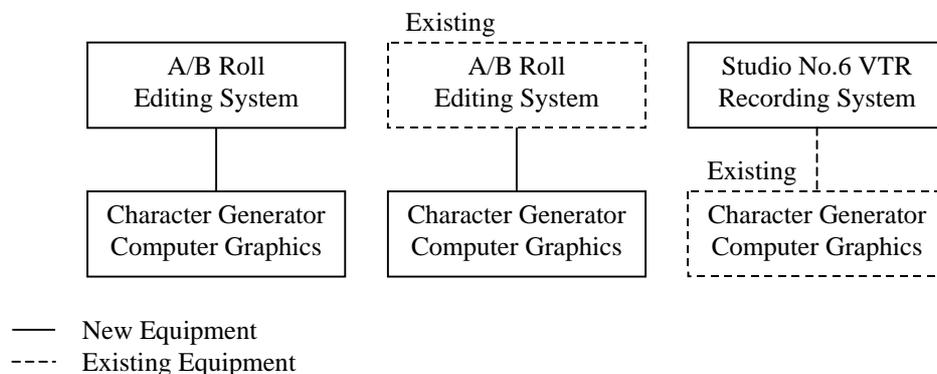
9) Digital Archive System   1 set   1 set

    (new name is "Broadcast Tape Storage System")

System Configuration
• The requested digital archive system has the following functions:
  (a) Converts analog tapes into digital tapes for rebroadcast and long term storage.
  (b) Can convert as many as 4,320 tapes/year by using 3 digital VTRs.
  (c) Tapes are registered using 3 computers, and about 10 items can be input per video material.
  (d) Can register compressed motion pictures that can be searched from outside the system.
  (e) Tapes are loaded onto an automatic cart machine, with which materials can be taken out automatically from outside.

Current Status of Existing Equipment
• Current status of existing broadcast tape storage system
  (a) Analog tapes were stored in physical form in a poorly regulated environment (temperature, ventilation, dust, etc.)
  (b) Tapes were registered using 3 computers (one of which was broken), which input 5 items per video material.
  (c) The tapes were stored on stationary steel or wooden racks.

Basis for of Appropriate Quantity
• During the survey, TVRI proposed the following downsizing of the archive system:
  (a) The tape conversion method would be the same as in the original plan.
  (b) The tape registration method would be the same as in the original plan. A still-pictures search function would also be provided.
  (c) Registration of compressed motion pictures would be cancelled.
  (d) Slide racks would be adopted, and storage and retrieval of tapes done manually.
  (e) 40,000 existing tapes and 10,000 new tapes would be stored.
 	
After examining the above downsizing plan, we have concluded that:
  (a) Storing tapes in digitized form would be useful and necessary as the trend will be for analog equipment to be gradually replaced by digital equipment.
  (b) A tape registration system and a still-picture search system would expedite the process of searching and retrieving tapes, and therefore should be given to the broadcast tape storage system.
  (c) Slide-racks would be locally procurable, improve the space factor of the storage system, and therefore be useful.
    The downsized plan is about 1/3 of the initial request, but still carries all the minimum functions that will allow digitization and long-term storage of tapes. Thus, the downsizing plan is deemed appropriate.

System Diagram See Fig. 2-2-3 and Fig. 2-2-4.
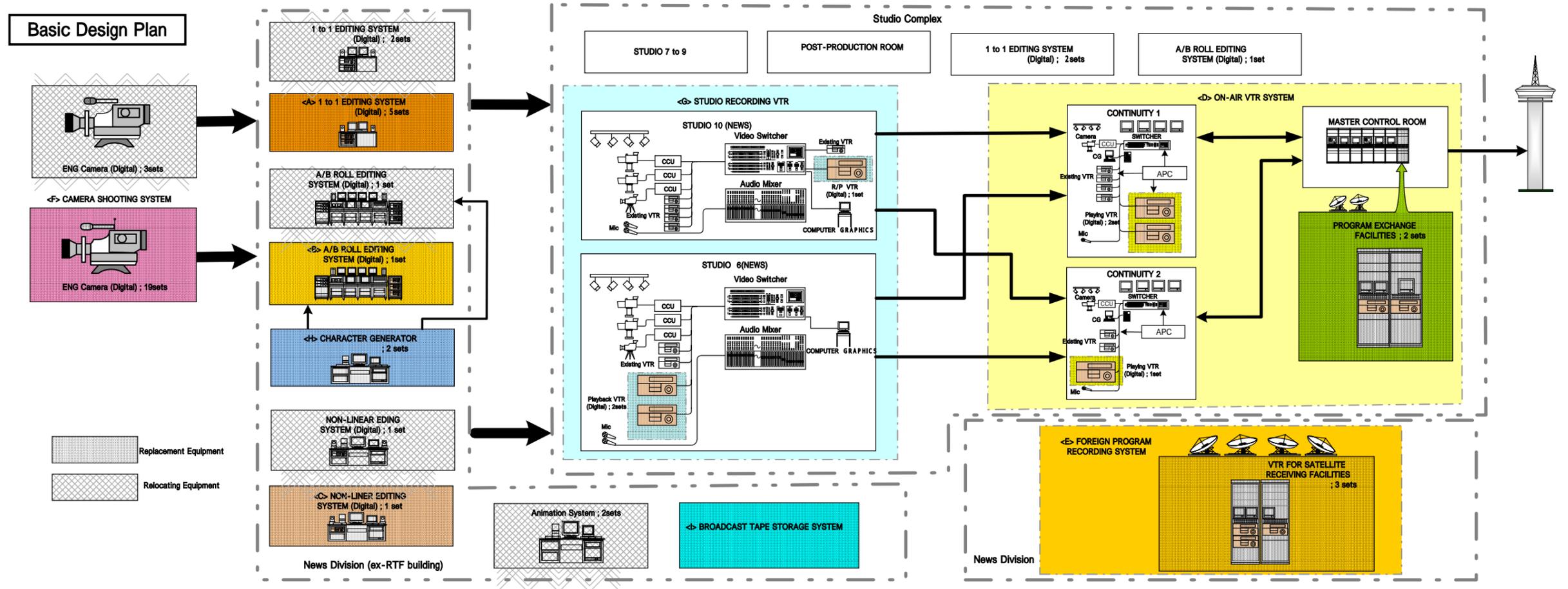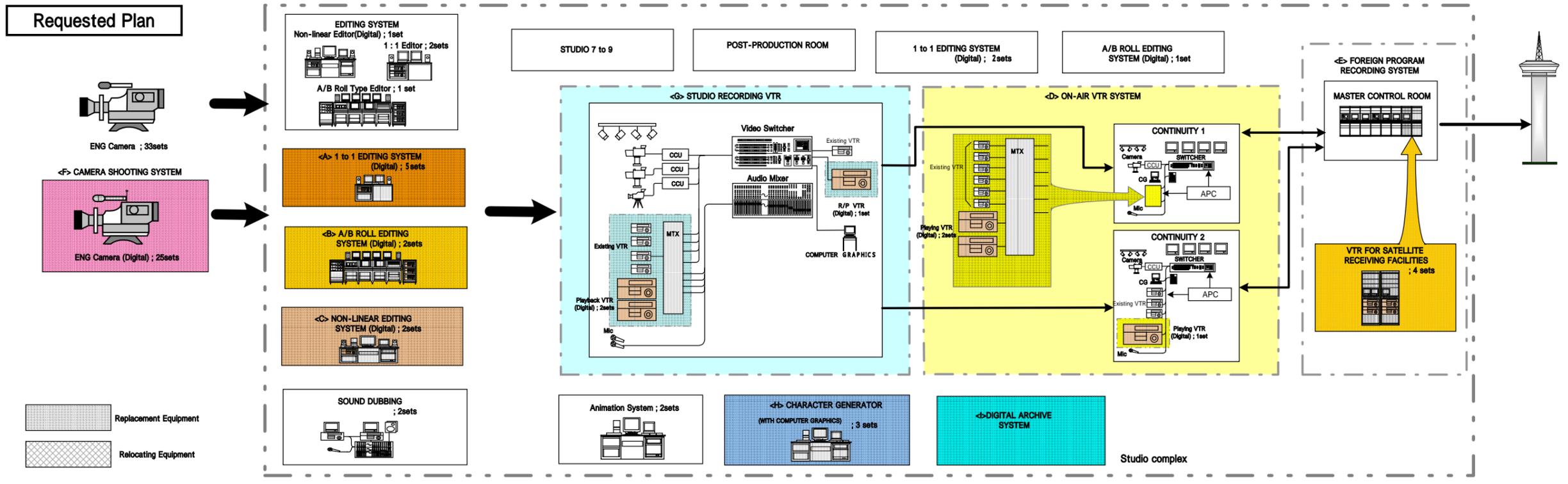
Figure 2-2-2 Final Modified Plan for Requested Equipment

(5) Standards Applicable to the Equipment

To ensure high video/audio quality, reliability, stability, and ease of use, the following standards and considerations will be applied to the equipment to be procured under this project:

1) TV systems shall comply with PAL-B.

2) High reliability and energy-conservation shall be pursued while taking into account easy maintenance, administration, and operation.

3) The standard applied to each broadcast system shall be compatible with IEC, JIS, and EIAJ standards and quality assurance.   The design shall conform to the technical standards of ITU-R while ensuring electrical and mechanical safety and equipment ruggedized for heavy-duty use.   Expandability shall also be taken into account.

Listed below are some of the applicable standards:

(a) Coding parameter of studio digital TV: ITU-R BT.601-2

(b) Serial digital interface: SMPTE 259M, EBU Tech 3267E

(c) Parallel digital interface: SMPTE 125M/EBU 3267

(d) Digital audio signal: A ES3-1992, AES-3id-1995

(6) Grade of Broadcast Equipment

It is desirable that the broadcast systems to be procured comply with certain broadcast-equipment standards for the following reasons:

1) The purpose of the project is to replace and improve deteriorated equipment.   Since all the existing systems at TVRI conform to broadcast standards, only newly introduced broadcast equipment must also be for broadcast use in order to ensure proper interfacing with existing systems and high stability of operation during live broadcasts.

2) High Reliability and Performance

Failure of broadcast equipment at shooting sites can mean missing opportunities to shoot valuable news scenes.   To avoid this, the equipment should meet the following requirements:

- Standard equipment compatible with the broadcast systems of other TV

stations for program delivery and receiving

Since most broadcast systems use component digital video signals in the 4:2:2 format (ITU-R [1] BT.601), equipment to be procured under this project should also conform to the same standard for compatibility.

As for audio systems, EBU [2]/AES will be applied.

Notes   *1: International Telecommunication Union (ITU)

         *2: European Broadcast Union (EBU)

- Inspection of Broadcast Equipment

  Standardized broadcast equipment may be expected to offer high stability, as it comes with a performance test sheet showing how the equipment performed under varying temperature, humidity, and other conditions.

- Securing of High Performance Characteristics

    Video cameras for broadcast-use utilize only the highest-grade CCDs selected from the thousands of CCD devices produced, as these devices have an inherently low yield.

    VTRs for broadcast-use adopt a guard band to improve leakage between recording tracks.

    Standard BNC connectors provide an even 75   impedance throughout the video bandwidth.

(7) Establishment of an Integrated System to Facilitate Broadcasting Operations

  1) Replacement of Analog Equipment with Digital Equipment for News Program Production.

  - Digitalization of cameras and the introduction of broadcast-use equipment
  - Of the 31 existing cameras, 28 sets are of the analog type and have gone beyond their service life. By replacing these deteriorated and unstable cameras with broadcast-use digital cameras, TVRI's news gathering crews will be able to concentrate on producing better quality news programs.

    Also, the integrated system will be so designed as to take advantage of digital technology as described in the following section.

  - Introduction of standardized broadcast-use equipment will be promoted.
  - The broadcast equipment shall comply with digital broadcast system standards in accordance with item 2-2-1-1 (1) and (6).

- This project intends to replace and improve deteriorated equipment in order to facilitate broadcasting operations at TVRI. Introduction of standardized broadcast-use equipment will be effectual from viewpoint of interface between various broadcast equipment and creating an environment to enable sophisticated operation in live news.

2) Enhanced Stability of Operations through the Introduction of Digital Equipment
   Outlined below are some of the advantageous characteristics of digital equipment:

Characteristics	Description
1. Enhanced video/audio quality	• Deterioration of video/audio characteristics occurs through video duplication and other editing operations in broadcast stations. • Digital is less susceptible to noise and other interference during signal distribution and transmission.
2. Improved reliability and easier maintenance	• Requires shorter time for installation and adjustment. • Less prone to deteriorate with time, thus providing more stability and easier maintenance and requiring less frequent adjustment.
3. Processing of multiple signals	• Allows use of memory technology to improve video quality and convert between TV systems. • Offers a wide range of effects, such as zooming in and out on the screen.
4. Smaller-sized equipment	• Enables signal processing by means of integration and switching, thereby enhancing reliability. • Use of fiberoptic and other multi-signal cables reduces the number of cables, thereby saving space.
5. Application to auxiliary equipment	Superimposition of auxiliary signals enables self-diagnosis of video/audio systems, thereby making maintenance work less labor intensive. Enables superimposition of resource ID signals, as well as main line signals, thereby upgrading operations.

3) Standardization of Tape Format of On-Air VTR and Camcorder for News Gathering
   The most efficient approach to news gathering is to establish an integrated system for all operations from camera shooting to editing and to SNG/FPU transmission. Under this system, using a unified videotape format will be most desirable.
   Usage of standardized digital camera systems and a unified tape format will simplify the editing and transmitting operations in this project as well.

4) Expediting Editing Operations by Introducing a Non-Linear System

To facilitate editing operations, TVRI has presented the following plan of specific equipment use:

(a) Use of Non-Linear Editing System for News Programs
- News documentary and magazine program (08:45, 15:45,22:45)
- 19:00 time slot on Metro Channel

(b) Benefits Expected from the Usage of Non-Linear Editing System
- Allows editing by program-length-adjusted substitution.
  When editing many news items in a weekly news program, for example, unwanted program previews for the domestic audience can be deleted and other "cuts" inserted using the program-length-adjusted substitution function.
- Facilitates editing operations
  Cut-in and cut-out points can be input as the operator feeds a VTR tape that contains news "cuts" into the non-linear editing system. All the operator has to do to finish editing the tape is fine-adjusting and checking the editing points and sending the tape to the server.
  Eliminates the need to convert tapes containing news video content recorded in different VTR formats into transmitting VTR format.
- Speeds up the editing process
- Saves labor in editing operations

(c) Editing Systems Suitable for Specific Types of News Program
  There are the following three types of news programs:
- Regular news   regular news program anchored by 1 person
- Wide News I (with a commentator explaining news)
- Wide News II (magazine program of 1 – 1.5 hours covering 20 – 30 news items with comments)

It will be possible to adopt different editing systems depending on the type of news program being edited.

Editing System \ Type of News Program	Regular (Spot) News	Wide News I/II
1:1 Editing System	Used to draw out the necessary "cuts" from one tape containing regular or urgent news video material, and splice them together on another tape.	—
A/B Roll Editing System	Suitable for drawing out video materials from several tapes to produce a regular or urgent news program, as it expedites effective editing and inserting of special effects.	Useful for switching and drawing out necessary "cuts" from several tapes, and combining them to produce one news item.
Non-Linear Editing System	—	Effective for transmitting a long news program covering 20 – 30 items and for inserting a variety of special effects and computer graphics.

2-2-1-2   Policy on Natural Environment

Broadcast equipment is very sensitive to high temperatures and humidity, and therefore requires special considerations in the facility into which it is installed, such as setting up a well-regulated air-conditioning system.   Although this project only covers the procurement of equipment, the consultant firm will give guidance to TVRI concerning the selection of appropriate air-conditioners and dehumidifiers with due regard to the temperature and humidity ranges of Jakarta City as shown in the table below:

Temperature/Humidity in Jakarta City by Month

Item	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Maximum Temperature	31.7	32.0	23.0	33.3	33.4	33.3	33.1	33.4	33.9	34.1	33.5	32.8
Humidity	82.0	78.0	76.0	76.0	75.0	68.0	66.0	68.0	66.0	68.0	73.0	75.0

2-2-1-3　Policy on Socio-Economic Condition

The digital archive system (new name "broadcast tape storage system") requested by the Indonesian side should be so designed as to much the capacity of TVRI's implementing system, and meet the minimum requirements of a system that will ensure the future availability of and allow reuse of previously broadcast tape content collected since the founding of Indonesia.

2-2-1-4　Policy on Construction Circumstances

Under this project, the Indonesian side is responsible for renovating the ex-RTF Engineering Center Building.

In laying out the equipment plan, the consultant firm should obtain building drawings and other necessary documents to check space requirements and availability for equipment installation, cable routes, etc.

2-2-1-5　Policy on Implementation Schedule

This project needs to be implemented within a schedule as stipulated in Japan's Grant Aid Scheme.　The consultant firm must plan the implementation schedule by carefully examining and taking into account the natural and other conditions of Indonesia that might affect the implementation works.

2-2-2　Basic Plan

2-2-2-1　Contents of the Request

(1) Overview

The survey was conducted to check the contents of the request by examining the current status of the News Division and its broadcasting activities and capacities in order to facilitate the proposed project for replacing and improving deteriorated news production equipment at TVRI.

Items included in the initial request were as follows:

Main Items Requested:

A   1-to-1 editing system ....5 sets

B   A/B roll editing system..................................2 sets

C   Non-linear editing system ....2 sets

D   On-air VTR system ....3 sets

E   Foreign program recording system.................4 sets

F   Camera shooting system, ...25 sets

    camcorder & peripheral equipment

G   Studio recording VTR system ....3 sets

H   Character-generator ....3 sets

    /computer-graphics system

I   Digital Archive system ....1 sets

J   Repair parts..1 set

(2)   Modification to the Request

After examining the usage and service life of each item of existing equipment, as well as TVRI's broadcasting activities and future plans, certain modifications and additions were made to the initial request, which is outlined below:

Item	Equipment	Qty. of existing equipment	Qty. of requested equipment	Final modified plan
A	1-to-1 editing system	5 sets (analog and digital)	5 sets (digital)	5 sets (digital)
B	A/B roll editing system	1 set (analog) 1 set (digital, under repair)	2 sets (digital)	1 set (digital)
C	Non-linear editing system	1 sets (digital)	2 sets (digital)	1 set (digital)
D	On-air VTR system	3 sets (analog)	3 sets (digital)	5 sets (digital)
E	Foreign program recording system	1 set (analog)	4 sets (digital)	3 sets (digital)
F	Camera shooting system, camcorder & peripheral equipment	31 sets (digital: 3) (analog: 28)	25 sets (digital)	19 sets (digital)
G	Studio recording VTR system	3 sets (analog)	3 sets (digital)	3 sets (digital)
H	Character-generator /computer-graphics system		3 sets (digital)	2 sets (digital)
I	Broadcast tape storage system (to be examined further)	Tape storage system	Digital archive system	Tape storage system ⌈Including digitization of tapes⌋
J	Repair parts	1 set	1 set	1 set

<Main Points of the Modification to the Requested Equipment>

(a) A/B Roll Editing System

TVRI uses the A/B roll editing system to produce weekly sports digest, public announcement programs, and daily-life information programs. After examining the current status of existing VTR editing systems, we determined that one existing system is still usable and could be moved into the new site. As the remaining one has been in use for over 10 years, it shall be replaced with new system.

(See "A/B Roll Editing System" on page 28).

(b) Non-Linear Editing System

One existing system was under repair and it could not be confirmed on site as to how it was used or whether it functioned differently from other editing systems.

We surveyed other commercial TV stations that found that each of them uses three to four non-linear systems editing in its news division. To cope with ever-diversifying editing materials and to enhance the quality of news programs, one non-linear editing system will be needed.

We also visited a news specialty TV station (METRO-TV commercial station) on September 13, and we made sure that the non-linear system worked effectively in editing news programs.

(See "Non-Linear Editing System" on page 29 for short summary.)

(c) On-Air VTR System

Three (3) VTRs for airing news programs were requested: two (2) for Continuity-studio 1 and one (1) for Continuity-studio 2. However, our survey discovered that two additional VTR sets would be needed for distributing news to Indonesian regional stations and other TV stations in certain Asian countries, including NHK.

(See "On-Air VTR" on page 30 for short summary.)

(d) Camera System for News Gathering

TVRI was in desperate need of video cameras. We determined that procuring 19 cameras would be appropriate based on the following observations:

- There were 31 registered at the camera room (of which some were

reparable and reusable).

- On the day of survey, 19 cameras were functioning and available for shooting.

- 4 of 31 cameras were purchased (delivered) more than 10 years ago.

- 25 of 31 cameras were analog.

- 14 of 31 cameras were nonstandardized.

- About 50% of the 19 functioning cameras were for industry-use, but not for broadcasting-use.

- TVRI's airtime for news programs was extended for two hours from the time of submission of TOR.

- TVRI was planning to expand the timeslots for news programs by 20% after the implementation of the project.

- At the time of survey, there was a plan to purchase eight SX type cameras, which was later disapproved and cancelled.

- By combining new and existing equipment, more news items could be shot and the range of news gathering activities expanded.

- To narrow the disparity in video quality between the programs made with analog cameras and with digital cameras, more digital cameras should be introduced.

  (See "Camera Shooting System " on page 25 for short summary.)

(e) Foreign Program Recording System

Four (4) VTRs to be connected to each of the four (4) systems to receive foreign TV signals (CNN, APTN, REUTERS, and AVN) were requested. After examining the actual reception record, as well as the future plan to receive more foreign programs, we determined that three (3) VTRs for the four (4) reception systems would be sufficient.

(See "Foreign Program Recording System" on page 32 for short summary.)

(f) Character generator/Computer-graphics System

Three (3) character generators (2 for A/B roll system and 1 for Studio No. 6) were requested.   As studio No. 6 was already equipped with one (1) character generator, which could be shared with other sections, we determined that providing two (2) character generators would be sufficient.

(See "Character generator/Computer-graphics System" on page 34 for short

summary.)

(g) Broadcast Tape Storage System

TVRI proposed a downsizing plan of the digital archive system as described in the Minutes of Discussion.

The downsizing plan proposes to digitize and expand the current tape storage system by installing an analog-to-digital conversion system, cataloging equipment to organize the digitized tapes, and tape storage racks. The expanded system would allow the conversion of existing tapes from analog to digital and storage thereof along with new digital tapes to be produced with digital news production equipment.

The downsized system is about 1/3 the scale of the initial request, but has all the minimum functions necessary to digitize, store, and search tapes.

(See "Points of Closer Examination Regarding Requested Equipment" under the following section (3).)

(3) Closer Examination Items Regarding the Requested Equipment

With regard to the requested equipment, a particularly detailed examination was made concerning following items:

1) Broadcast Tape Storage System

During the site survey by the consultant, a downsizing plan for the digital archive system (new name is "broadcast tape storage system") was proposed by TVRI {see Appendix-4 (Memorandums of Understanding 1-(1)-1) dated September 18 and Attachment-3)}.

At the time of concluding the Minutes of Discussion between the Study Team and the Indonesian party on August 23, TVRI mentioned reexamining the possibility of downsizing and downgrading the digital archive system (see Appendix-3, Minutes of Discussion dated August 23 item (8)).

In response to TVRI's proposal to downsize the archive system, the consultant conducted a site survey on the existing tape storage system and compared the downsizing plan with the original plan in order to determine the technical appropriateness of the proposal.

Survey Result on the Existing Tape Storage System

(a) Tapes were organized according to type and broadcast year and stored on steel or wooden racks situated in five separate locations, most of which did not have adequate air-conditioning or dust-proofing systems and were not suitable for storing analog tapes for a long period of time.

(b) Personal computers had been used to register and manage the tapes, using in-house software for inputting data for cataloging since two years ago. However, the number of registered items was rather small, and it was taking long time to search and retrieve tapes.

(c) There were three PCs for registering tapes, of which one was out of order, hindering the registration work.

The above result indicates an urgent need for improving the tape storage system, modernizing the cataloging operation, and long-term storage of tapes in digital format.

What was requested initially was a large-scale digital archive system that would have the function to digitize existing tapes, do cataloging for tape storage, search stored data using motion picture, take out video tapes automatically by a cart machine, and search information automatically via the Internet.

The proposed downsizing plan was composed of the cataloging function, tape digitization system, and tape storage racks, which basically meant expansion and modernization of the existing system.   As the proposed plan would significantly reduce the scale and cost of the original plan.

The downsizing plan, original request, and the existing system are compared in Table 2-2-3 and Fig. 2-2-3 and Fig. 2-2-4 below.

Table 2-2-3　Comparison of Digital Archive Systems

Items to be examined	Digital archive system (original request)	Broadcast tape storage system (downsizing plan)	Existing system
1. Tape storage 1-1 Storage of existing tapes	Converts analog tapes into digital for storage. 4,320 tapes/year are converted with 3 VTRs ⎰ Restores aged video materials ⎱	Converts analog tapes into digital for storage. 4,320 tapes/year are converted with 3 VTRs ⎰ Restores aged video materials ⎱	Most tapes are being stored in analog format. About 75,000 tapes ⎰ Video materials are deteriorating and could be lost ⎱
1-2 Storage of new tapes produced daily	Digitized tapes are readily available for cataloging and storage. 6tapes × 30days × 12months 2,160 tapes	Digitized tapes are readily available for cataloging and storage. 6tapes × 30days × 12months 2,160 tapes	Tapes are catalogued in analog format and stored. 6tapes × 30days × 12months 2,160 tapes
2. Registration Cataloging	10 or more items can be entered on 3 PCs 12tapes × 30days × 12months 4,320 tapes	10 or more items can be entered on 3 PCs 12tapes × 30days × 12months 4,320 tapes	Entry through 2 PCs
3. Motion picture registration	Compressed motion picture entered in the system can be searched from outside.	Entry of still-pictures (50-100 frames per video material) allows the search for contents.	——
4. Tape storage and retrieval of video materials	Desired video materials are loaded onto an automatic cart machine and brought outside.	Stored on slide-racks. After a search on PC, tapes are taken out manually (in 5 minutes or less).	Stored on steel or wooden racks. Takes 10 – 20 minutes to retrieve the desired tape.
5. No. of operators	4	4	4
6. Maintenance cost (cost for tapes)	18 tapes × 30 days × 12 months 6,480 tapes 6,480 × 2,200 yen 14,256,000 yen	18 tapes × 30 days × 12 months 6,480 tapes 6,480 × 2,200 yen 14,256,000 yen	12 tapes × 30 days × 12 months 4,320 tapes 4,320 × 2,200 yen 9,504,000 yen
7. Estimated cost (from the letter of request)	Approx. 330 million yen	100 million yen or less (estimate)	——
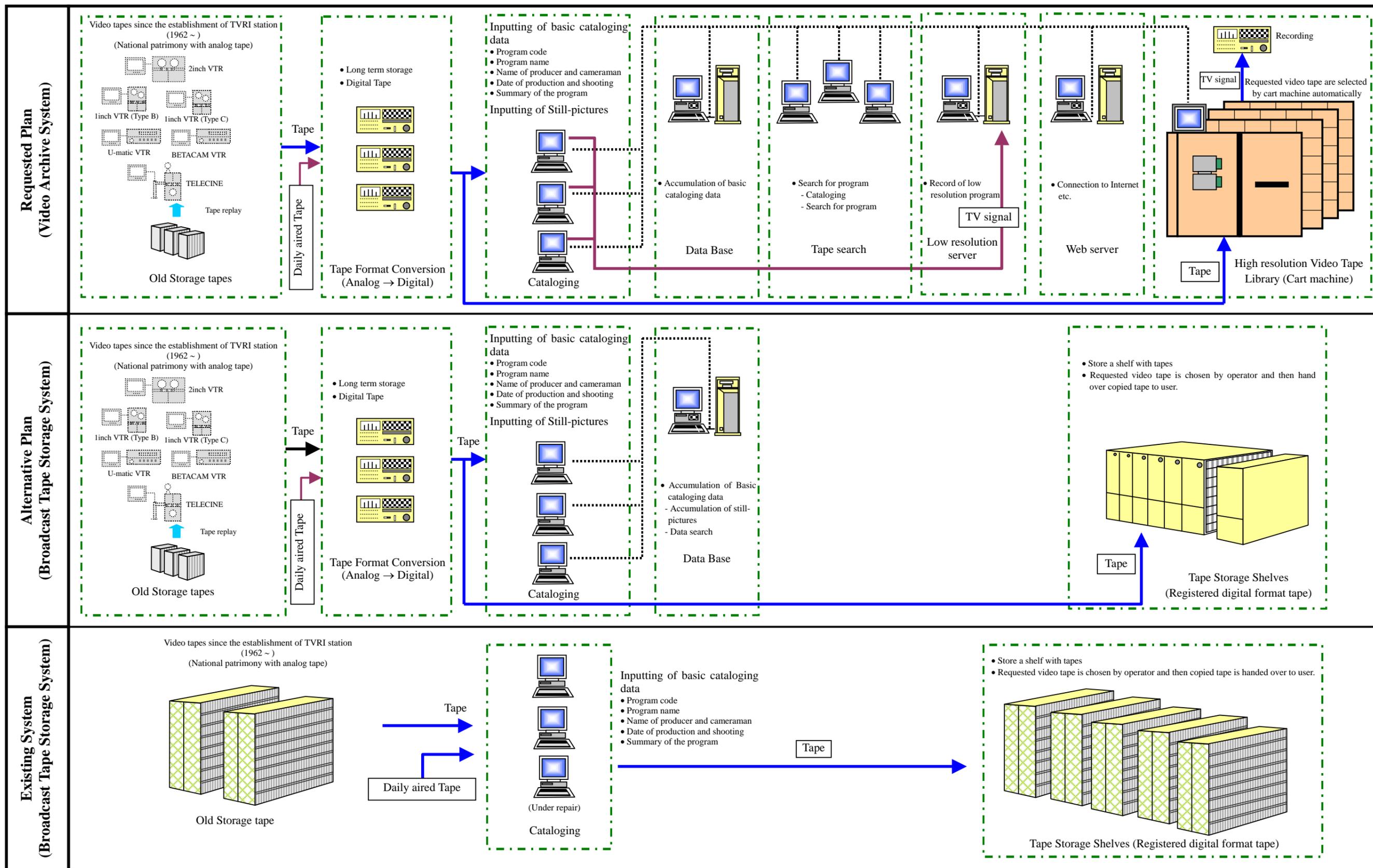
Fig. 2-2-3　Comparison Between Requested and Alternative Plan of Digital Archive System

Registration flow of daily broadcast tape

6 tapes/day → Cataloging 6 tapes/day →

6 tapes × 30 days × 12 months = 2,160 tapes/year
2,160 tapes × 5 years = 10,800 tapes

10,000 tapes in 5 years

Broadcast tape since the establishment of TVRI station (1962-) (national patrimony by analog tape)

- 2inch VTR
- 1inch VTR (Type B)
- 1inch VTR (Type C)
- U-matic VTR
- BETACAM VTR
- TELECINE

Old Storage tape

Tape relay

Digitized tape for long-term storage

Tape Format Conversion (Analog → Digital)

Inputting of basic cataloging data
- Program code
- Program name
- Name of producer and cameraman
- Date of production and shooting
- Summary of the program

Inputting of Still-pictures

Cataloging

- Storage of Basic cataloging data
- Storage of still-pictures
- Search for registered video materials

Data Base

Administrator retrieve the tape requested by user from the tape shelf, and then duplicate its original tape with VTR player and recorder. Finally administrator hand over the duplicated tape to user.

Cataloged tape   12 tapes/day

Digitized tape   6 tapes/day

Tape Storage Shelf

Registration flow of existing analog tapes

Digitizing →

4 tapes × 3 sets = 12 tapes/day

Cataloging 6 tapes/day →

6 tapes × 30 days × 12 months=2,160 tapes/year
2,160 tapes × 9 years = 19,440 tapes

Keep 6 tapes/day to tape shelf →

6 tapes × 30 days × 12 months=2,160 tapes/year
2,160 tapes × 9 years = 19,440 tapes

40,000 tapes in 9 years

Fig. 2-2-4　Flow of Registration and Storage System for Broadcast Tape

(4) Changes from Modified Plan to Final Plan

    1) Quantity of ENG Cameras

        As a result of close examination in Japan, the quantity of cameras was reduced from 22 to 19.

        See page 25 for detail.

    2) 1-to-1 Editing System

        Request for five systems was changed as follows:

            Type A (without audio mixing):   3 sets

            Type B (with audio mixing):   2 sets

    3) No. of A/B Roll Editing Systems

        As a result of close examination in Japan, the number of editing systems was reduced from two to one.

        See page 28 for detail.

    4) Archive System

        The name was changed to the Broadcast Tape Storage System.

        Matrix equipment was changed to jack panel for the following reasons:

- There are only a few input resources.

  (Betacam SP, S-VHS, 1-inch VTR, etc.)

- Switching is infrequent (only 12 tapes are dubbed per day).

        Thus, the following items were deleted on the Appendix-4 (Memorandums of Understanding, Attachement-1):

        I-9, I -10, I -11, I –12, I -13, I-14, I -15, I -16, I -20

2-2-2-2   Overall Plan of the Requested Japanese Assistance

(1)   Works to be Undertaken by the Japanese Side (tentative)

This project aims to replace and improve the deteriorated "news equipment" at TVRI. However, the site survey on the existing equipment confirmed that some items could still be used after the implementation of the project.

The table below relates the Project equipment to be procured to equipment relocated after the implementation of the project.   See Fig. 2-2-2: Final Modified plan for Requested Equipment and Fig. 2-2-5: Flow of Various Tape Formats (draft) for an overview of the project.

No.	Name of Equipment	To be procured		To be relocated	Total
		New	Replace	Relocate	
A	1-to-1 VTR editing system	0	5	2	7
B	A/B roll VTR editing system	0	1	1	2
C	Non-linear editing system	1	0	1	2
D	On-air VTR system	2	3	0	5
E	Foreign program recording system	0	3	0	3
F	Camera shooting system, camcorder & peripheral equipment	0	19	3	22
G	Studio recording VTR system		3	0	3
H	Character-generator/computer-graphics system	2	0	0	2
I	Broadcast tape storage system	0	1 set	0	1 set

(2)   Works to be Undertaken by the Recipient Country Side

- Renovation of Building

    The details of the division of works for the building renovation are described in Appendix-4.2: Memorandums of Understanding, Attachement-4).

    As per the Memorandums of Understanding, improvement work on the existing building and relocation of the News Division need to commence by the end of December 2001, and the construction work needs to be completed by the end of June 2002.

    The renovation work includes the installation of :   220V, 3-phase electrical cables from the power room of TVRI's main building to the ex-RTF Engineering Center,   partition walls in the equipment rooms on the 2nd floor,   simple sound insulation in the announcer booth,   power distribution box in each editing room,   partition walls on the 1st floor,   air-conditioners and dehumidifiers in

the Broadcast Tape Storage Room, and   power distribution box in the Broadcast Tape Storage Room.

- Works to be Carried Out by the Recipient Side as Stipulated on E/N:

  Inland transportation of project equipment, insurance, tax exemption of the equipment, etc.

Fig. 2-2-5　Flow of Various Tape Formats (draft)

ENG Cameras

Editing Equipment

Studios

Transmission Equipment

Receivers

1to 1Editing Equipment

1 to 1 Editing No.1　5
Format-1
Replacement; 5 sets

1 to 1 Editing No.6
Relocation

1 to 1 Editing No.7
Relocation

A/B Roll

A/B Roll No.1
Format-1
Replacement: 1set

A/B RollNo.2
Format-2
Relocation; 1 set

Nonlinear Editing Equipment

Nonlinear No.1
Foramt-1
New; 1 set

Nonlinear No.2
Format-2
Relocation; 1set

Camera No.1 ~ 19
1/2" Digital format
Replacement;
19 sets

Camera No.20 ~ 22
1/4" Digital format
Relocation;
3 sets

Other Camera
No.23 ~
Analog format

Tape Format-1

Tape Format-2

Tape Format-3

Tape Format-4

Tape format-5

Tape format-1

Tape format-2

Tape format-4

Studio10
VTR (Rec.)
New; 1 set

Studio 6
VTR (Play/Rec.)　VTR (Rec. / Play)
New equipment;
2 sets

Tape format-1

Tape format-4

Tape format-5

Analog

Continuity Studio -1
VTR (Player)
New; 2 sets

MCR
VTR (Player)
New; 1set
TX TO INDOSAT

VTR (Rec.)
New; 1 set
RX FROM INDOSAT

ON-AIR

Continuity Studio-2
VTR (Player)
New; 1 set

Broadcast tape storage system
(for recording of aired program)
Tuner
VTR (Play/Rec.)
VTR (Play/Rec.)
VTR (Play/Rec.)
Replacement; 1 set

Foreign Program Receiving System
VTR (Rec.)
VTR (Rec.)
VTR (Rec.)
Replacement; 1 set

??

New equipment

Replacement Equipment

Relocating Equipment

Existing Equipment

Tape format-1 (1/2" digital format)

Tape format-2 (1/4" digital format)

Tape format-3 (analogue S-VHS VTR)

Tape format-4 (digital BETACAM VTR)

Tape format-5 (analog BETACAM VTR)

Existing analog signal line

2-2-2-3　Equipment Plan

Based on our examination of each item of requested equipment, we selected the equipment to be procured for TVRI's News Division (Division II), the main items of which are outlined in the table below:

Table 2-2-4　Equipment Specifications

Item	Description	Quantity	Specification
A	Cut to cut Editing System	5 system	
A-1	1/2-inch Digital VTR (Recorder / Player)	10 sets	(1) Input and Output: Be complied with ITU-R recommendation and AES/EBU Standard. 1/2-inch Digital cassette tape
A-2	14-inch Color Video Monitor	12 sets	(1) 14-inch Color Analog type including 2 sets for Announce Booth
A-3	Editing Control Unit	5 sets	(1) Digital Input / Output (2) with SMPTE / EBU time code and Jog-shuttle controls
A-4	Active Monitor Speaker	5 pairs	(1) Output power; 10W or more (2) with built-in power amp. stereophonic type
A-5	Editing Console	5 sets	(1) EIA Standard. Space-saving type (2) with caster, power supply unit, local Switch,
A-6	Announcer Table	2 sets	(1) Space-saving type
A-7	Chair	14 sets	(1) Available for height control, 360° rotation, reclining control (2) with arm rest
A-8	System Rack	5 sets	(1) EIA Standard mini-rack (2) with caster, power supply unit, rack side-mounted guide rails
A-9	Tape (60 minutes)	50 tapes	1/2-inch Digital Cassette Type
A-10	Audio Mixer	2 sets	(1) Digital 4-Input & 2-Output
A-11	Stereo type Headphone	4 sets	(1) Enclosed dynamic type / 50 mm. Stereo type
A-12	Dynamic Microphone	4 sets	(1) Dynamic Type (2) with microphone stand
A-13	Installation Materials	1 lot	(1) Based on JIS Standard
B	A/B Roll Editing System	1	
B-1	1/2-inch Digital VTR (Recorder / Player)	3 sets	(1) Input and Output: Be complied with ITU-R recommendation and AES/EBU Standard (2) 1/2-inch Digital cassette type
B-2	TBC Remote Controller	2 sets	(1) Adjustable in Video level, Chroma level, Color phase and Sub-carrier Phase etc.
B-3	Editing Control Unit	1 set	(1) SMPTE/EBU time code. Digital Input / Output, control terminal: 3 or more (2) with Jog-shuttle controls
B-4	Character Display Monitor	1 set	(1) 15- inch color, Fine dot type

Item	Description	Quantity	Specification
B-5	Digital Video Switcher	1 set	(1) Digital: 4-Input & 2-Output, Control : 4 or more (2) with Video Special Effects and 3D Video Mapping Effects
B-6	Audio Mixer	1 set	(1) Digital 8-Input &2-Output or more. (2) with Digital Equalizer
B-7	14-inch Color Monitor	6 sets	(1) 14-inch color Analog Type including 1 set for Announce Booth
B-8	Wave Form Monitor	1 set	(1) Analog PAL System, 2 Input Channels or more. Editing Console-mounted Type
B-9	Vector Scope	1 set	(1) Analog PAL System, 2 Input Channels or more. Editing Console-mounted Type
B-10	System Rack	2 sets	(1) EIA Standard mini. Rack (2) with Caster, Power Supply Unit, rack side-mounted guide rails
B-11	Monitor Speaker	1 set	(1) Output Power: 50W or more (2) with built-in power amp., power supply unit, Stereophonic Type
B-12	Editing Console	1 set	(1) EIA Standard. Space-saving type (2) with Caster, Power Supply Unit, Local Switch,
B-13	Announce Table	1 set	Space-saving type
B-14	Chair	4 sets	(1) Available for height control, 360 ° rotation, reclining control (2) with arm rest
B-15	Audio Multi Effect Processor	1 set	(1) 2-Input & 2-Output, (2) with Digital Multi Effect, Digital Delay, Digital Reverberator
B-16	CD Player	1 set	(1) 2 Output or more , Input / Output; 600 balance/10k Unbalance, Stereophonic type
B-17	DAT Recorder	1 set	(1) 2-Output or more, Input / Output : 600 balance / 10k Unbalance, Stereophonic type
B-18	Cassette Tape Recorder	1 set	(1) Input / Output; AES/EBU Standard, 600 balance /10k unbalance, 4-track, 2 Channel, stereo type
B-19	Microphone	2 sets	(1) Dynamic Type (2) with table stand
B-20	Tape (60 minutes)	50 tapes	(1) 1/2-inch Digital Cassette Type
B-21	Stereo Headphone	2 sets	(1) Enclosed dynamic type / 50 mm, Stereophonic type
B-22	Installation Materials	1 lot	(1) Based on JIS Standard
C	Non-Linear Editing System	1 System	
C-1	Non-Linear Editing A/B Processor	1 system	(1) Non-Linear Processor, (2) with 3D Lighting / Trail Effects Board
C-2	UPS for server	1 set	(1) Input Voltage; 220V AC

Item	Description	Quantity	Specification
C-3	Computer	1 set	(1) CPU; Pentium , 600 MHz or more. Memory; 128 MB or more. Hard Disk; 10GB or more. Be complied with Windows NT
C-4	Character Display	1 set	(1) 15-inch color display, fine dot type
C-5	1/2-inch digital VTR (Record / Replay)	1 set	(1) Input / Output; Be complied with ITU-R regulation and AES/EBU standard. 1/2-inch digital cassette type
C-6	Video Color Monitor	2 sets	(1) 14-inch analog color monitor including 1 set for announce booth
C-7	Microphone	2 sets	(1) Dynamic type (2) with table stand
C-8	Active speaker	1 pair	(1) Output; 10W or more (2) with built-in power amp.. stereo type
C-9	Hub	1 set	(1) Port; 6 or more. Ethernet; 10 Mbps or more
C-10	Editing console	1 set	(1) EIA standard. Space-saving type (2) with caster, power supply unit, local switch
C-11	System rack	1 set	(1) EIA mini rack (2) with caster, rack side - mounted guide rails, power supply unit
C-12	Announce table	1 set	(1) Space-saving type
C-13	Chair	4 sets	(1) Enable height control, 360° rotation, reclining control (2) with arm rest
C-14	VTR tape (60 minutes)	50 tapes	(1) 1/2-inch digital cassette type
C-15	Installation materials	1 set	(1) Based on JIS standard
D	On-air VTR system	1 set	
D-1	1/2-inch digital VTR (Record/ Replay)	5 sets	(1) Input / Output; Be complied with ITU-R recommendation and AES/EBU standard. 1/2-inch digital cassette type
D-2	Small size video monitor	3 sets	(1) 9-inch analog color monitor
D-3	Rack-mounted type monitor speaker	4 sets	(1) Output; 2W or more (2) with built-in power amp.
D-4	19-inch rack	2 sets	(1) Based on JIS, EBU or EIA standard (2) with power supply unit
D-5	Wave Form Monitor	3 sets	(1) Be complied with analog PAL system, 2- input or more and rack-mounted type
D-6	Vector Scope	3 sets	(1) Be complied with analog PAL system, 2- input or more, and rack-mounted type
D-7	Video matrix switcher	1 set	(1) Input / Output; Be complied with ITU-R recommendation. Digital 8-input & 8 output or more.
D-8	Audio matrix switcher	1 set	(1) Input / Output; Be complied with AES/EBU standard. Digital 8-input & 8 output or more.
D-9	Remote control panel	1 set	(1) Wide range; 8 × 8 or more. Rack-mounted type
D-10	Video Distribution Amplifier	1 set	(1) Based on JIS, EBU or EIA rack standard

Item	Description	Quantity	Specification
D-11	Audio Distribution Amplifier	1 set	(1) Based on JIS, EBU or EIA rack standard
D-12	VTR tape (60 minutes)	50 tapes	(1) 1/2-inch digital cassette type
D-13	Installation Materials	1 set	(1) Based on JIS standard
E	Foreign Program Recording System	1 set	
E-1	1/2-inch digital VTR (Record / Replay)	3 sets	(1) Input / Output; Be complied with ITU-R recommendation and AES/EBU standard. 1/2-inch digital cassette type
E-2	Small Size Video Monitor	4 sets	(1) 9-inch analog color monitor
E-3	Rack-mounted Monitor Speaker	4 sets	(1) Output; 2W or more. (2) with built-in power amp
E-4	19-inch Rack	2 sets	(1) Based on JIS, EBU or EIA rack standard (2) With power supply unit
E-5	Wave Form Monitor	1 set	(1) Be complied with analog PAL system, 2- input or more and rack-mounted type
E-6	Video Matrix Switcher	1 set	(1) Input / Output; Be complied with ITU-R recommendation. Digital 8-input and 8 output or more
E-7	Audio matrix switcher	1 set	(1) Input / Output; Be complied with AES/EBU standard. Digital 8-input and 8 output or more
E-8	Remote Control Panel	1 set	(1) Wide range; 8 × 8 or more. Rack-mounted type
E-9	Video Distribution Amp.	1 set	(1) Based on JIS, EBU or EIA rack standard
E-10	Audio Distribution Amp.	1 set	(1) Based on JIS, EBU or EIA rack standard
E-11	VTR tape (60 minutes)	50 tapes	(1) 1/2-inch digital cassette type
E-12	Installation Materials	1 set	(1) based on JIS standard
F	ENG Camera System	19 sets	
F-1	ENG Cameras	19 sets	(1) Input / Output; Be complied with ITU-R recommendation and AES/EBU standard. Combination camera-recorder system. 1/2-inch digital cassette type
F-2	Standard lens	21 sets	(1) 20:1 lens. Extender; 2:1
F-3	Wide- lens	2 sets	(1) 10:1 lens
F-4	Telephoto lens	2 sets	(1) 40:1 lens, Extender 2:1
F-5	Battery Pack	76 pieces	(1) Lithium-ion Battery
F-6	Battery Adopters	19 pieces	(2) with Battery case
F-7	Chargers	10 pieces	(1) Input Voltage; 220V AC. Enabled simultaneous charging to 4 batteries or more
F-8	Video Monitors	10 sets	(1) 5-inch LCCS (Liquid Crystal Color Shutter) type monitor
F-9	AC Adapter	5 pieces	(1) Input Voltage; 220V AC. Output Voltage; DC out (Maker's Rating Voltage)
F-10	Camera Tripod	10 sets	(1) (2) with tripod adapter, softcover case, caster

Item	Description	Quantity	Specification
F-11	Hardcover Carrying Case	19 sets	(1) Standard product for ENG camera
F-12	Wireless Microphones	19 pieces	(1) Condenser type in UHF band
F-13	Diversity type Receiver for Wireless Microphone	19 sets	(1) (2) with Space diversity antenna in UHF band
F-14	Lighting kit	19 sets	(1) Handy type. Lamp; 150W or more. (2) with built-in battery charger, carrying case, connection cable.
F-15	Portable Teleprompter	2 sets	(1) Monitor size; 20-inch or less (CRT or TFT)
F-16	Gun Microphone	8 sets	(1) High directivity. Condenser type. (2) with built-in power supply & phantom power supply driven. Mic. windshield, hand grip
F-17	Fishing pole for microphone	5 sets	(1) Weight; 1.0 kg or less. Withstand load; 1.0 kg or more. Expansion; 900~2500 mm or less
F-18	Headphones	10 pieces	(1) Enclosed dynamic type. Stereo type
F-19	Portable type DAT Recorder / Player	5 sets	(1) Input/Output; 600 balance 10k unbalance. Stereo type. Portable type
F-20	VTR tapes (60 minutes)	100 tapes	(1) 1/2-inch digital cassette type
G	Studio Recording VTR	1 set	
G-1	1/2-inch digital VTR (Recorder/ Player)	3 sets	(1) Input / Output; Be complied with ITU-R recommendation and AES/EBU standard. 1/2-inch digital cassette type
G-2	Video Monitor	2 sets	(1) 14-inch analog color monitor
G-3	Small size Video Monitor	2 sets	(1) 9-inch analog color monitor
G-4	Rack-mounted monitor speakers	4 sets	(1) Output; 2W or more. (2) with built-in power amp.
G-5	TBC Remote Controllers	2 sets	(1) Adjustable in Video level, Chroma level, color phase and Sub-carrier Phase etc
G-6	19-inch rack	1 set	(1) Based on JIS, EBU or EIA standard (2) with power supply unit
G-7	Video Distribution Amp.	1 set	(1) Based on JIS, EBU or EIA rack standard
G-8	Audio Distribution Amp.	1 set	(1) Based on JIS, EBU or EIA rack standard
G-9	VTR tapes (60 minutes)	50 tapes	(1) 1/2-inch digital cassette type
G-10	Installation Materials	1 set	(1) Based on JIS standard
H	Character Generators	2 sets	
H-1	Character Generators	2 sets	(1) Input / Output; Be complied with ITU-R recommendation and AES/EBU standard. (2) with graphics function
H-2	Character Display	2 sets	(1) 21-inch color display. Fine dot type
H-3	Video Monitor	2 sets	(1) 14-inch analog color monitor
H-4	Operation table	2 sets	(1) Space-saving type
H-5	Chaires	2 sets	(1) Height control, 360° rotation, reclining control (2) with arm rest

Item	Description	Quantity	Specification
H-6	Installation Materials	1 set	(1) Based on JIS standard
I	Broadcast tape Storage System	1 set	
I-1	1/2-inch digital VTR (Recorder / Player)	3 sets	(1) Input / Output; Be complied with ITU-R recommendation and AES/EBU standard. 1/2-inch digital cassette type
I-2	Small size Video Monitor	3 sets	(1) 9-inch analog color monitor
I-3	Rack-mounted monitor speaker	2 sets	(1) Output; 2W or more (2) with built-in power amp. Stereo type
I-4	19-inch rack	2 sets	(1) Based on JIS, EBU or EIA standard (2) with power supply unit
I-5	Wave Form Monitor	1 set	(1) Be complied with analog PAL system, 2- input or more and rack-mounted type
I-6	Vector Scope	1 set	(1) Be complied with analog PAL system, 2- input or more and rack-mounted type
I-7	Video Jack Panel	1 set	(1) 20 jacks or more . Based on JIS, EBU or EIA rack standard (2) With patching cable
I-8	Audio Jack Panel	1 set	(1) 20 jacks or more . Based on JIS, EBU or EIA rack standard (2) With patching cable
I-9	Video Distribution Amp.	1 set	(1) Based on JIS, EBU or EIA rack standard
I-10	Audio Distribution Amp.	1 set	(1) Based on JIS, EBU or EIA rack standard
I-11	Video Capture	3 sets	(1) Still-picture; 320× 240 pixels or more (2) Video; 640× 480 pixels or more
I-12	Data Base Server	1 set	(1) CPU; Pentium , 800 MHz or more. Memory; 1 GB or more. Hard Disk; 364GB or more. Be complied with Windows NT
I-13	Character Display	1 set	(1) 15-inch color display. Fine dot type
I-14	UPS for Data Base Server	1 set	(1) Input Voltage; 220V AC
I-15	Client Server	3 sets	(1) CPU; Pentium , 600 MHz or more. Memory; 128 MB or more. Hard Disk; 10GB or more. Be complied with Windows NT
I-16	Character Display	3 sets	(1) 15-inch color display, fine dot type
-17	Compact VTR player	3 sets	(1) 1/2-inch digital cassette type
-18	Active speaker	3 sets	(1) Output; 10W or more.. Stereo type (2) with built-in power amp.
-19	Video Monitor	3 sets	(1) 14-inch analog color monitor
-20	Hub	2 sets	(1) Port; 6 or more. Ethernet; 10 Mbps or more
-21	Tape storage shelf	1 set	(1) Sliding shelf. Double-side storage. Full metal. Standard color
-22	Chairs	4 sets	(1) Adjustable in height control, 360 ° rotation, reclining control (2) with arm rest
-23	Operation Table	4 sets	(1) Space-saving type
-24	VTR tape (194 minutes)	1000 tapes	(1) 1/2-inch digital cassette type

Item	Description	Quantity	Specification
-25	Installation Materials	1 set	(1) Based on JIS standard
J	Repair Parts	1 set	
J-1	Repair parts	1 set	