



Training program ELT commissioning



Ed. July 2008



www.kannad.com



Agenda

- **General Presentation of KANNAD**
- The KANNAD ELT system
- COSPAS-SARSAT
- Structure of the transmitted data
- Coding protocols
- Programming data sheet (PDS)
- Programming kit and programming software
- Paperwork
- Installation Acceptance Test
- Maintenance policy / Scheduled maintenance program



Who We Are

- **KANNAD Company** designs and manufactures data, safety, tracking and locating systems for a variety of applications and international markets
- **KANNAD** is a world leader with more than 20 years of experience in the supply of beacons for the aviation, marine and tracking industry



History

- SERPE-IESM created in 1976 (1986 Mobile Safety dpt)
- Joined the MARTEC group in Feb 2002
- In 2007, creation of KANNAD company from MARTEC's Beacons & Instrumental Systems dept.
- KANNAD France turnover 14 M€ - 68 employees
- EN 9100 - ISO9000 - PART 21, subpart G, subpart O



KANNAD Company Market Focus

- **Safety**
 - Alerting and transmitting the position of people in distress
 - The prevention of collisions at sea
- **Tracking**
 - Management of remote fixed and mobile assets
- **Data Systems**
 - Environmental, Scientific and Naval systems



Market applications

- **Safety**
 - Marine Search & Rescue (SAR Beacons, EPIRB, PLB, SLDMB, MOB, etc.)
 - Aviation Search and Rescue (SAR Beacons, ELT, PLB, etc.)
 - Private remote security network
 - Maritime signalling system (RACON, AIS)
 - Maritime anticollision system (Activ'Echo, AIS)
- **Tracking**
 - Asset Management (Fixed and Mobile systems, Fishing Buoys)
 - Vessel Monitoring System (Argos and Iridium VMS)
- **Data Systems**
 - Beacons & Platforms
 - Oceanographic (Provor, Arvor, SVP, etc.)
 - Meteorological (SVP/BP, SVP/WSD, SLDMB, etc.)
 - Polar (CAD, CALIB, Ice Beacon, POPS, etc.)
 - Petroleum (SLDMB, ArgoSphere, etc.)
 - Naval Systems (MASS, SILC, Acoustic applications, etc.)



Examples of products designed by KANNAD





We are leading the 406 MHz industry



- The smallest beacon on the market in 1987
- Easy programming
- Worldwide maritime & aero Distribution and Service Network (over 50 countries)
- Type approval worldwide
- Complete range of beacons
- JAA/EASA/CAA/FAA... Approvals
- Member of RTCA working Group on DO-204 MPOS
- Chairing EUROCAE ED62 revision working group



Questions ?



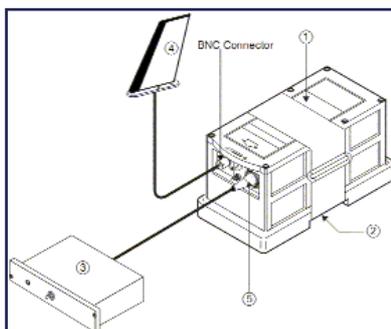


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The ELT system



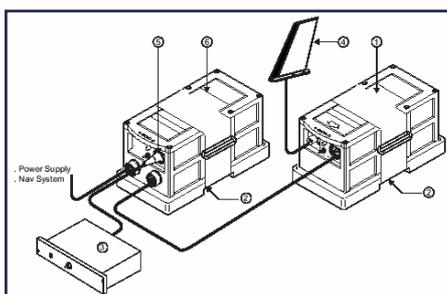
Standard installation

→ ELT = Emergency Locator Transmitter

- Transmit on 1, 2 or 3 frequencies :
 - 121.5 MHz
 - 243 MHz
 - 406.02x MHz

→ 121.5/243MHz are called "Homing" frequencies.

Analog audio signal



Installation with NAV-ELT interface (CS-144)

- 406 MHz burst
Digital message containing identification data
Can contain position data with optional NAV-ELT interface



“We have the solution for your aircraft”

→ Commercial aviation

- ⇒ Airliners
- ⇒ Commuters



→ General Aviation

- ⇒ Business aircraft
- ⇒ Helicopters
- ⇒ Light aircraft



The KANNAD ELT range

Automatic fixed	Kannad model	Homing	406 MHz	G-Switch	Antenna	Activation	ELT-NAV interface	
	121 AF	121.5/243	-	Horizontal	External	Shock + Manual	-	
	121 AF-H	121.5/243	-	45°	External	Shock + Manual	-	
	406 AF	121.5/243	YES	Horizontal	External	Shock + Manual	Option	
	406 AF-H	121.5/243	YES	45°	External	Shock + Manual	Option	
	406 AF-6D	121.5/243	YES	x 6 directions	External	Shock + Manual	Option	
	406 AF-Compact	121.5	YES	Horizontal	External	Shock + Manual	Option available mid 2008	
Automatic portable	Kannad model	Homing	406 MHz	G-Switch	Antenna	Activation		
	406 ATP	121.5/243	YES	Horizontal	Ext. + Auxiliary	Shock + Manual	Option	
		406 AP	121.5/243	YES	Horizontal	Ext. + Auxiliary	Shock + Manual	Option
		406 AP-H	121.5/243	YES	45°	Ext. + Auxiliary	Shock + Manual	Option
Survival	Kannad model	Homing	406 MHz	G-Switch	Antenna	Activation		
	406 AS	121.5/243	YES	-	Auxiliary (BNC)	Manual + Water Switch (option)	-	
	406 AS TNC	121.5/243	YES	-	Auxiliary (TNC)	Manual + Water Switch (option)	-	
	406 Survival	121.5/243	YES	-	Auxiliary (TNC)	Manual + Water Switch	-	



Wide range of accessories

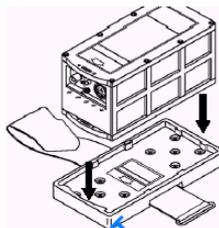
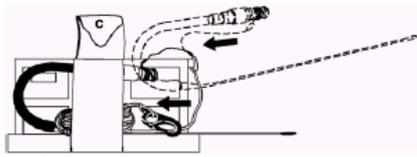


- ➔ Remote Control Panels
- ➔ Programming Dongles
- ➔ Mounting Brackets
- ➔ Antennas
- ➔ NAV-ELT interfaces
- ➔ Programming and testing tools



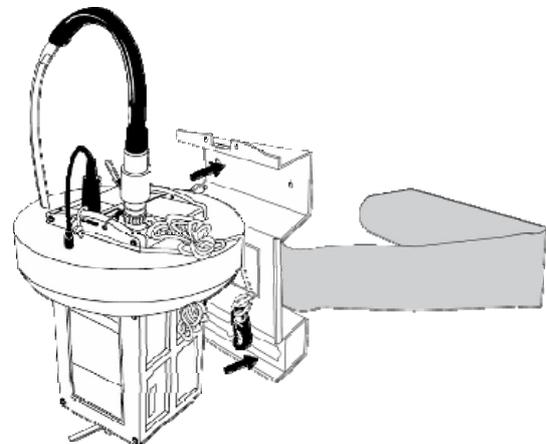
Mounting Bracket

Mounting bracket, 1 strap



- ➔ For KANNAD 406 AP, AF, AP-H, AF-H, 121 AF, 121 AF-H

Mounting bracket, AS



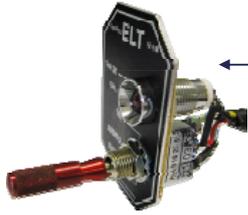
- ➔ For KANNAD 406 AS, AS-TNC, Survival

➔ Note : KANNAD 406AF-Compact mounting bracket is included with the ELT



Remote Control Panels

RC1xx



RC200/RC200-NVG



Also compatible
with AF-
Compact

RC300/RC300-NVG



RC400



RC500



RC600-NVG



Antennas

ANT410



ANT300



ANT200



ANT500



Blade antennas are
not available with
406AF-Compact

ANT650





DIN12 Connector and dongles



DIN12 connector



Programming dongle



Programming dongle A320

Programming dongle A330 & A340



- A DIN12 connector is used to connect the ELT to the RCP.
- This connector can include a Serial Memory Module (SMM) containing the coding information of the ELT. It is called a "Programming Dongle"
- In fixed installation (AF, AP...) the dongle is permanently attached to the ELT side of the RCP cable.
- In survival installation (AS, Survival...) the dongle can be stored in the mounting bracket or in the carry-off bag.
- To program an ELT from a dongle, connect the dongle to the ELT, then switch to ARM. The coding information is transferred from the dongle to the ELT
- Once the ELT is programmed, if the dongle is removed, the ELT keeps the coding information previously downloaded from the dongle
- To restore an ELT back to factory programming (test protocol), use a maintenance dongle.



Programming dongle assembly



Maintenance dongle

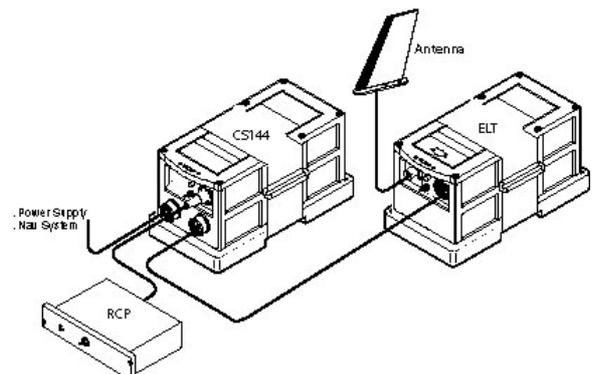


ELT-NAV Interface Kit

CS144-RS RS-232 or RS422 interface

CS144-A ARINC 429 interface

- A programming dongle is mandatory when using the CS144.
- The CS144 get the identification of the aircraft from the dongle (short message)
- The CS144 get the position of the aircraft from the aircraft navigation equipment
- The CS144 combines the identification and the position to build a long message.
- The long message is transmitted to the ELT via the ELT DIN12 connector.





Typical configurations

“I fly a C172”

- KANNAD 406 AF-Compact Kit + ANT200

Turboprop

- KANNAD 406 AF or AP + MB + RC200 + OUTSIDE BUZZER + ANT300 + DONGLE
- CS144-RS or CS144-A + MB (option)

Corporate jet

- KANNAD 406 AF + MB + RC200 + OUTSIDE BUZZER + ANT650 + DONGLE
- CS144-RS or CS144-A + MB (option)

Airliners

- KANNAD 406 AF + MB + RC500 + OUTSIDE BUZZER + ANT650 + DONGLE
- CS144-RS or CS144-A + MB (option)

Helicopter

- KANNAD 406 AF-H or AP-H + MB + RC200 + ANT300 + DONGLE (option)
- OUTSIDE BUZZER (option) + CS144-RS or CS144-A + MB (option)

“I want a ELT(S) to comply with ICAO retrofit installation of Commercial Aircraft”

- KANNAD 406 SURVIVAL
- MOUNTING BRACKET, AS or CARRY-OFF BAG

For more details on How to build a chipset refer to the appropriate technical presentation for Fixed Wing or for Helicopter application



Competitive edges

Commercial

- Price and availability
- Customized solution “We have the solution for your aircraft”

Reliability

- 20 years of experience in 406 MHz technology (maritime)
- 10 years of experience with thousands of ELTs in service

Technical

- Weight & Size (the smallest 406 MHz ELT in the world)
- 3 frequency transmitter (121.5/243/406 MHz)
- Complying with latest regulation (JAR-OPS, ICAO...)
- Full qualification (ETSO & TSO) on the same P/N (no retrofit required when changing country of registration)
- Short circuit protection (No combination of short circuits from the Remote Control Panel wires will stop the ELT once activated)
- Easy programming (no hardware operation)
- Pin-programming option (using a “programming dongle” or “smart connector”)
- 6 year battery



OEM references



Questions ?





Agenda

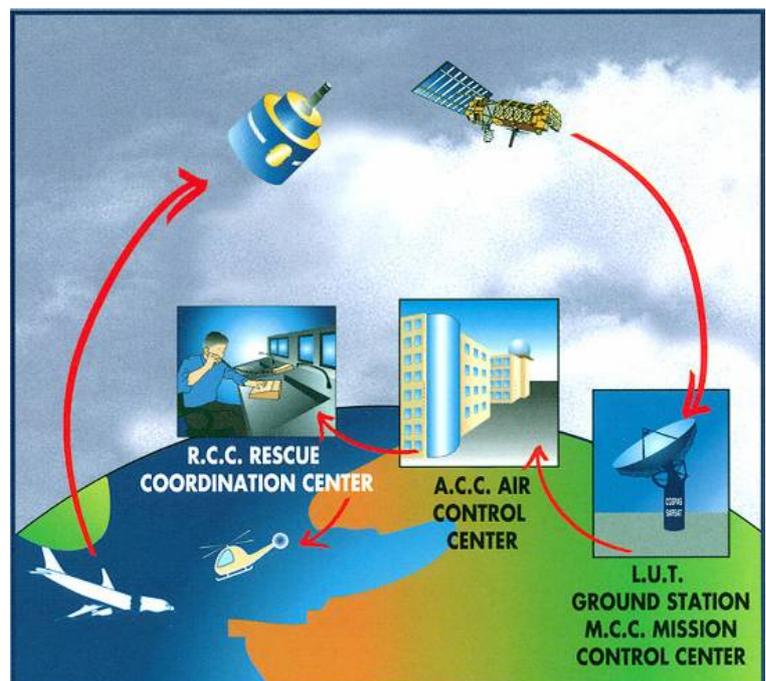
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COSPAS-SARSAT

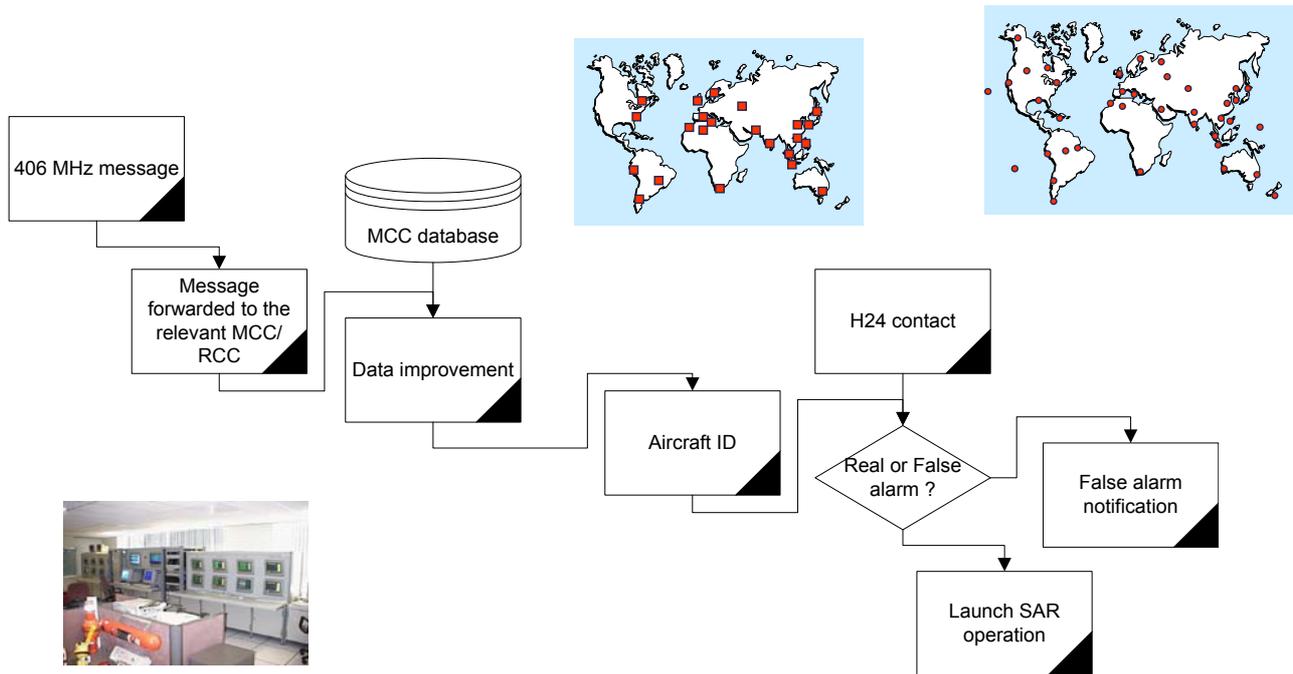


- Identification of the Aircraft
- Precise positioning
- Global coverage





Distress Message Processing



Aircraft identification

- ➔ Thanks to a shared database, SAR* headquarters know the type of aircraft in distress as well as the color of the fuselage, the number of passengers...
- ➔ Knowing who is transmitting brings an efficient solution to false alarms
- ➔ KANNAD company holds a database of its beacons that can be used as a backup of the "official" database

*SAR = Search And Rescue



Precise pinpointing

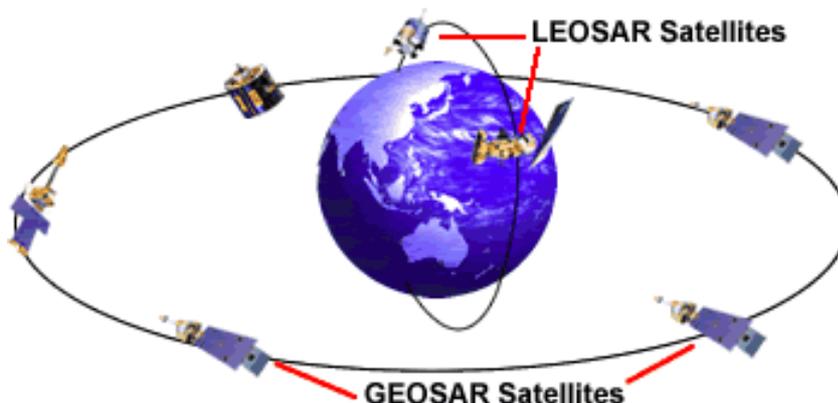
- Thanks to an Ultra-Stable signal, the COSPAS-SARSAT satellites can pinpoint a 406Mhz ELT by doppler effect within 2 Nautical Miles (according to COSPAS-SARSAT spec).
- Test carried out with KANNAD ELTs show an accuracy better than 500 meters
- The position of the aircraft can be added in the “long” digital message with an accuracy of 4” (125 meters). A special “NAV-ELT” interface is required (CS144).



COSPAS-SARSAT satellites

The COSPAS-SARSAT alerting system is based on two types of satellites :

- ① LEOSAR (Low Earth Orbiting Search And Rescue Satellites)
- ② GEOSAR (Geostationary Earth Orbiting Search And Rescue Satellites)

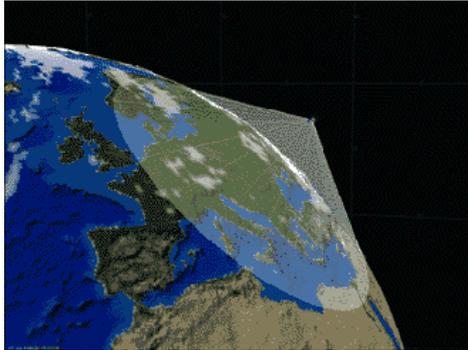




LEOSAR satellites



- Polar orbiting satellites
- 5 satellites
- Altitude = 850 km
- Revolution period = 100 minutes



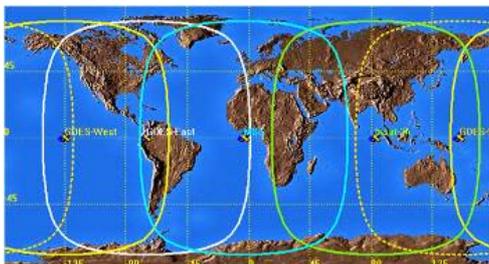
-
- Depends on satellite pass (max waiting time in Europe = 50 minutes, on the equator = 2 hours, duration 15 minutes)
 - Ambiguity of the Doppler positioning (one position East and one position West of the satellite track)

- +
- Low altitude (high link margin)
 - Global coverage (including the poles)
 - Visible from any place in the world (even behind a tall mountain...)
 - 406 MHz signal processed by the satellite (Recording)
 - Location of the transmitter (Doppler effect)
 - 121,5 MHz repeater (until 2009)



GEOSAR satellites

- Geostationary satellites
- 4 satellites
- Altitude = 36 000 km (over the equator)

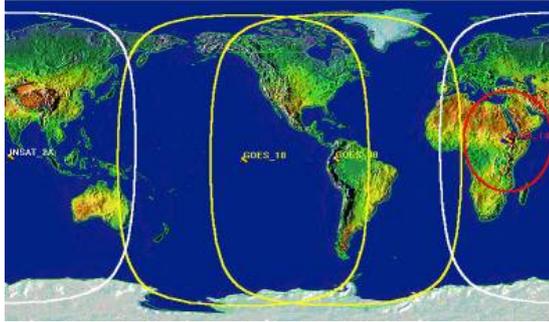


-
- High altitude (low link margin) => will not pick-up a low signal
 - Can be hidden by tall obstacles (ex North of a tall mountain...)
 - Unable to determine the location of a transmitter (No Doppler effect) = identification but no position (except if the ELT transmits its position)

- +
- Always visible (within the coverage area)
 - Quasi global coverage (except the poles)
 - 406 MHz signal repeater
 - Immediate alert (less than 5 minutes)



Perfect satellite complementarity



➔ COSPAS-SARSAT benefits from the combination of both satellite systems

+

- Always visible (within the coverage area)
- Nearly global coverage (except the poles)
- 406 MHz signal repeater
- Immediate alert (less than 5 minutes)

+

- Low altitude (high link margin)
- Global coverage (even the poles)
- Will be visible from any place on the world (even North of a tall mountain...)
- 406 MHz signal processed by the satellite (Recording)
- Can determine the location of a transmitter (Doppler effect)
- 121,5 MHz repeater (until 2009)



Questions ?



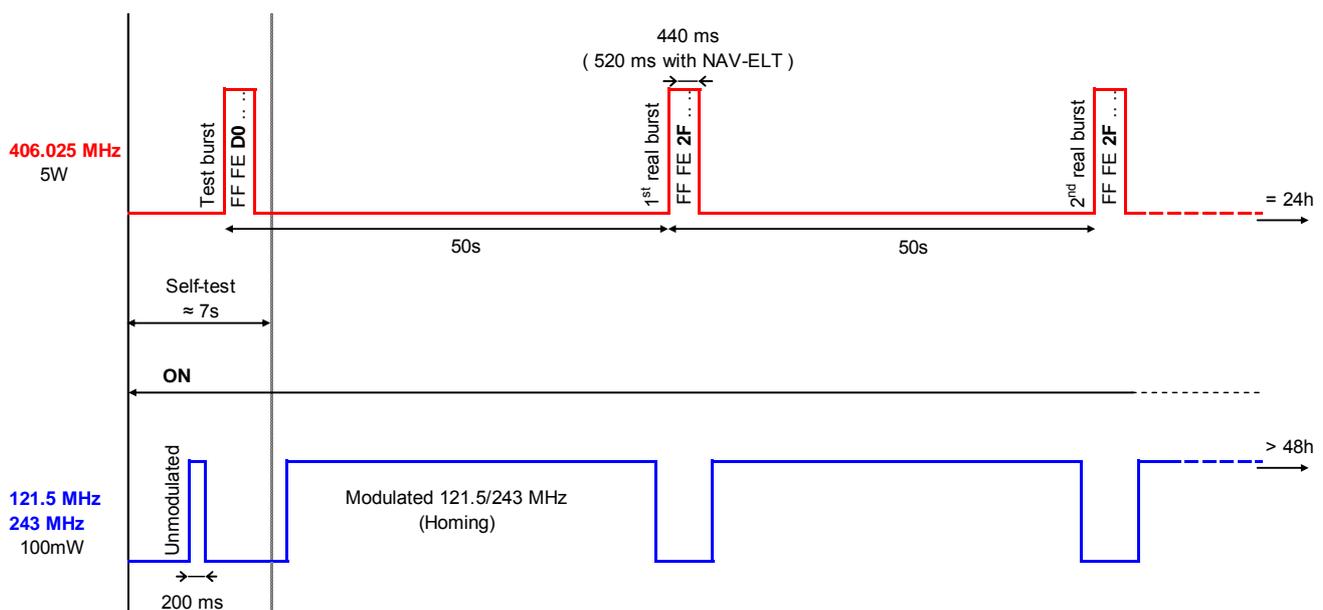


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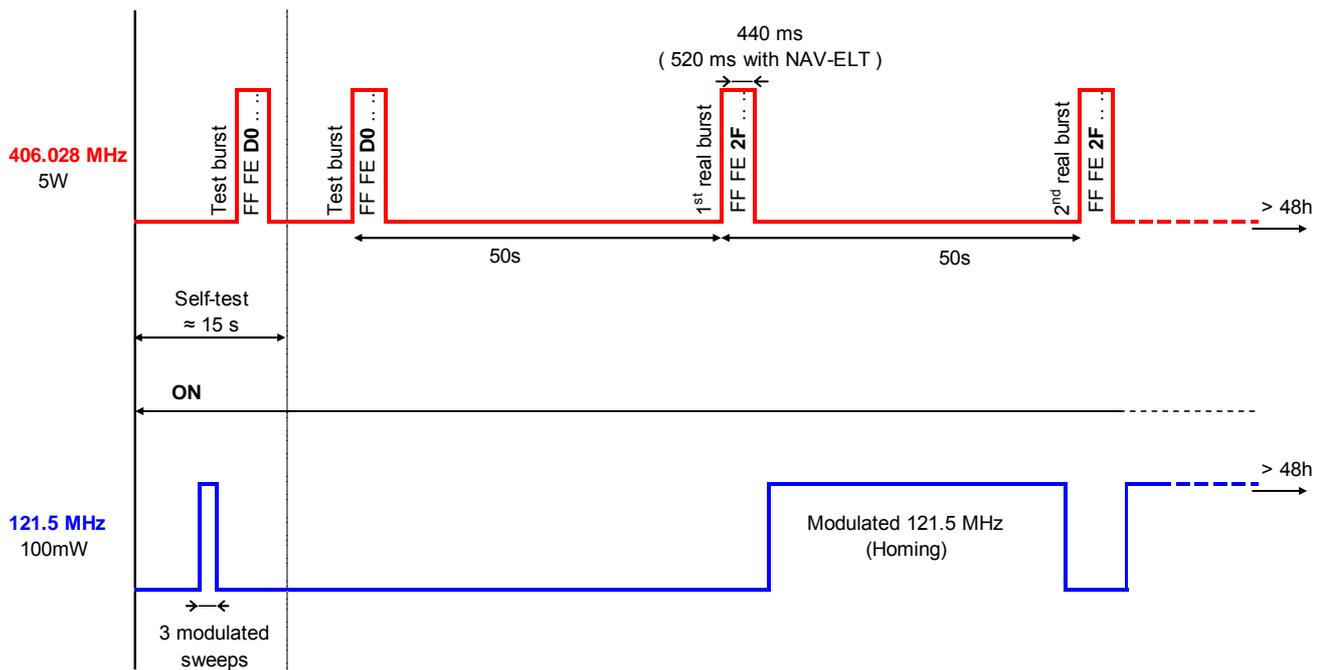


Transmission diagram (all ELTs but AF-Compact)

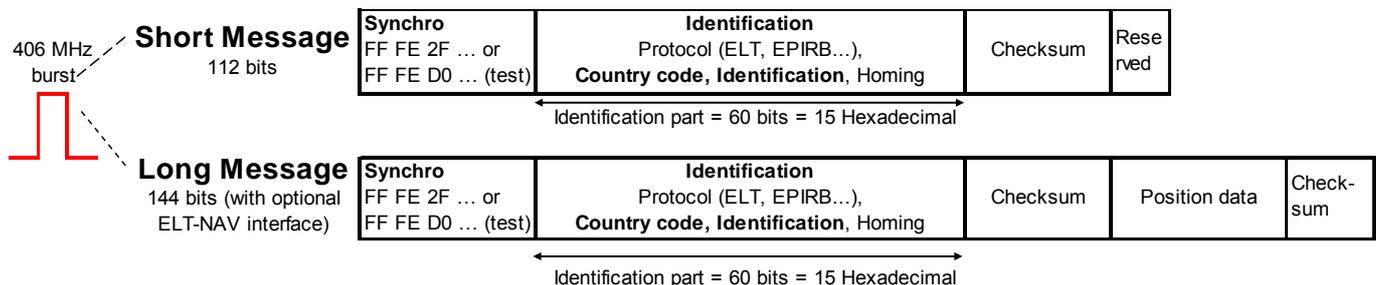




Transmission diagram (Kannad 406 AF-Compact)



Structure of the digital message (406MHz burst)



- ➔ **Short message** (No ELT-NAV) = 112 bits = 28 hexadecimal chars.
 - Example of short message : FF FE 2F 4C 93 24 97 38 0B A6 06 F1 25 90
- ➔ **Long message** (with ELT-NAV) = 144 bits = 36 hexadecimal chars.
 - Example of long message : FF FE 2F CC 93 24 97 38 0B A6 05 09 86 80 23 01 1E D3
- ➔ In short or long message, the 60 identification bits can be noted as 15 hexadecimal characters called **15 Hex ID**.
 - Example of 15 Hex ID : 9926492E70174C0 ← **This is a unique identifier for every single ELT in the world.**



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Information encoded in the ELT

The coding protocol defines the type of information encoded in the “Identification” field of the digital message

- 4 possible types of coding when ELT installed :
 - *Protocols which identify the aircraft*
 - ⇒ Tail number (T/N)
 - ⇒ ICAO 24bit address (ICAO)
 - *Protocols which identify the ELT itself*
 - ⇒ Unique serial number (S/N)
 - ⇒ Aircraft Operator Designator + serialised number (AOD)

- 1 special type for ELTs not on board (i.e. “Maintenance Code” = MN)
 - Details in document C/S G.005
<http://www.cospas-sarsat.org/Documents/gDocs.htm>



Coding protocol : Aircraft registration marking - also called T/N (tail number) protocol -

- The ELT will transmit the Aircraft Registration marking (or Tail Number, T/N) “in clear”, without the dash (-)
- Any aircraft registry is based on this number
- Main advantage: no database needed
- This type of code shall be selected if no relevant Sarsat Point of Contact or no clear information about accepted coding protocols is available.
- When possible (Tail Number on only 5 digits), two ELTs installed on the same aircraft will be distinguished by their rank on board by adding a slash “/” before the rank of the ELT
 “FBXRV/1” fixed ELT
 “FBXRV/2” first survival
- This coding protocol will also include the country code

→ **Example of identifier** : FBXRV/1, HBA6D/1, GCGAB/2, N86173



Coding protocol : Aircraft 24 bit address - also called ICAO 24 bit address protocol -

- Unique number issued by the relevant Civil Aviation Authority
- Also used to encode Mode S transponders or TCAS systems
- International aircraft registry based on this number (ICAO)
- Coded on 24 bits, noted in Hexadecimal notation
- This coding protocol will also include the country code, the TAC*, and the rank on board (from 0 to 63)

→ Example of identifier : A379B1

*TAC = Type Approval Certificate from Cospas-Sarsat, selected from a drop down menu in the programming software



Coding protocol : Unique Serial Number

1/2

- Requires a specific database to link the serialised number with the A/C identification
 - If ELT changes
 - ☞ no re-programming needed
 - ☞ but registration update with the relevant SPOC* is required.
 - 2 “sub-types” depending on who gives the serialised number (COSPAS-SARSAT, ELT manufacturer, Country authority)
 - ☞ Serial number assigned by beacon manufacturer (CSN)
 - ☞ Serialised number issued by country authorities
- Example of identifier : 327634, 31, 453720

*SPOC = Sarsat Point Of Contact



Coding protocol : Unique Serial Number

2/2

→ Serial number assigned by beacon manufacturer (CSN)

- ⇒ Each Kannad ELT or Dongle has its own CSN.
- ⇒ CSN is a 6 digit number starting with a 3
- ⇒ This number is written on the "Identification label" of the ELT or the Dongle.

→ Serialised Number issued by country authorities

- ⇒ The programmer shall contact KANNAD or the local COSPAS-SARSAT authorities to obtain a number before programming
- ⇒ This number is issued only if "registration form" is duly completed (to ensure registration)

These coding protocols will also include the country code and usually include the TAC*

*TAC = Type Approval Certificate from Cospas-Sarsat, selected from a drop down menu in the programming software



Coding protocol : Aircraft Operator Designator

- Enables an airlines to manage its fleet with a database to link the S/N with the A/C
- As this database is handled by the airline:
 - ⇒ no need to update registration with SPOC
 - ⇒ no need to re-program ELT
 - ⇒ but H24 contact required
- Code composed of the "three letter aircraft operator designator" + serial number from 0001 to 4096 (issued by airline)
- *NB : when using a CS144 ELT-NAV interface, the serial number must be from 001 to 511*
 - Example of identifier : AFR 0027, AAL0153



Maintenance code (test protocol)

- Agreement between KANNAD and FMCC (French Mission Control Centre)
- ELTs coded with
 - ⇒ Country code “France” 227
 - ⇒ Test protocol
 - ⇒ Identifier = “SI” plus the 5 last digits of the CSN or “K” plus the 6 digits of the CSN (since mid 2008)
- Recognised by COSPAS-SARSAT as “ELT not on board”
- To program an ELT with a “Maintenance code”, use function “ELT Maintenance Code Programming” in Winprog software or connect a “Maintenance Dongle” and switch ELT to “ARM”.
- When ELT programmed with a “Maintenance code”, ELT self-test result is 3+4 flashes.



Which protocol to select ?

- Depends on the country of registration of the aircraft
- Document C/S G.005 (§6.2) asks the “manufacturer or distributor” of a 406 MHz beacon to determine the identity of administration authorising its use (SPOC) and to comply with administration registration requirements.
- References :
 - ⇒ File spocs.xls on KANNAD download site
 - ⇒ COSPAS-SARSAT Website
 - ⇒ COSPAS-SARSAT “Handbook of regulation” C/S S.007
<http://www.cospas-sarsat.org/Documents/handbookOfBeaconRegs.htm>



COSPAS-SARSAT web site

➔ The Web-site gives information for each country the SPOC (Sarsat Point Of Contact)



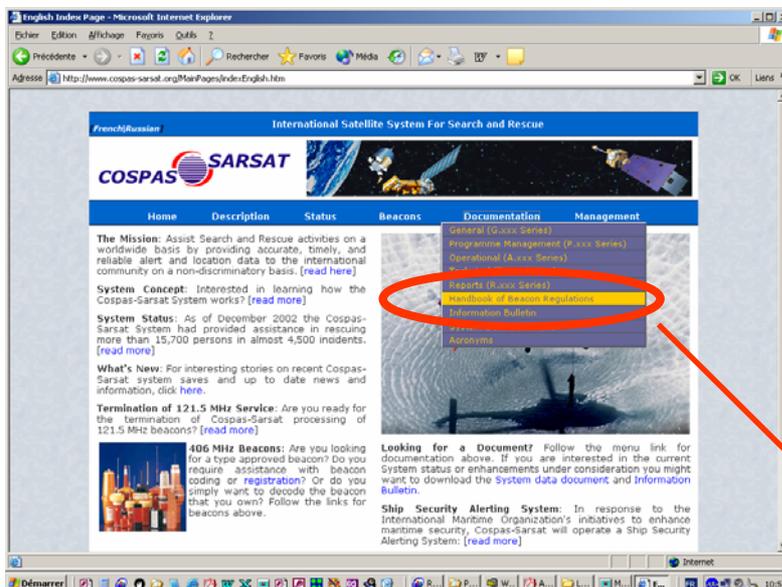
<http://www.cospas-sarsat.org/BeaconsCodingGuideGeneral/poc.htm>



C/S-S007 Handbook of regulation

1/2

➔ This document can be downloaded from COSPAS-SARSAT's web site [ww.cospas-sarsat.org](http://www.cospas-sarsat.org) and is annually updated



Handbook of Beacon Regulations

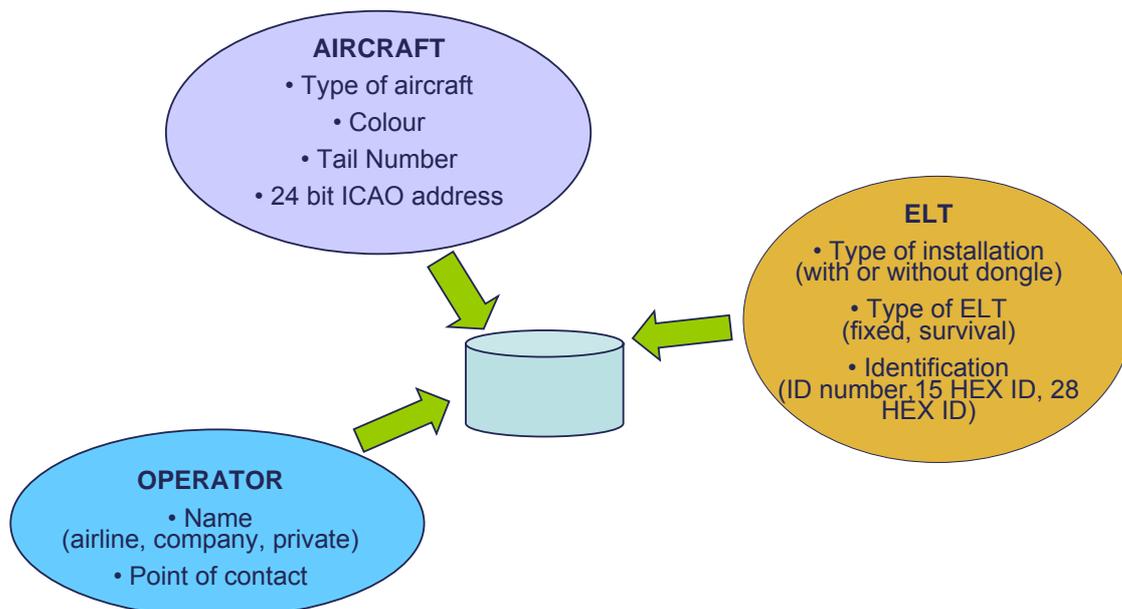


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Registration





How to get the information from the operator ?

- ➔ A Programming Data Sheet (PDS) must be filled in for each programming of an ELT or a Dongle.
- ➔ **If the ELT will be programmed by a dongle, the PDS apply to the Dongle.**
- ➔ Programming Data Sheet (PDS) must be completed by the operator to get the relevant information on the aircraft registration and operational point of contact.

Lower part is to be completed by the programmer and must be sent to KANNAD

- ➔ Programming Data Sheet is available :
 - ➔ On KANNAD download site
 - ➔ In Winprog, Menu "Misc"
 - ➔ Upon request to KANNAD Customer Support



Programming Data Sheet

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Purpose

Installation
 Removal
 Re-coding
 New owner

Important note :

The PDS apply to any device, either Dongle or ELT, which is programmed by the PR550 or PR600

When programming a Dongle, the PDS must be filled in the same way as for an ELT.

- ➔ To install a new ELT, select option "Installation"
- ➔ To remove an ELT, select "Removal"
- ➔ Unless A/C is equipped with programming dongle, 2 PDS must be completed when replacing an ELT (1 with "Removal", the other with "Installation")
- ➔ The ELT needs to be reprogrammed if A/C changes country of registration (select "Re-coding")
- ➔ Any change of ownership must be registered (select "New owner")



Programming Data Sheet

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Aircraft

Type of aircraft (use ICAO abbreviation)	A319
MSN (if forwardfit)	1239
Homebase (airport)	LFPO

- This information is useful to organise the Search and Rescue Operation
- MSN (Mainframe Serial Number) is required to deliver ELT to an Aircraft Manufacturer. This number is copied on the ELT identification label



Programming Data Sheet

3/8

Aircraft identification

Country of registration	France
Aircraft registration marking (Tail Number)	F-BXRV
Repeated in International Alphabet (ex: FOX BRAVO ROMEO ZOULOU ECHO)	FOX BRAVO X-RAY ROMEO VICTOR
Aircraft 24 bit address (hexadecimal format)	A37B2F

→ This information is mandatory. It is either programmed into the ELT or registered with both SPOC and KANNAD

→ The 24 bit address is available from the Civil Aviation Authority and must be converted in Hexadecimal format.
1101 1111 0010 1100 0011 0001 = DF2C31



TIP : the Calculator included in Windows can easily convert BIN to HEX and vice-versa. (Scientific mode)



Programming Data Sheet

4/8

Aircraft operator

Airline / Name (if private)	Air France
Three letter airline designator (AOD)	AFR
Address	Aéroport Roissy Charles de Gaulle 95783 Roissy en France Cedex
Country	France
Phone (with country code)	+ 33 1 86 50 50 50
Fax (with country code)	+ 33 1 86 50 55 55

H24 contact

Contact name	Flight Operations
Phone (with country code)	+ 33 1 86 53 78 20
Fax (with country code)	+ 33 1 86 53 78 25

→ At least one H24 telephone number is required



Programming Data Sheet

5/8

Aircraft configuration

Type of ELT _____
 Rank of ELT (1=fixed, 2=survival, etc..) if T/N _____
 Rank of ELT (0=fixed, 1=survival, etc.) if 24-bit address _____

Installation with programming dongle Yes No

Date: _____ Signature: _____

→ Complete the exact type of ELT to be installed. Ex: KANNAD 406 AP or KANNAD 406 AS ...

- The rank of the ELT must be specified if other ELTs are installed on board
 - ☉ T/N protocol : rank 1 = automatic ELT, rank 2 = first survival ELT, etc...
 - ☉ 24-bit address protocol : rank 0 = first ELT, rank 1 = second ELT, etc...

→ The ELT installation option must be specified by the aircraft operator as this information will enable to determine whether the ELT or the DONGLE contains the code.

→ The signature engage the responsibility of the operator



Programming Data Sheet

6/8

ELT or DONGLE information

CSN (ex: 322742) _____

S/N (ex: L0782-0027) _____

- ➔ Information usually added by the programmer (found on the equipment's name plate)
The ELT or Dongle CSN is a 6 digit number between 300000 and 399999
The CSN is software encoded in the PCB board (Read-Only)
- ➔ It must be provided by the aircraft operator in case of ELT removal
- ➔ The S/N is a production stamp. Not used for programming. Given for information only



Programming Data Sheet

7/8

Coding information

COSPAS-SARSAT Country Code (MID) _____

Protocol T/N (tail number) S/N (serialized number) ICAO (24 bit address) AOD (Op. Designator)

Identification number _____

Identification (15 HEX ID)

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

- ➔ Information usually added by the programmer
- ➔ Examples of Identification numbers (depending on the identification protocol) :
 - ➔ FBXRV/1 , CFEYS/1 (T/N protocol)
 - ➔ 3A7C2F (24-bit address protocol)
 - ➔ AFR 0783 (AOD protocol)
 - ➔ 322742 (Serial protocol)
- ➔ The Identification code (15 HEX ID) is computed by the Kannad Winprog software. It is a "key information" within the COSPAS-SARSAT system. This number is required to complete any "registration form".



Programming Data Sheet

8/8

Programmer details

Name of distributor / dealer / airline

.....

Date

Signature (the programmer) :

- Name of the organization that has performed the ELT or DONGLE programming
- The signature engage the responsibility of the programmer.



Questions ?





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Commissioning

- Before installation on board an aircraft, the operator must ensure that the ELT is programmed (self-test OK) and registered with the relevant COSPAS-SARSAT authorities.
- The PR600 equipment is designed to program either the ELT or a Programming Dongle.
- In case of installation with a programming dongle the programming is done automatically when the ELT is switched to ARM.
- The programming dongle has to be programmed once. It has to be reprogrammed only in case of a change of registration.



**PR600
USB**





Kannad Winprog setup

Note : *Kannad Winprog V2 runs on Windows 98SE, Windows 2000 and Windows XP.
However, PR600 drivers are not supported by KANNAD for Windows 98SE*

→ Installation

- If the Kannad Winprog CD doesn't autorun, launch "Setup.exe"
- After the "Installshield Wizard Completed" screen, wait for the "FTDI Drivers successfully installed" screen

→ Initial Setup

- Connect your programming kit to the PC. When plugging a PR600 for the first time, a "New Hardware found" wizard may pop-up for a few seconds.
- Launch Kannad Winprog from the icon in the Start menu
- Fill in the "User Name" and "Identifier" fields with the code delivered by Kannad
- A second setup screen asks you to choose either PR550 or PR600, and to select the appropriate COM port.
- PR600 is using a *virtual COM port*, usually the last one from the list.



Kannad Winprog use

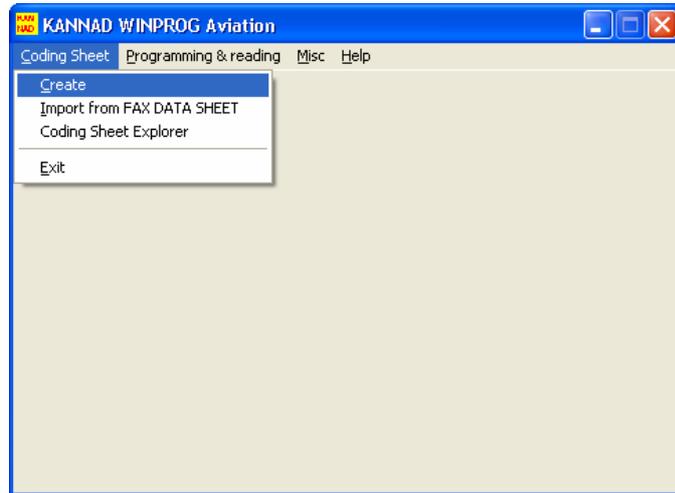
- The use of Kannad Winprog software is easy and intuitive.
- Refer to online help provided with the software for reference
Menu Help → Contents
- A convenient printable PDF format help is provided
Menu Help → PDF Help Format (pages 1 to 38)



Kannad Winprog main window

→ Menu

- Coding Sheet
- Programming & reading
- Misc
- Help



Programming - Step1

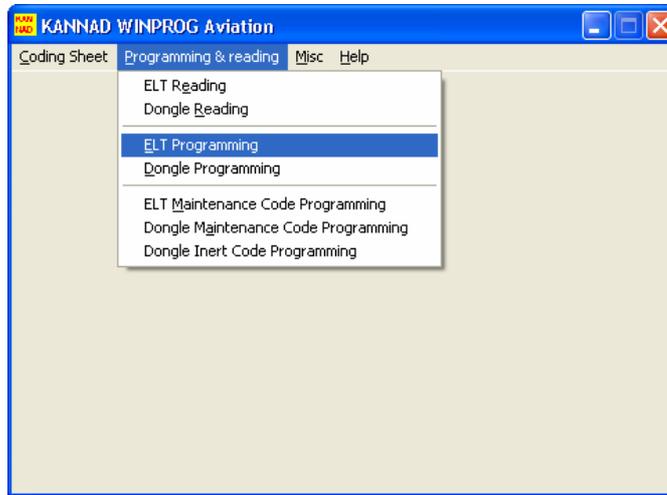
→ Create the Coding Sheet

→ or import the Coding Sheet

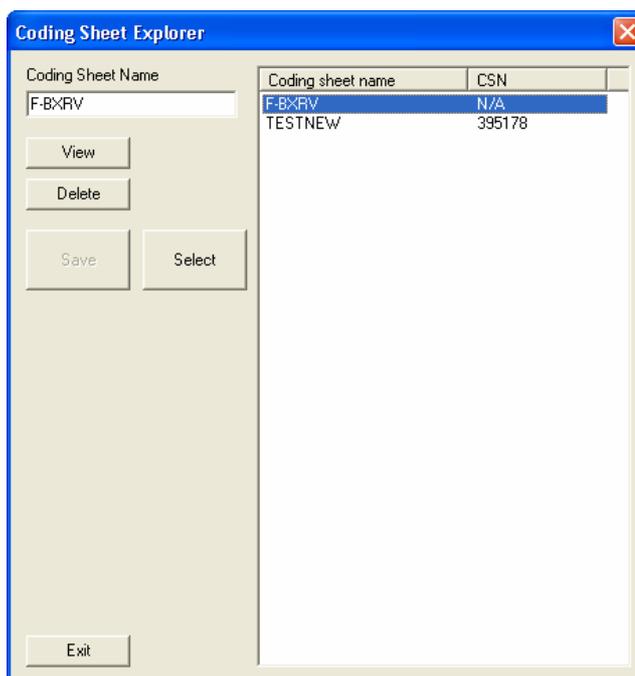


Programming - Step 2

➔ Select Menu ELT Programming



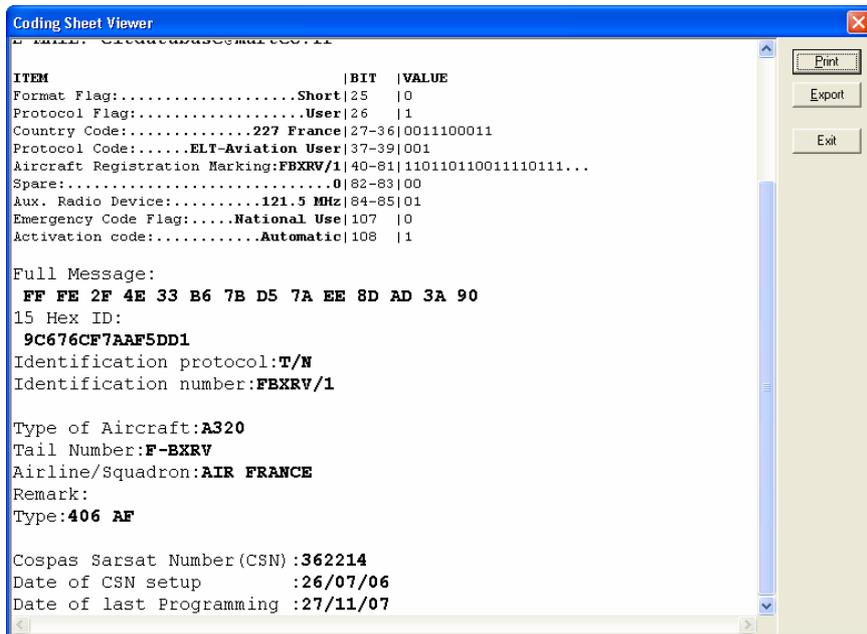
Programming - Step 3



- ➔ In the “Coding Sheet explorer”
 - ➔ Highlight the coding sheet to transfer
 - ➔ Click “Select”
 - ➔ Switch the ELT to “ARM” to transfer the coding sheet from PC to ELT.



Programming - Step 4

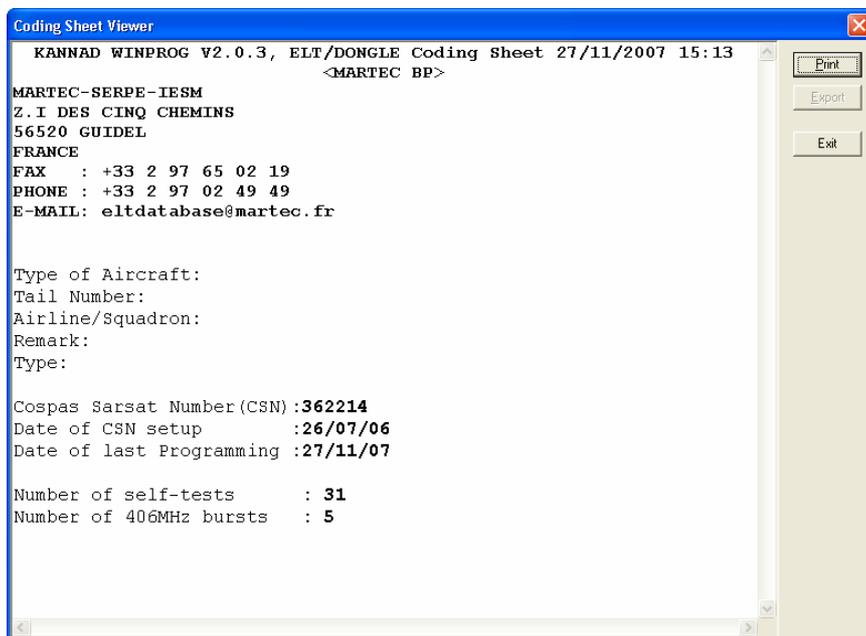


➔ View, print and/or export the coding sheet after download



Kannad Winprog additional features

➔ Read ELT counters



➔ Decoding Cospas-Sarsat message





Questions ?



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Deliverables

- ➔ Deliverables to KANNAD (by fax, e-mail and/or mail)
 - One PDS
 - One “Coding Sheet”

- ➔ Deliverables to the Operator
 - One “Coding Sheet”
 - “Registration form” (if applicable, otherwise PDS)



ELT logbook

KANNAD
Emergency Locator Transmitters by SERPE-IESM

**INSTALLATION MANUAL
OPERATION MANUAL
INSPECTION LOG**

**KANNAD 406 AF
KANNAD 406 AF-H**

P/N : S18 21 502 – XX KANNAD 406 AF transmitter
S18 22 502 – XX KANNAD 406 AF-H transmitter
S18 20 511 – XX Mounting bracket

PROGRAMMING LOG

Identification protocol : TN ICAO AOD S/N TEST

Identification number :

Beacon identification (HEX) :

Aircraft Tail Number :

Date : _ _ / _ _ / _ _ _ _

Service station :

Signature and stamp :

Fill in the programming log

Identification protocol : TN ICAO AOD S/N TEST

Identification number :

Beacon identification (HEX) :

Aircraft Tail Number :

Date : _ _ / _ _ / _ _ _ _

Service station :

Signature and stamp :

- 31 -



ELT label (not applicable if dongle installed).

If a dongle is used, just write "On Dongle" in the Identification field

ITEM	BIT	VALUE
Format Flag:.....Short	25	0
Protocol Flag:.....User	26	1
Country Code:.....227 France	27-36	0011100011
Protocol Code:.....(ELT-Aviation User)	37-39	001
Aircraft Registration Marking(FBXR/V)	40-81	110110110011110111....
Spare:.....0	82-83	00
Aux. Radio Device:.....121.5 MHz	84-85	01
Emergency Code Flag:.....National Use	107	0
Activation code:.....Automatic	108	1

Full Message:
FF FE 2F 4E 33 B6 7B D5 7A EE 8D AD 3A 90
 15 Hex ID:
9C676CF7AAF5DD1
 Identification protocol:T/N
 Identification number:FBXR/V/1

Type of Aircraft:A320
 Tail Number:F-BXR/V
 Airline/Squadron:AIR FRANCE
 Remark:
 Type:406 AF

Cospas Sarsat Number(CSN) **362214**
 Date of CSN setup :26/07/06
 Date of last Programming :27/11/07

Inspection Date :	Next Control :
Battery type :	
Battery Expiry Date :	
Identification Protocol : <input type="checkbox"/> TN <input type="checkbox"/> ICAO <input type="checkbox"/> AOD <input type="checkbox"/> S/N <input type="checkbox"/> TEST	
Identification Number :	Cospas Sarsat Number (CSN):
Beacon Identification code (15 HEX ID) :	
Tail Number :	MSN :

TIP : the use of a label printer is highly recommended



DONGLE label

ITEM	BIT	VALUE
Format Flag:.....Short	25	0
Protocol Flag:.....User	26	1
Country Code:.....227 France	27-36	0011100011
Protocol Code:.....(ELT-Aviation User)	37-39	001
Aircraft Registration Marking(FBXR/V)	40-81	110110110011110111....
Spare:.....0	82-83	00
Aux. Radio Device:.....121.5 MHz	84-85	01
Emergency Code Flag:.....National Use	107	0
Activation code:.....Automatic	108	1

Full Message:
FF FE 2F 4E 33 B6 7B D5 7A EE 8D
 15 Hex ID:
9C676CF7AAF5DD1
 Identification protocol:T/N
 Identification number:FBXR/V/1

Type of Aircraft:A320
 Tail Number:F-BXR/V
 Airline/Squadron:AIR FRANCE
 Remark:
 Type:406 AF

Cospas Sarsat Number(CSN) **362214**
 Date of CSN setup :26/07/06
 Date of last Programming :27/11/07

P/N: S1820514- AMDT: SIN: KANNAD F8794 CONNECTOR FOR KANNAD 406 ELTs QAC23 ED62 TSO-C91a & TSO-C126 JTSO-2C91a & JTSO-2C126	Identification Number	CSN
	Beacon Identification code (Hex.)	<input type="checkbox"/> SN <input type="checkbox"/> MN <input type="checkbox"/> ICAO
	Registration Marking	<input type="checkbox"/> TN <input type="checkbox"/> AOD <input type="checkbox"/> ICAO
	MSN	

TIP : the use of a label printer is highly recommended



Step-by-step programming procedure

- Verify that PDS is complete
- **Double-check if the aircraft is equipped with a programming dongle. If so, the Dongle must be programmed, not the ELT.**
- According to country of registration, check Country Code and protocol to be used (see COSPAS-SARSAT web-site)
- Create Coding Sheet
- Program ELT or DONGLE (transfer data from PC to ELT or DONGLE)
- Complete log book (ELT only)
- Complete label (ELT or DONGLE)
- Print two “Coding Sheets” (one for KANNAD and one for the Operator)
- Complete lower part of the PDS
- Download, print and prefill the relevant “Registration Form” (if applicable)
- Deliver the relevant document to both KANNAD and the Operator (see Deliverables)
- Inform the Operator that the ELT must be registered before first flight with the relevant authority (if applicable).
- Any change (ELT replacement, change of ownership, change of A/C registration...) must be declared to KANNAD and the relevant authority.



Questions ?





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ELT operational test

- Connect the outside antenna or a 50 Ohms load to J2
- Connect the DIN 12 connector (or dongle) to J1
- Switch the ELT from OFF to ARM
- The buzzer operates during the whole self-test procedure, after a few seconds the LED displays the result.
- Check that the Self-Test result is OK (one long flash).
- Without dongle, if the test result is 3+4 flashes, the ELT must be removed and programmed with the PR600
- With a dongle, if the test result is 3+4 flashes, the dongle must be removed and programmed with the PR600

- **Do not switch the ELT to "ON" position at any any time, unless a real emergency case.**



ELT exchange (with Programming Dongle)

- Connect the outside antenna or a 50 Ohms load to J2
- Switch the ELT from OFF to ARM,
- Check that the Self-Test fails (3+4 flashes).
- If not, connect a maintenance dongle to J1:
 - Switch the ELT from OFF to ARM,
 - Check that the Self-Test fails (3+4 flashes),
 - Remove the maintenance dongle from J1.
- Connect the "Programming Dongle" to J1
- Switch the ELT from OFF to ARM:
- The buzzer operates during the whole self-test procedure, after a few seconds the LED displays the result.
- Check that the Self-Test result is OK (one long flash).
- **Do not switch the ELT to "ON" position at any any time, unless a real emergency case.**

Why?

Tip : before programming an ELT from a dongle, it's mandatory to ensure that the ELT is not programmed yet (maintenance code = 3+4 flashes).

This is to ensure that the dongle is OK :

1. If the dongle is defective, the ELT will keep its previous coding :
 - If the ELT was not programmed (3+4 flashes) it will continue to display 3+4 flashes → Self-Test Failed = dongle failure detected
 - If the ELT was programmed from a previous aircraft (One long flash) it will continue to display one long flash. → Self test OK = dongle failure NOT detected.
2. If the dongle is correct, the ELT will get the new coding from the dongle.
 - If the ELT was not programmed (3+4 flashes) it will then display one long flash → Self-Test OK = programming done.



RCP operational test

- Check correct operation of RCP LED and external buzzer by switching ELT and RCP as described in the sequential procedure hereunder (with ELT switch in position "ARM").

Sequence	RCP Switch	Result
1	TEST/RESET then back to ARMED (neutral)	Self-test: ELT and RCP LEDs flashing + uninterrupted buzzer activation (max. duration 5 seconds) (15 seconds for AF-Compact)
2	ON	ELT transmission: ELT and RCP LEDs flashing + uninterrupted buzzer activation. IMPORTANT; do not operate for more than 30 seconds
3	ARMED (neutral)	ELT transmission goes on.
4	TEST/RESET then back to ARMED (neutral)	ELT transmission stops.

* Given for information : the ELT should not be switched to "ON" , unless a real emergency case.



406 MHz transmission test (optional)



- ➔ This test must be carried out with a COSPAS-SARSAT decoder (SARTECH ARG5410 or BT100AVtriple for exemple).
- ➔ Perform self-test (Press RESET and TEST on the RCP or switch ELT from OFF to ARM).
- ➔ Check with decoder that, *except for the 5th and the 6th digits*, the decoded message is identical to the programmed message.
- ➔ The message transmitted during self-test sequence always begins with FF FE D0 whereas a "real" message begins with FF FE 2F.

Example of message programmed in ELT as sent during self-test sequence :

FF FE 2F 53 C3 24 97 38 0B A6 0F D0 F5 20

Example of same message decoded by Cospas-Sarsat decoder :

FF FE D0 53 C3 24 97 38 0B A6 0F D0 F5 20



121.5 MHz transmission test (optional)

- ➔ **IMPORTANT** : this test must only be carried out between H and H+5 minutes.
- ➔ Do not exceed 30 seconds of transmission.
- ➔ This test must be carried out with a VHF receiver (or BT100AVTriple).
- ➔ Tune VHF receiver to 121.5 MHz



- ➔ All ELTs but AF-Compact :
 - ➔ Start transmission: either on ELT « ON » position, or on the RCP « ON » position
 - ➔ Listen to the 121.5 MHz "sweep tone",
 - ➔ Stop transmission: either on ELT: « OFF » position or on the RCP « Test/Reset »
- ➔ Kannad 406AF-Compact
 - ➔ Perform a self-test : either on ELT to "ARM" position, or on the RCP « Test/Reset »
 - ➔ Listen to the 121.5 MHz "sweep tone" (duration : 2 or 3 sweeps)



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Scheduled maintenance

An ELT is an item of standby safety equipment

→ The ELT does not operate unless activated and must be fully operational when required

The only way to ensure good operation is to perform periodic checks:

- Operational check
- Functional check
- Battery replacement



Operational check

1/2



- When : Every first flight of each month
- By whom : Pilot, Maintenance man
- Where : From the cockpit (Remote Control Panel)
- How : Press "TEST" on the Remote Control Panel and check the self-test result on the LED
 - One long flash = ELT OK
 - Short flashes = Faulty ELT
 - 3 + 4 flashes = the ELT is not programmed

If the ELT is considered as a "NO GO" equipment according to national regulation, the flight must be cancelled..

- With what : No specific tool is required
- How : sweep "tone test". Switch the ELT to "ON", listen to the sweep tone after the self-test. Switch the ELT to "OFF" (ELT) or "RESET" (RCP)

This test should be conducted between H and H + 5 minutes after warning the control tower. This test should never exceed 30 seconds.



Operational check

2/2

- It is possible to determine the type of failure by counting the number of flashes when performing the self-test :

3+1	LOW BATTERY VOLTAGE
3+2	LOW RF POWER
3+3	FAULTY VCO LOCKING
3+4	NO IDENTIFICATION PROGRAMMED

- Each self-test consumes energy from the battery which has been designed to allow an average of **one self test per month**. Should self-tests be carried out more often than the maximum suggested, the battery life-time might be shorter than expected.



Functional check

1/2

- When : As required by relevant regulations.
- By whom : Authorized radio technician
- Where : Authorized avionics shop (the ELT must be removed from the aircraft)
- How : Refer to procedure "Test and Fault isolation" in the Component Maintenance Manual
- The following parameters are to be tested:



- Self-test
- Battery voltage
- Communication with RCP
- G-Switch
- Frequency / Power measurement on 121,5 MHz, 243 MHz and 406,025 MHz
- Programming and counters (if PR550/PR600)



Functional check

2/2



BT100AVtriple

- ➔ The tools required to perform Functional check are standard radio test equipment such as :
 - ➔ Radio bench (optional if BT100AVtriple or Aeroflex IFR4000 Opt. 1)
 - ➔ Spectrum analyzer (optional if BT100AVtriple or Aeroflex IFR4000 Opt. 1)
 - ➔ Voltmeter
 - ➔ Test models (connectors / resistors / switches)
- ➔ The only specific tool is a COSPAS-SARSAT decoder ARG5410, BT100AVtriple, or equivalent.



Battery replacement

1/2

- ➔ When : Battery replacement is mandatory
 - ➔ After more than 1 hour of real transmission (cumulated duration),
 - ➔ Prior to or on the battery expiration date.
 - ➔ If the battery is discharged (self-test = 3+1 flashes and/or measured voltage lower than expected)
- ➔ By whom : Avionics technician
- ➔ Where : Part 145 avionics shops (the ELT must be removed from the aircraft)
- ➔ How : Refer to CMM level 2
- ➔ All the necessary parts are available in a « Battery replacement kit » :
 - KIT, BAT300 (P/N S1820516-99) for all ELTs but AF-Compact
 - KIT, BAT200 (P/N S1840510-01) for 406AF-Compact

According to Kannad maintenance policy, no training is required for battery replacement, using CMM level 2.

The use of the CMM level 3, to be used for repair, is available only after a maintenance and repair training from Kannad.

Refer to Kannad Website or to our Service Letter "Kannad ELT maintenance policy" to know more about this policy.



Battery replacement

2/2



- The Battery Expiry Date has been determined 6,5 years from the Date of Manufacture of the battery pack.
(6 years operation + 6 months manufacturing, storage, sale).
- Only original battery packs supplied by KANNAD can be installed.
- KANNAD refuses all responsibility and invalidates all warranty should other battery packs be installed.



- A functional check must be performed after battery replacement
- As the ELT housing is opened, it must be tested for water-tightness after re-assembly. The ELT is immersed in hot water (60°C +/- 5°) for about 5 minutes. No air bubbles should escape.



Warranty policy

- The standard warranty is **two years** from date of delivery
- Warranty is void in case of misuse.
 - ⤷ If it is determined that a 50 Ohms load (antenna or dummy load) has not be connected to the RF output while transmitting, the replacement of the output RF amplifier will not be covered by the warranty.
 - ⤷ If the seal is removed or damaged (housing opened by an unauthorized avionics shop), the warranty will not apply.
- The battery is never replaced under warranty except if it is determined that a failure of the PCB has discharged or damaged the battery.
- The equipment shall be sent to an authorized avionics shop with full capability to repair KANNAD ELTs.

CAUTION : A NFF (No Fault Found) charge will be billed to the customer if it is not possible to reproduce the failure in the shop. It is thus strongly recommended to describe as precisely as possible the conditions in which the failure appeared.



Questions ?



How to contact us ?

- **KANNAD ELTs CUSTOMER SUPPORT :**
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- **PDS REGISTRATION :**
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