

Oriente University
Faculty of Electrical Engineering
Department of Telecommunication



5th FORUM OF TV-Digital.

Modification of fundamental parameters of the transport
stream of TV-Digital

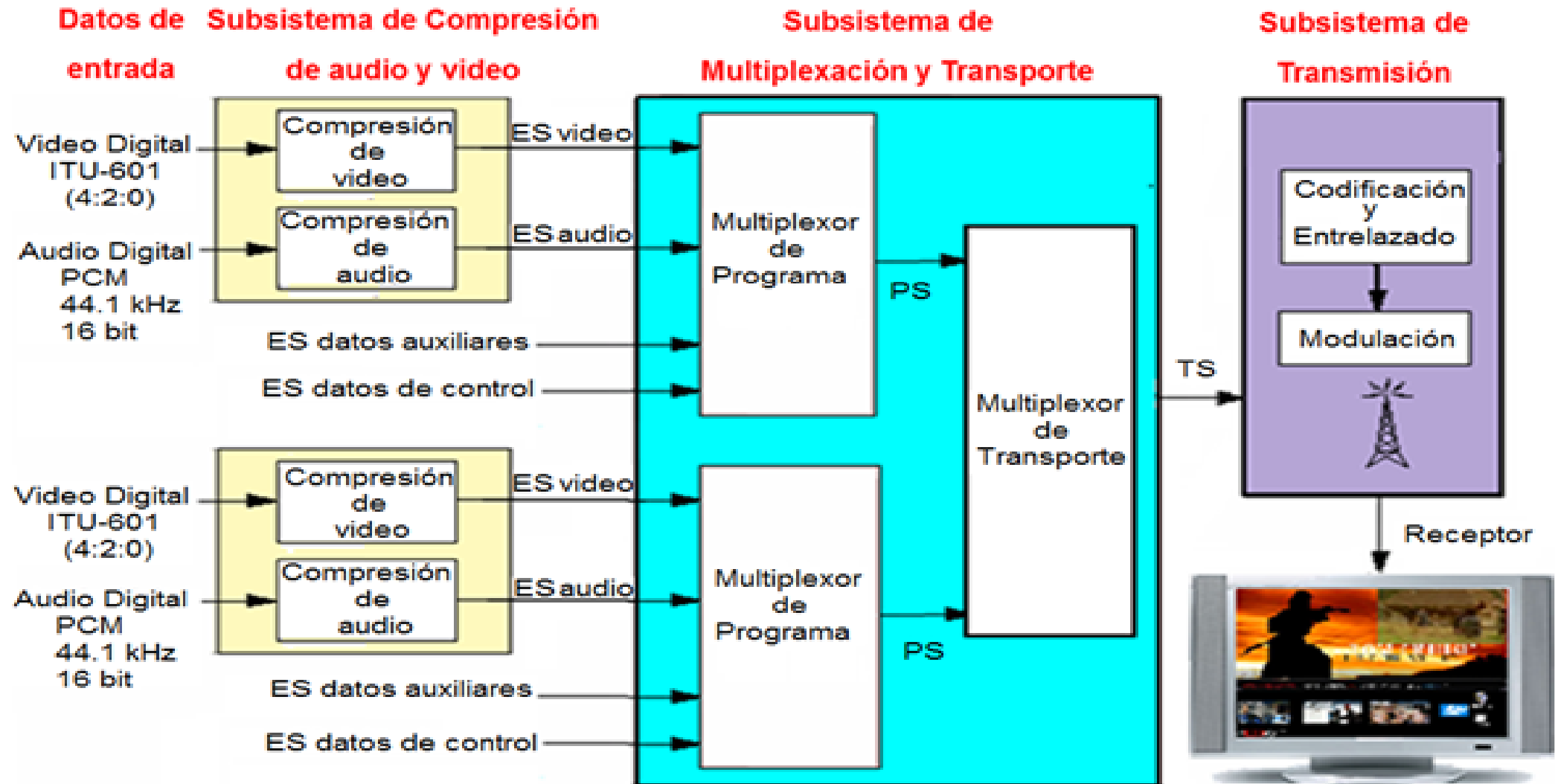
Author: MSc. Ing. Fidel Giró Uribaz

NOVEMBER, 2017

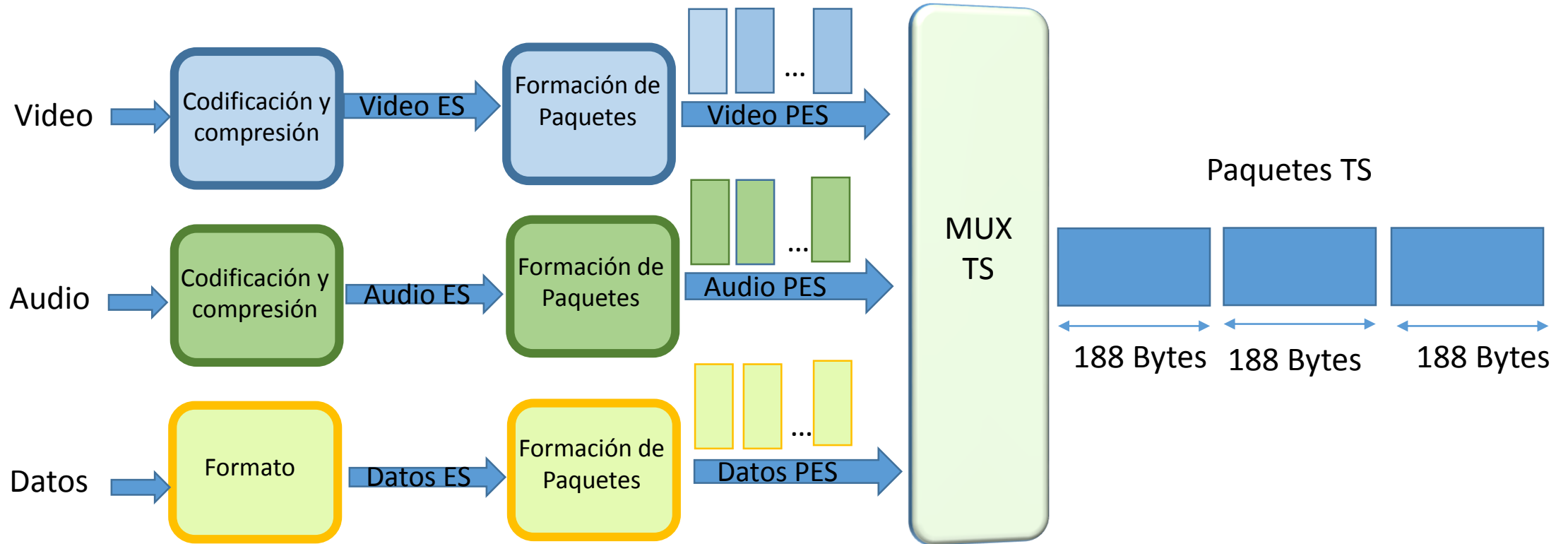
INTRODUCTION



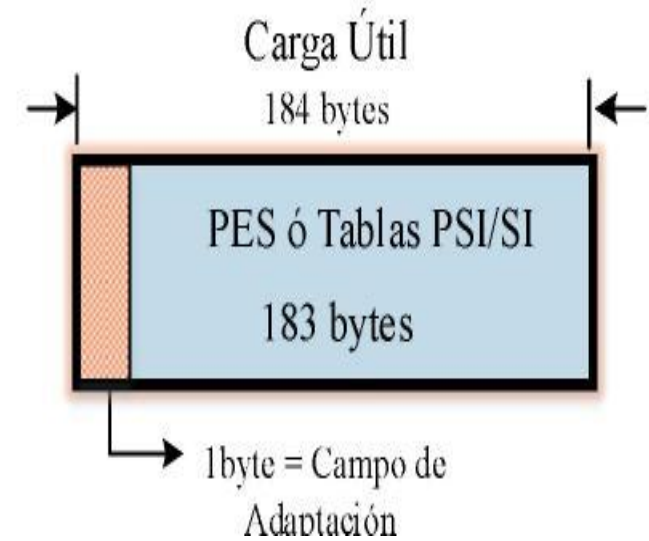
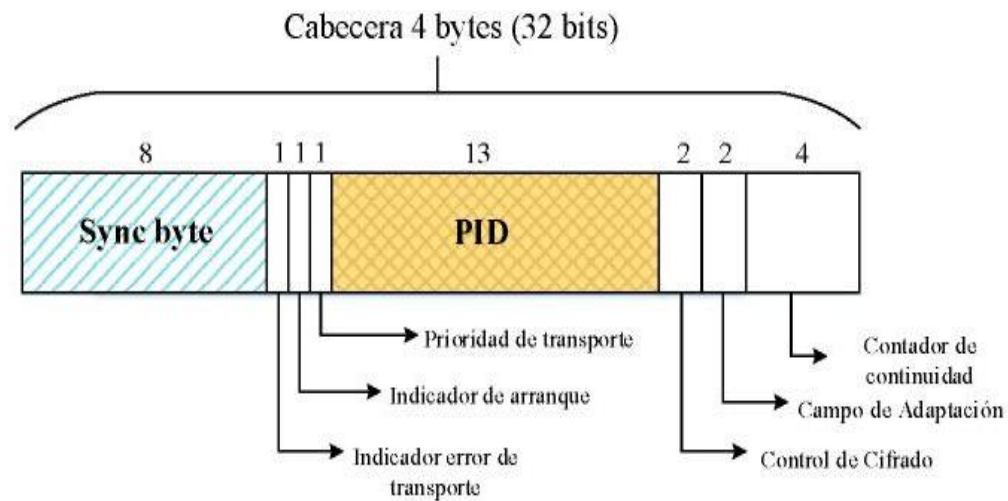
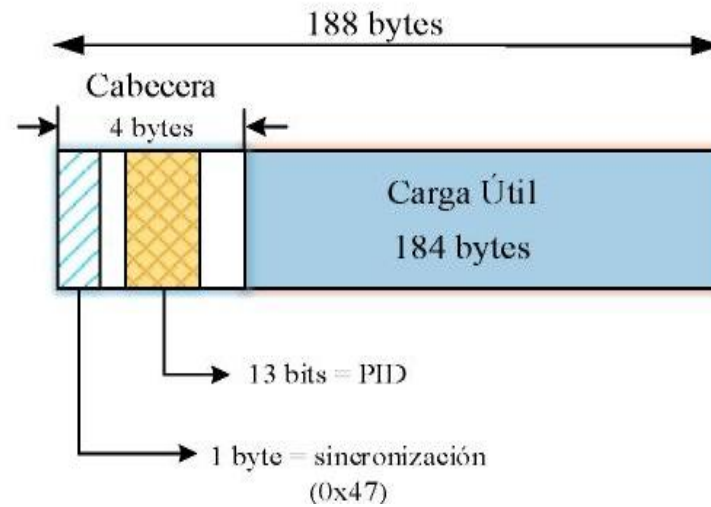
Scheme at blocks of the terrestrial Digital TV



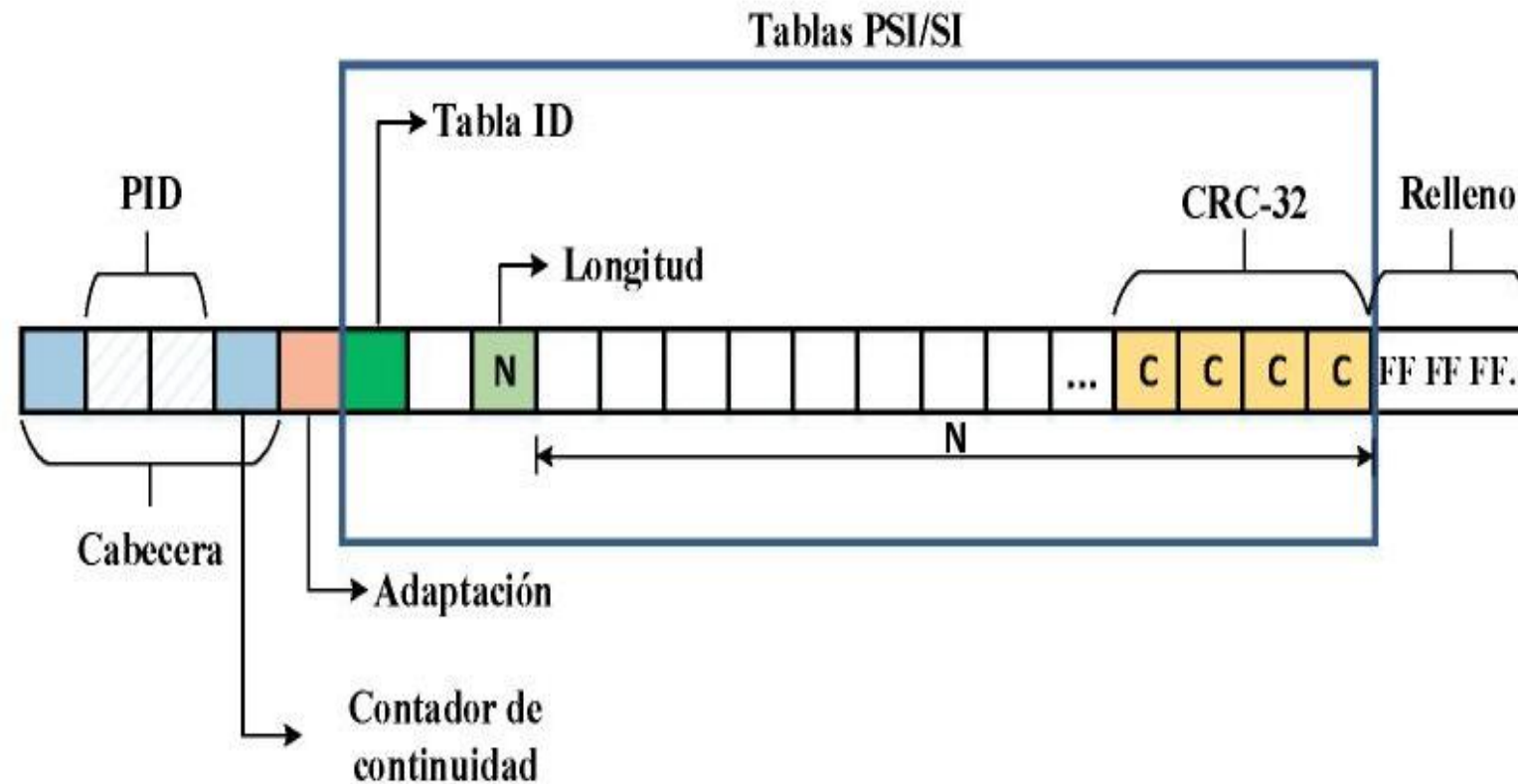
The system of transportation in the Digital TV



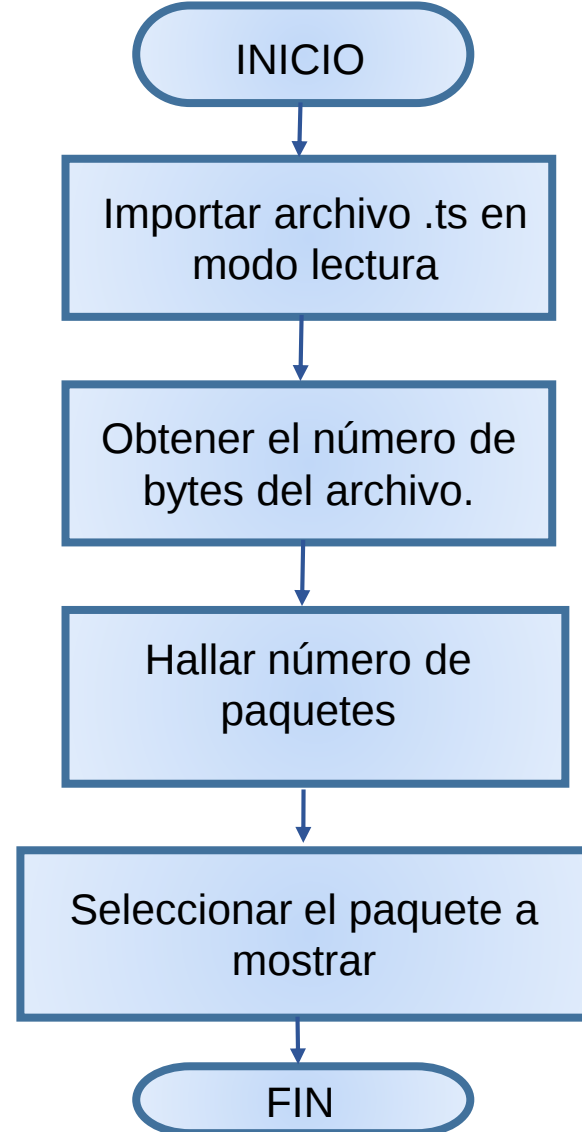
Paquete TS : Transport Stream



Specific information of the Program and Information of Service(PSI/SI)



Importation of files type .TS in MATLAB



Importation of file: Prueba.ts in MATLAB

```
Command Window
New to MATLAB? Watch this Video, see Examples, or read Getting Started.
video =
Prueba.ts

archivo =
3

D =
    name: 'Prueba.ts'
    date: '07-Feb.-2017 00:45:20'
    bytes: 60761600
    isdir: 0
    datenum: 7.3673e+05

nbytes =
60761600

paquetes =
323200
```



```
Command Window
New to MATLAB? Watch this Video, see Examples, or read Getting Started.
trama =
47
40
11
10
00
42
F0
25
00
01
C1
00
00
01
00
FC
80
14
48
12
01
06
46
46
6D
70
65
```

Name: Prueba.ts

nbytes: 60761600

Paquetes: 323200

Analysis of the file Prueba.ts from the MPEG-2 TS Packet Analyser

TS file

Path D:\Yandy\Prueba.ts

Info 59,337 Kb, 323,200 188-byte packets, offset 0

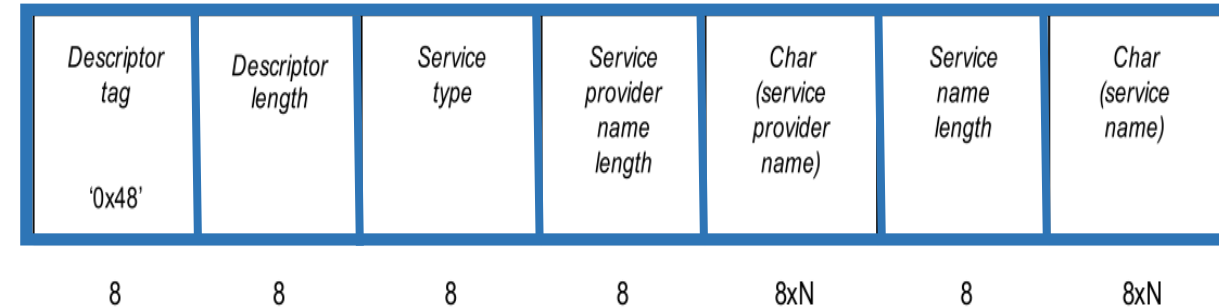
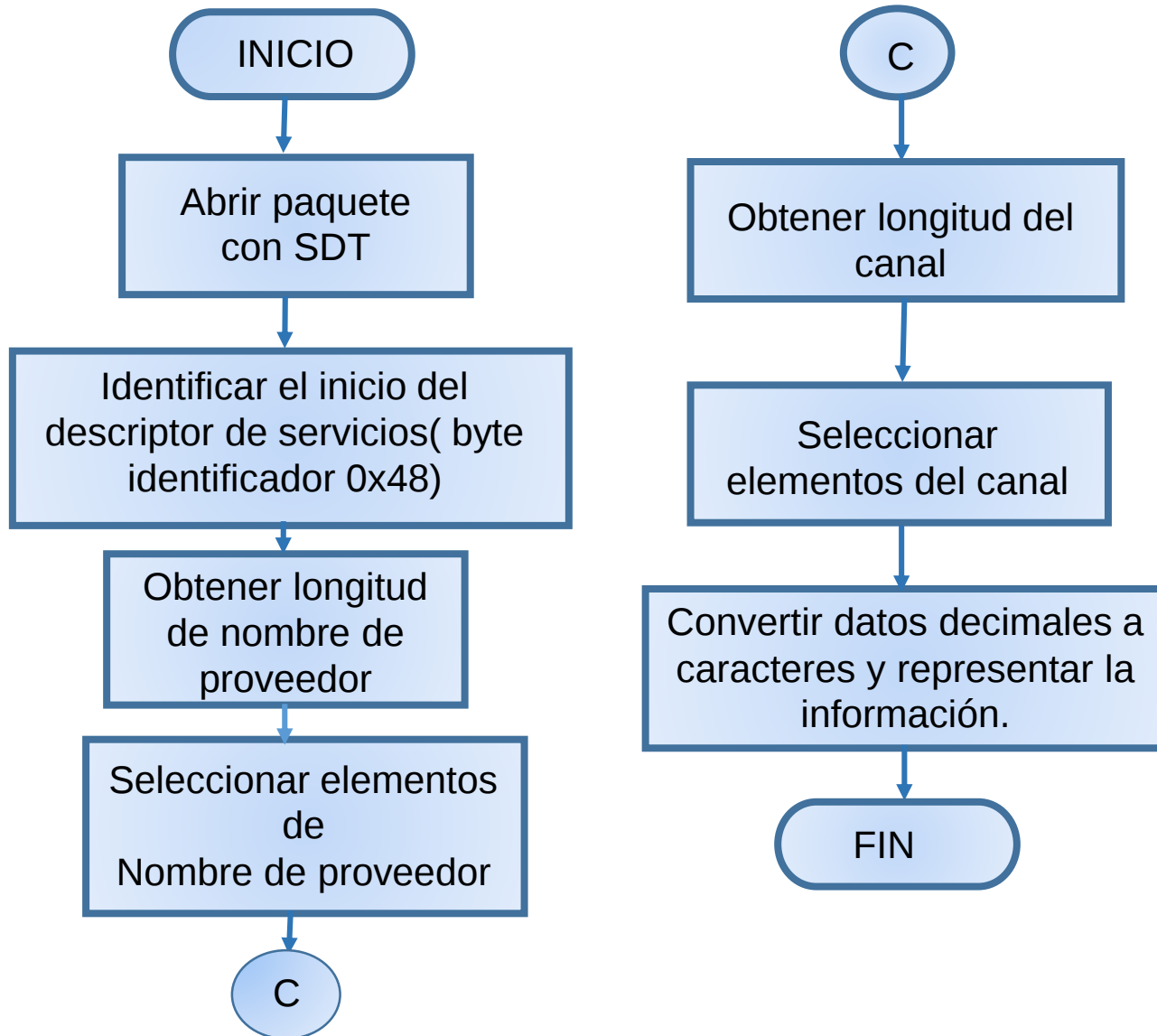
TS header

Sync byte	0x47
Transport error indicator	0
Payload unit start indicator	1
Transport priority	0
PID	17
Transport scrambling control	0
Adaptation field control	1
Continuity counter	0

TS packet 1

0	47 40 11 10 00 42 F0 25 00 01 C1 00 00 00 01 FF
16	00 01 FC 80 14 48 12 01 06 46 46 6D 70 65 67 09
32	53 65 72 76 69 63 65 30 31 A7 79 A0 03 FF FF FF
48	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
64	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
80	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
96	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
112	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
128	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
144	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
160	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
176	FF FF FF FF FF FF FF FF FF FF FF FF FF

Algorithm for analysis SDT table



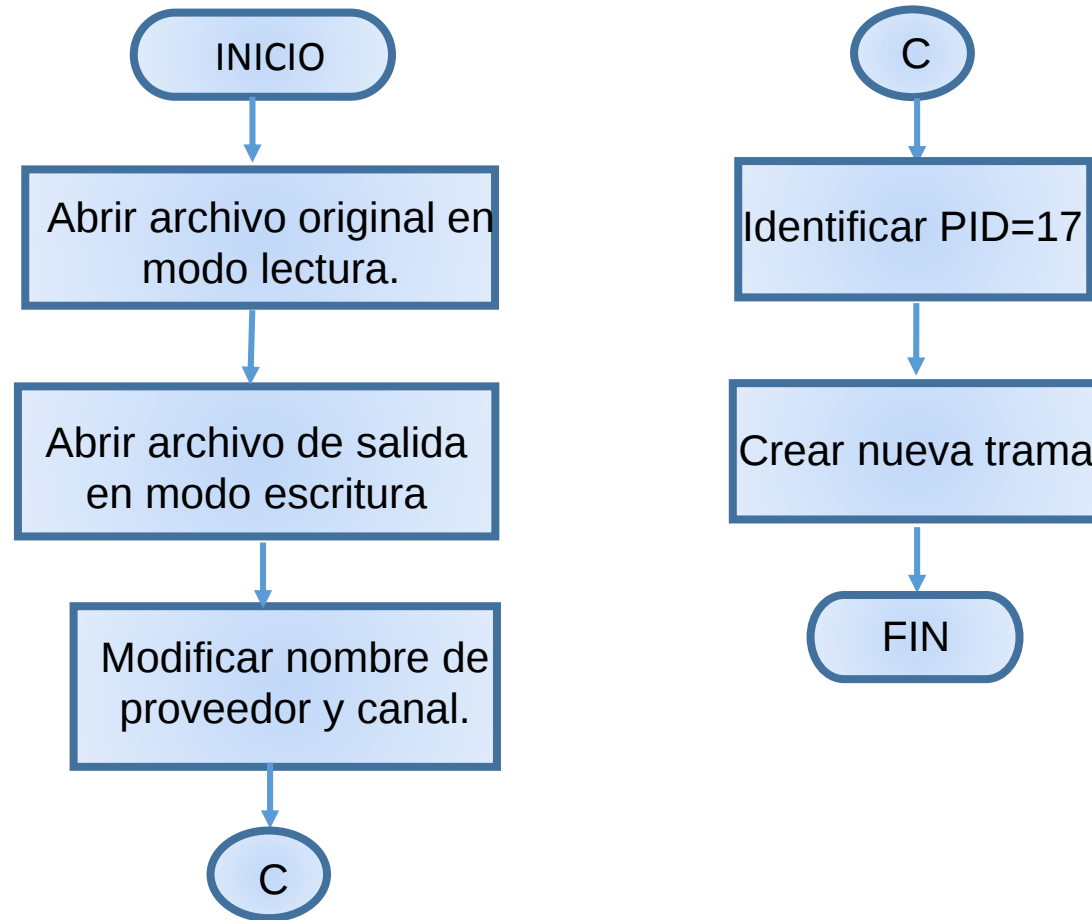
Execution the analysis to the SDT table in MatLAB

```
Proveedor =  
  
Radiocuba  
  
Canal =  
  
Cubavisión  
  
ans =  
  
Radiocuba  
fx >> |
```



Proveedor = Radiocuba
Canal = Cubavisión

Algorithm to modify the SDT table



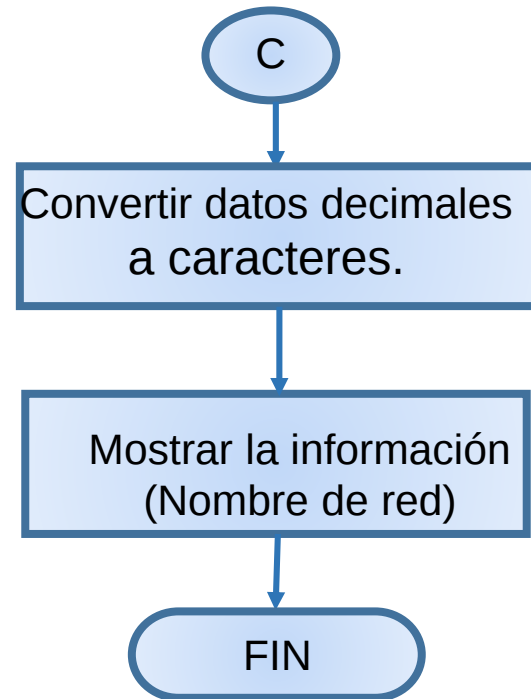
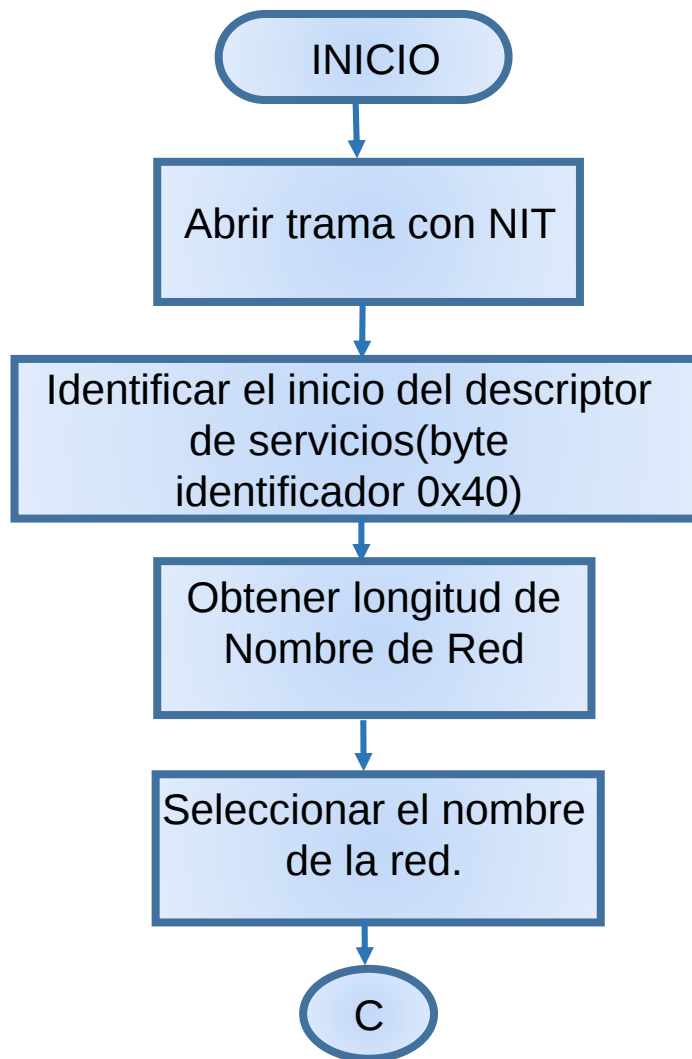
Modified Table SDT

```
Proveedor =  
  
Laboratorio TVD UO  
  
Canal =  
  
Transmisión de Prueba  
  
ans =  
  
Laboratorio TVD UO  
  
fx >> |
```



Proveedor = Laboratorio TVD UO
Canal = Transmisión de Prueba

Algorithm for analysis NIT table



Descriptor tag	Descriptor length	Char (network name)
'0x40'		
8	8	8xN

Execution the analysis to the NIT table in MatLAB

```
Command Window
New to MATLAB? Watch this Video, see Examples, or read Getting Started.
>> Analizador_NIT(trama)

Lengthdescriptor =

    11

Descriptor =

    64
     9
    82
    97
   100
   105
   111
    99
   117
    98
    97
   240
    59
     0
     1
     0

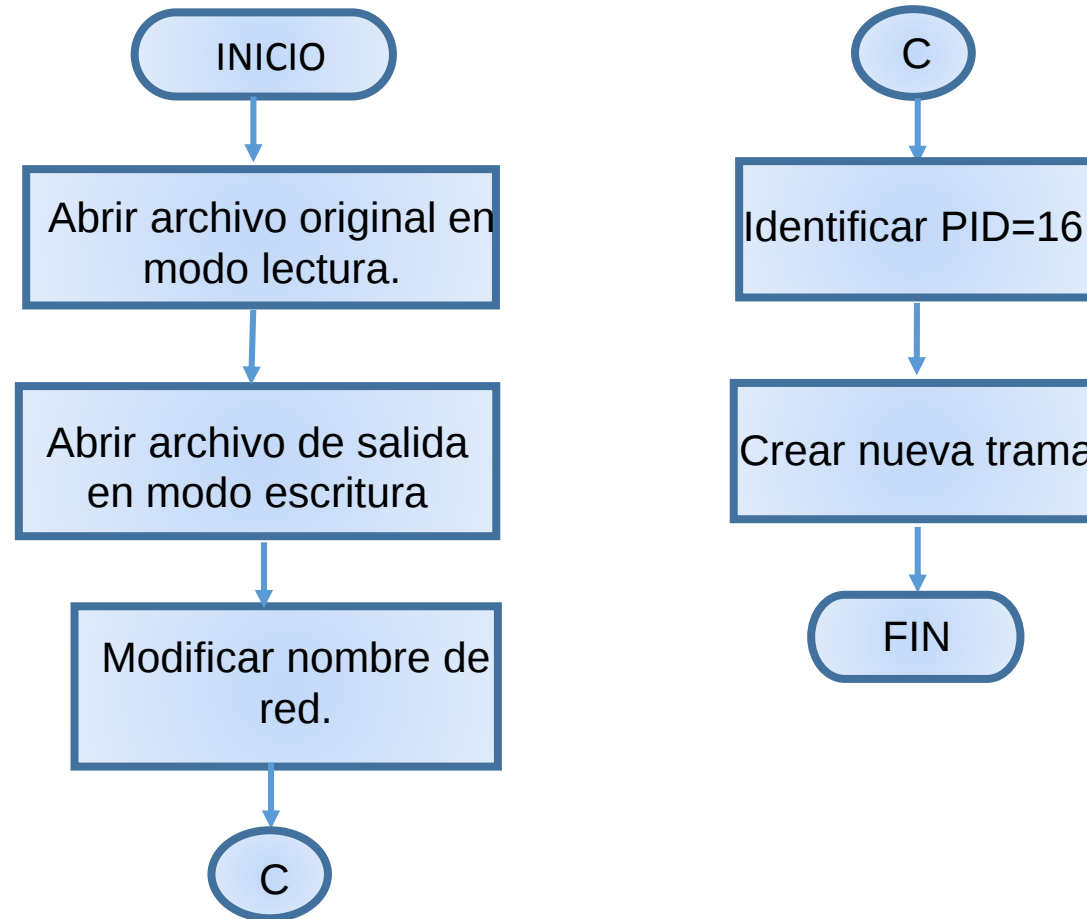
NombreRed =

Radiocuba
```



Analizador_NIT(trama)
Lengthdescriptor
11
Descriptor
NombreRed = Radiocuba

Algorithm to modify the NIT table



Modified Table NIT

```
Command Window
New to MATLAB? Watch this Video, see Examples, or read Getting Started.
>> Analizador_NIT(trama)

Lengthdescriptor =

    11

Descriptor =

    64
     8
    32
    82
    69
    68
    95
    85
    79
    32
     0

NombreRed =

    RED_UO

ans =

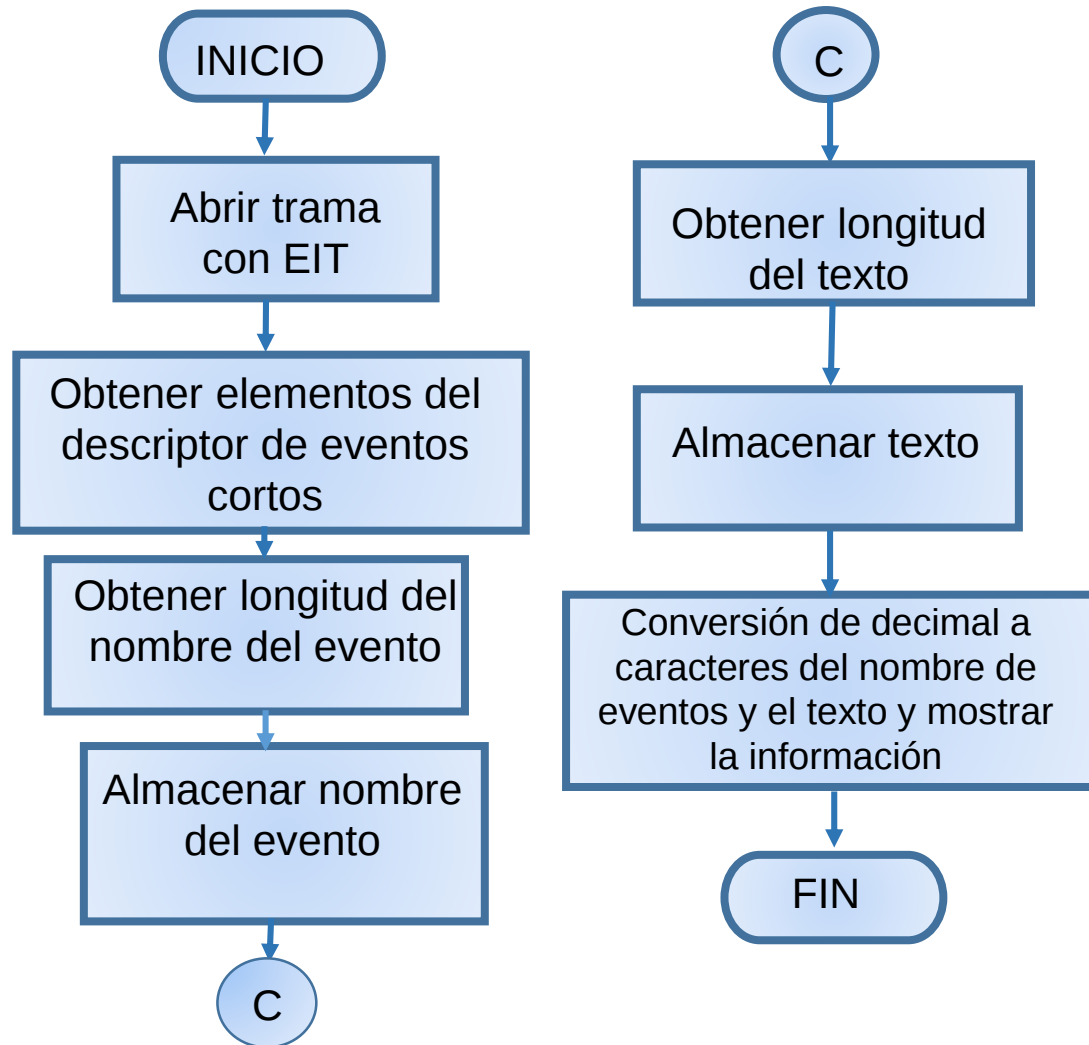
    RED_UO

fx >> |
```



Analizador_NIT(trama)
Lengthdescriptor
11
Descriptor
NombreRed = Red_UO

Analysis of the EIT table in MATLAB



<i>Descriptor tag</i>	<i>Descriptor length</i>	<i>ISO 639 language code</i>	<i>Event name length</i>	<i>Char (event name)</i>	<i>Text length</i>	<i>Text char</i>
'0x4D'						
8	8	24	8	8xN	8	8xN

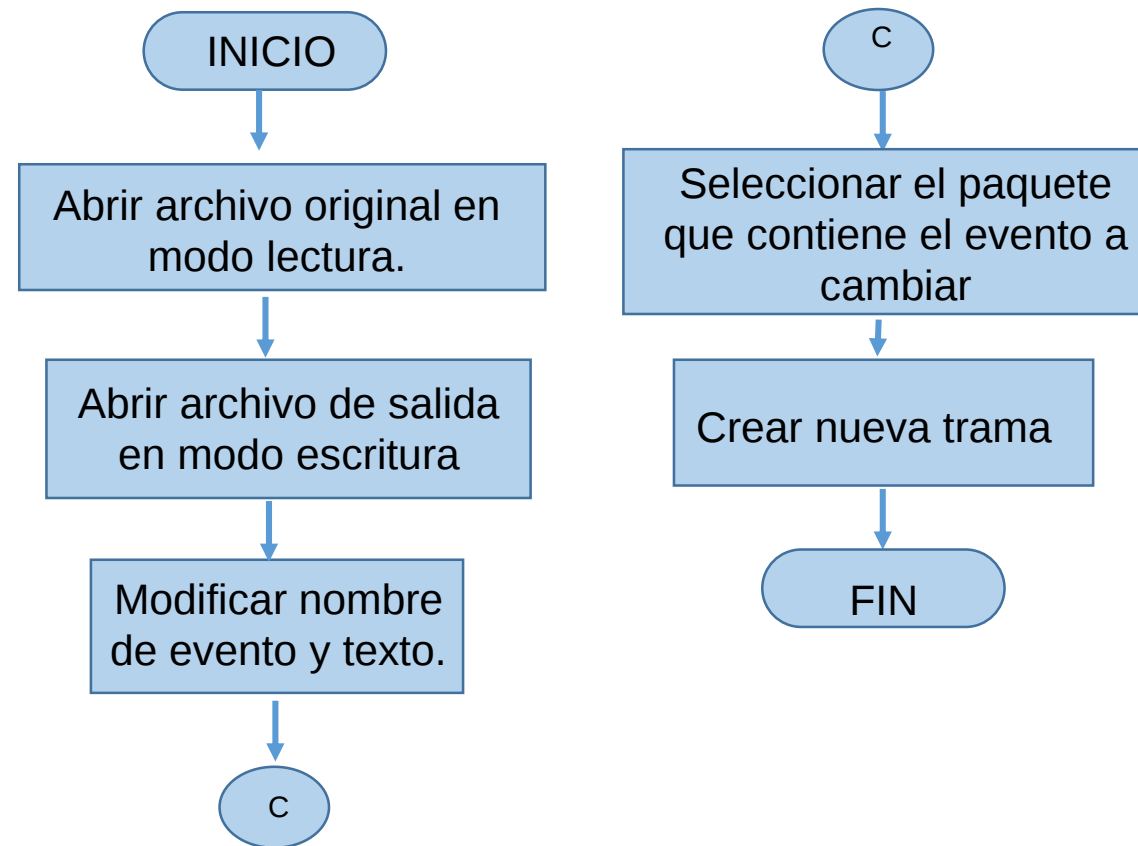
Execution the analysis to the EIT table in MatLAB

```
NombreEvento =  
  
SERIE DEL CARIBE  
  
Texto =  
  
DISCUSIÓN DE LA MEDALLA DE ORO  
  
ans =  
  
SERIE DEL CARIBE  
fx >> |
```



NombreEvento = SERIE DEL CARIBE
Texto = DISCUSIÓN DE LA MEDALLA DE ORO

Algorithm to modify the table EIT



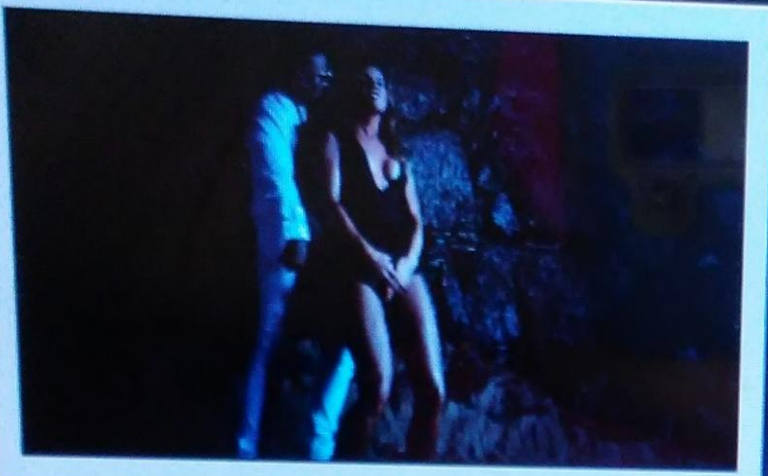
Modified Table EIR

```
NombreEvento =  
  
Emission_Especial  
  
Texto =  
La programacion sera interrumpida para transmitir una emision especial  
  
ans =  
  
Emission_Especial  
fx >> |
```



NombreEvento = Emisión_Especial
Texto = La progamación será interrumpida
para transmitir una emisión especial.

Validation of modified files with the Analyzer S7000



Video PID 257 / H.264

Video Bitrate 0.0000 Mb/s

Audio PID1 256 / AC3

Audio Bitrate1 0.0000 Mb/s

Audio PID2 ---

Audio Bitrate2 ---

RealTime

REC

REPLAY

CH

SPECT

NEXT>>

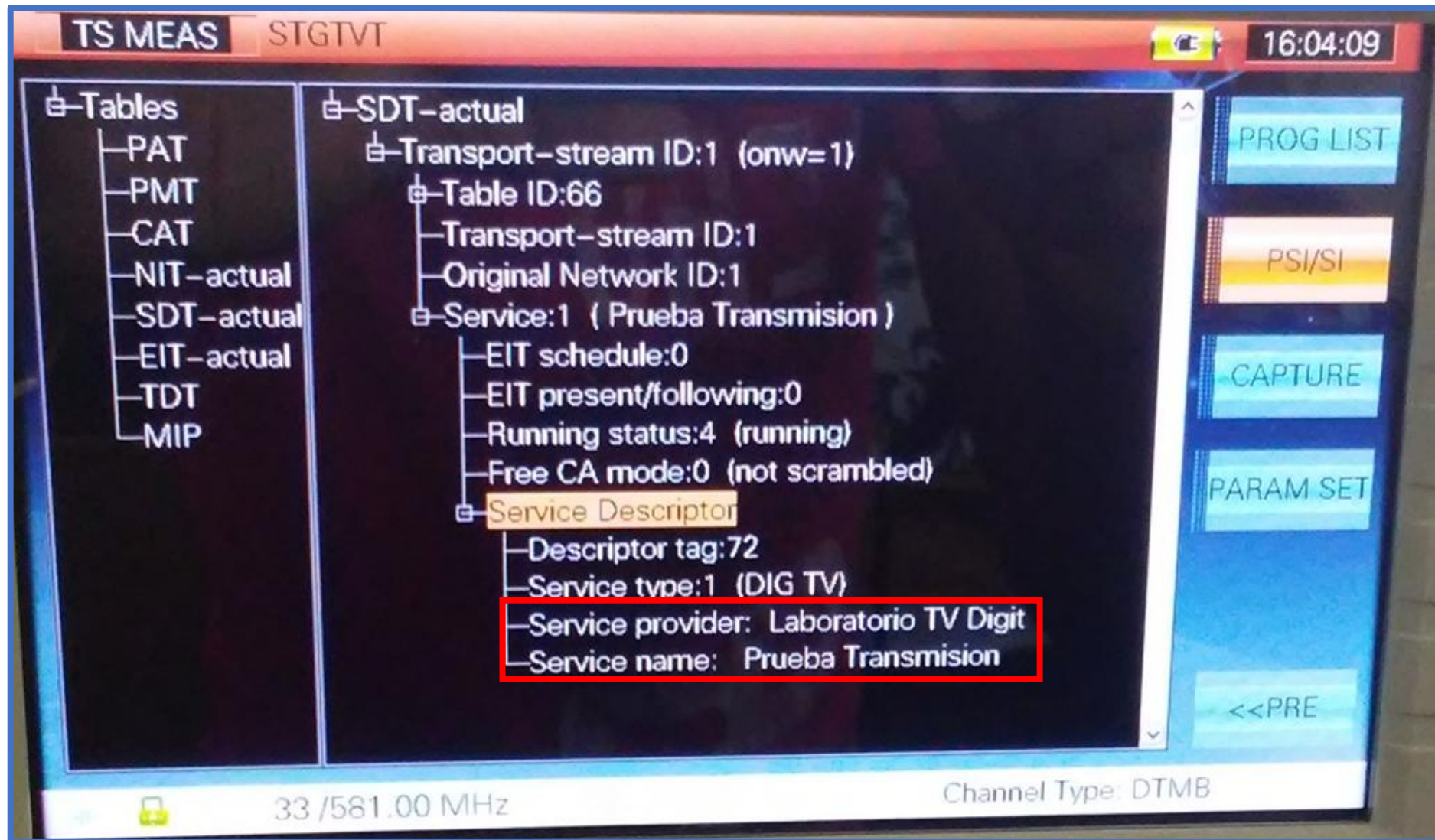
SID	CA	ServiceName	Provider	ServiceType	VideoType	Resolution
0001		Prueba Trans Laborator DIG TV			H.264	1280*720P



33 /581.00 MHz

Channel Type: DTMB

Validation of modified files with the Analyzer S7000



Application developed en the GUIDE-MatLAB



Main window to the application

Analizador y modificador de paquetes TS

Archivo Analizar Modificar Ayuda

Por favor introduzca la información que se requiere:

Número del paquete deseado:

Nombre del canal deseado:

Nombre del proveedor deseado:

Nombre de red deseado:

Nombre de evento deseado:

Nombre de texto deseado:

Nombre del archivo de salida:

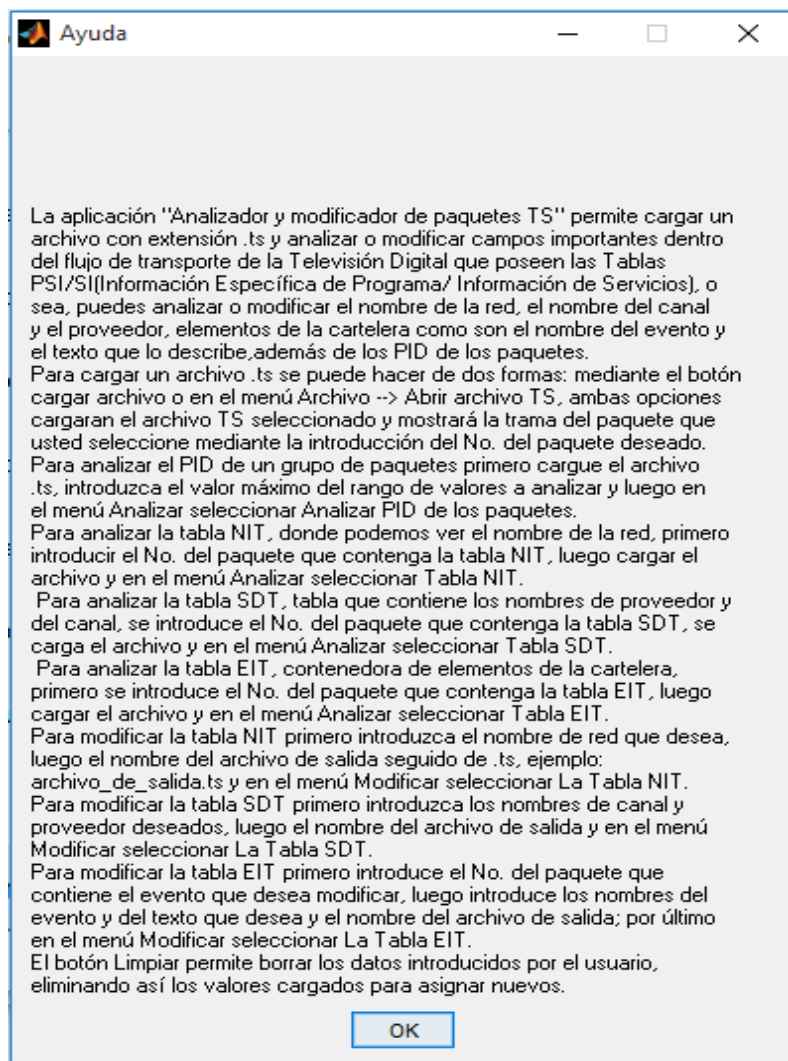
No. máximo de paquetes a analizar PID:

Paquete TS

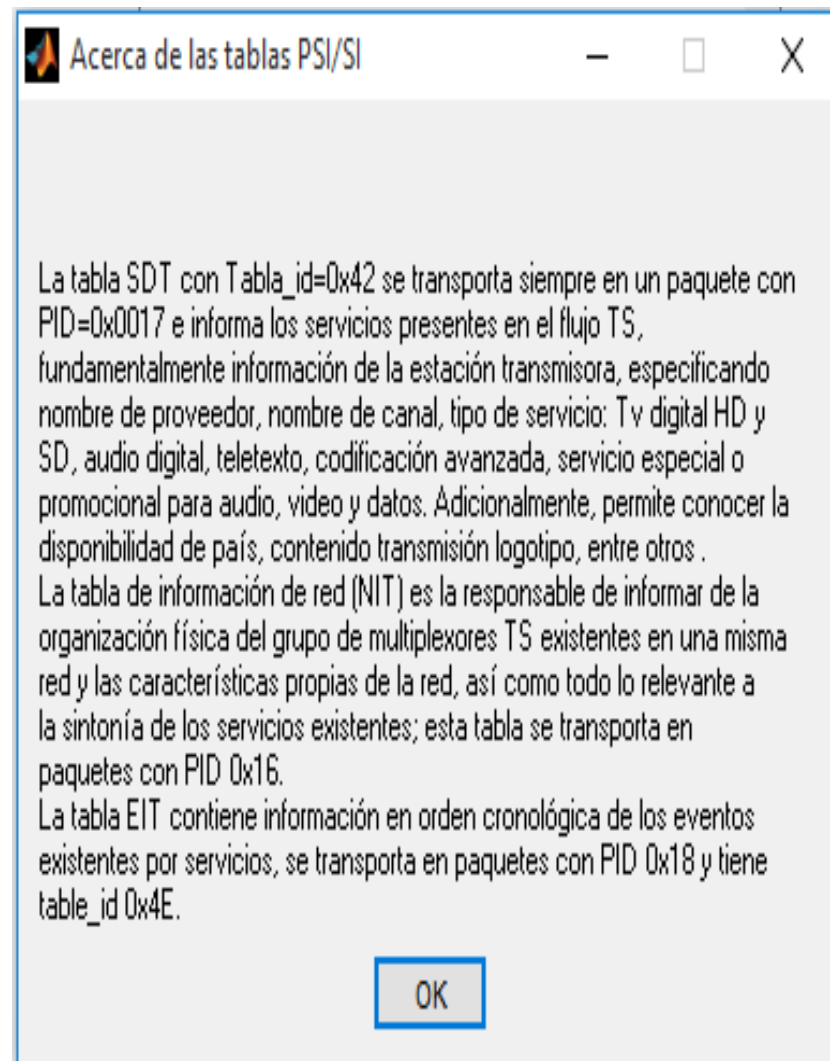
Cargar archivo

Limpiar

Window help to the application



Ayuda de la aplicación GUIDE



Ayuda de la aplicación GUIDE, sección de tablas PSI/SI.

Example of analysis and modifications in the application

Analizador y modificador de paquetes TS

Archivo Analizar Modificar Ayuda

Por favor introduzca la informacion que se requiere:

Numero del paquete deseado:

Nombre del canal deseado:

Nombre del proveedor deseado:

Nombre de red deseado:

Nombre de evento deseado:

Nombre de texto deseado:

Nombre del archivo de salida:

No. maximo de paquetes a analizar PID:

Cargar archivo

Limpiar

47
60
11
1D
00
42
F1
F0
00
01
E1
00
00
00
64
FF
00
01

Example of analysis and modifications in the application

Analizar

Radiocuba

Cubavisión

Analizador y modificador de paquetes TS

Archivo Analizar Modificar Ayuda

Por favor introduzca la información que se requiere:

Número del paquete deseado: 2001

Nombre del canal deseado:

Nombre del proveedor deseado:

Nombre de red deseado:

Nombre de evento deseado:

Nombre de texto deseado:

Nombre del archivo de salida:

No. máximo de paquetes a analizar PID:

Cargar archivo Limpiar

Radiocuba

Cubavisión

Example of analysis and modifications in the application

Modificar

Analizador y modificador de paquetes TS

Archivo Analizar **Modificar** Ayuda

Por favor introduzca la información que se requiere:

Número del paquete deseado:

Nombre del canal deseado:

Nombre del proveedor deseado:

Nombre de red deseado:

Nombre de evento deseado:

Nombre de texto deseado:

Nombre del archivo de salida:

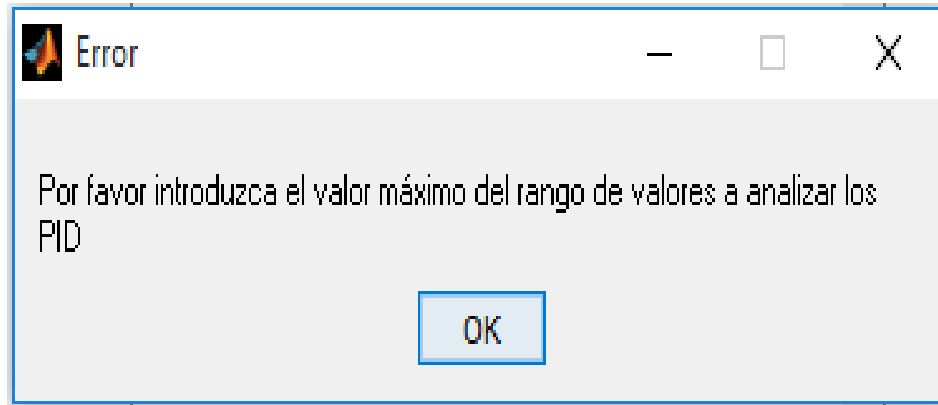
No. máximo de paquetes a analizar PID:

Cargar archivo Limpiar

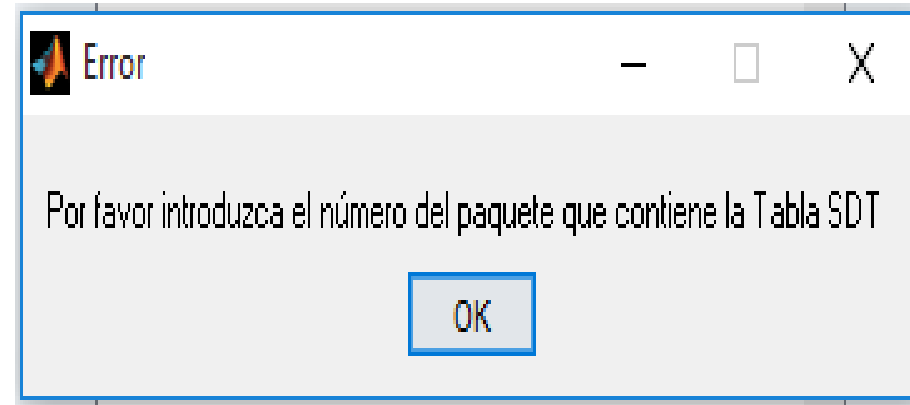
Radiocuba

Cubavisión

Example of analysis and modifications in the application



Mensaje de error al analizar los PID



Mensaje de error al analizar la tabla SDT

CONCLUSIONS

It was possible to import a file with extension .ts in MATLAB that allowed to obtain information of the packages that integrated it like: the name of the file, the amount of bytes, the number of packages and the date of modification.

The SDT, NIT and EIT tables were analyzed using MATLAB programs, which allowed the decoding of information that contains the descriptors such as the service descriptor, the network name, and the short event descriptor.

CONCLUSIONS

New files with .ts extension were generated, the following fields were modified: the name of the channel and the provider, the name of the network, and the short events with the texts that describe it (billboard).

A GUIDE application was used to load a file with .ts extension and to analyze or modify important fields within the Digital Television transport stream that have the Specific Program Information / Service Information (PSI / SI) tables.

Recommendations

Extending the handling of flow of transportation of Digital TV to the table FDT that contains the data of inter-activity , to achieve to generate a local data channel

Incrementing the options of the analyzing application and modifier of parcels TS , to offer the user bigger facilities , including the analysis and modification of the table FDT

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November, 2017