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Automatic data transmission procedure from Domex3 station at the Concordia base in the Antarctic to IFAC "Nello Carrara", Florence, Italy

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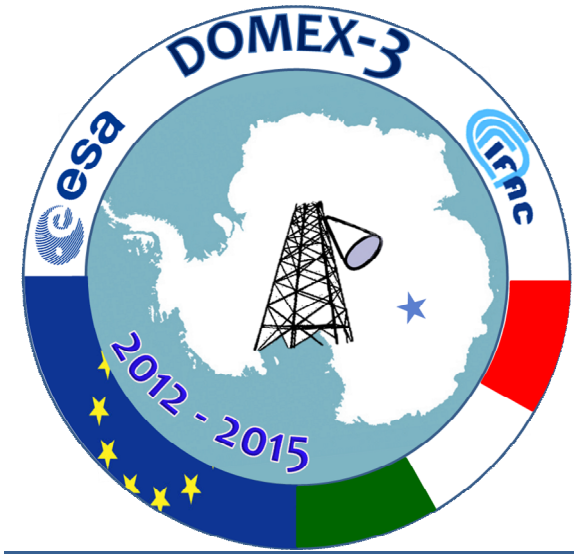

Summary

Abstract

The availability of an efficient communications link between the Antarctica laboratories and other research laboratories in the world is of strategic importance in monitoring both the climatology and the phenomena which are characteristic of Antarctica.

This technical report describes the setup of an automatic procedure for receiving daily radiometric data in the main control office building (in Florence) of the DOMEX3 experiment.

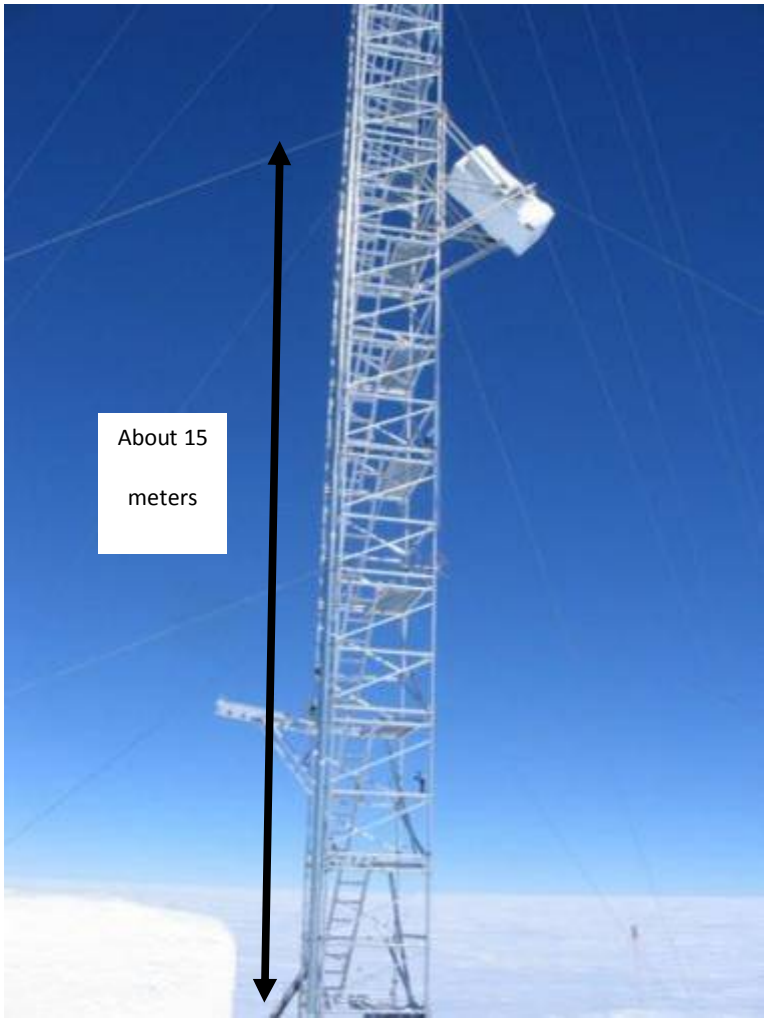

Fig 1 Tower on which the TANKGM45A personal computer is located inside a white box

Fig 2 In the picture the white box containing the TANKGM45A personal computer used for the acquisition of data, all these data are sent automatically at IFAC CNR "Nello Carrara" headquarter.

Software for realizing the project (mainly opensource software)

- *System Scheduler* Splinterware
- *Easy Robocopy*
- 7zip
- Open-source "Blat" for sending e-mails

***System scheduler*:** *System Scheduler* is an excellent tool for scheduling the unattended running of applications, batch files, scripts, and many others. System Scheduler not only makes it possible to launch programs at scheduled times, but also to send key-presses and mouse clicks to those programs. This enables the personnel not only to schedule programs to run overnight or at the weekend, but also to have these programs perform useful tasks while running unattended.

Lastly, the Free version of *System Scheduler* also includes a Window Watcher feature. The program will check for the existence of a particular window and send key-presses, or will send a close signal to the window in order to terminate running applications. It is useful for triggering actions or handling error messages when no one is present.

The main task in this project is to sequence the starting procedure, and then to compress and send the attachment by e-mail to the main office at IFAC CNR in Sesto Fiorentino (Florence). http://www.splinterware.com/products/wincron.htm

Easy Robocopy

RoboCopy is a Microsoft command-line tool for copying files and folders. It is very fast, fault-tolerant, and has dozens of parameters for customizing the copy process, such as filtering by name, attributes, synchronizing folders, etc. *Easy RoboCopy* is a graphical user interface (GUI) for *RoboCopy*. It shows all the options on a graphical user interface, together with descriptive names and tooltip help. As options are selected, the corresponding command line is shown and may be executed directly or saved in a batch file. Run the program and click the help button for more information.

Windows Vista Windows 7 and 2008 Server come with a copy of robocopy.exe (version XP027) that runs in only these operating systems. For older versions of Windows, such as XP and 2003 Server, *Easy RoboCopy* installs the previous version of robocopy.exe (XP026). Any topics that require a specific version are color-coded in the interface.

The use of *Robocopy* in our procedure is devoted to making a backup copy of the data. We also need it to copy from the computer of the instrument only the files changed during the preceding 24 hours (4 files of the radiometric measurement), so that we can prepare to embed and send them.

http://www.tribblesoft.com/Pages/EasyRoboCopy.aspx

7zip

This is a free and open source file archiver. 7-Zip operates using the 7z archive format, but can read and write in several other archive formats. The program can be used from a command line interface, a graphical user interface, or with window-based shell integration.

7-Zip software is distributed free of charge under the GNU Lesser General Public License (LGPL). It is also possible to archive in other archival formats, such as ZIP (which is what we have used in our software procedure)

http://sourceforge.net/projects/sevenzip/

Blat

This is an open source program that is used to send e-mail messages (with attachments) in a very simple way, using a command line.

This utility is very useful for creating scripts that automatize the e-mail delivery.

For example the command 'blat - - t destid@yahoo.com –s 'test' –attach xyz.zip'

will send the attachment file called xyz.zip to the e-mail address destid@yahoo.com.

To use blat, it is necessary to initiate the program by instructing it to use the Concordia base (xxxxx@concordiastation.aq) smtp server.

For example:

```
blat -install smtpserver userid
```

Attention!

The user [for example, simone.pettinato@concordiastation.aq] needs to remain active at the Concordia base for the entire time that the automatic procedure for sending mail is being used.

http://sourceforge.net/projects/blat/

A step-by-step guide

First of all, it is necessary to install all the programs needed in the Concordia Base personal computer. Remember also to correct the right PATH with the directory of the programs that will be installed (for example, add PATH c:\Program Files\7-Zip). Also make sure that the correct date on the computer of the base conforms to the UTC standard date.

1) The procedure starts by copying the files modified during the most recent days of acquisition from the personal computer inside the instrument on the tower. We will thus have a safe copy of all the acquisition data (sincronizza.cmd) in the base computer.
   This procedure has been launched by System Scheduler software, and realizes a copy from \\tankgm45\acq to c:\lavoro\origine in the personal computer at the base.

2) The next step is to copy only the files that have changed during the preceding 24 hours (the most recent data acquisition files) from the personal computer inside the instrument on the tower.
   A copy of these files will be made from directory \\tankgm45\acq in a directory called c:\lavoro\dati on the personal computer at the base.

3) To realize the above procedure, it is necessary to install (on the Concordia personal computer) the following software:
   Easy Robocopy,7zip (32 bit or 64 bit),Blat and ssfree (system scheduler)

4) *Easyrobocopy* will be set up with the correct field (see the Minimum =1 and Maximum=2 manual). It will copy files no older than 1 day and not exceeding 2 days.
   (in the following image, the interface of the *Robocopy* is programmed as shown in Fig 3).

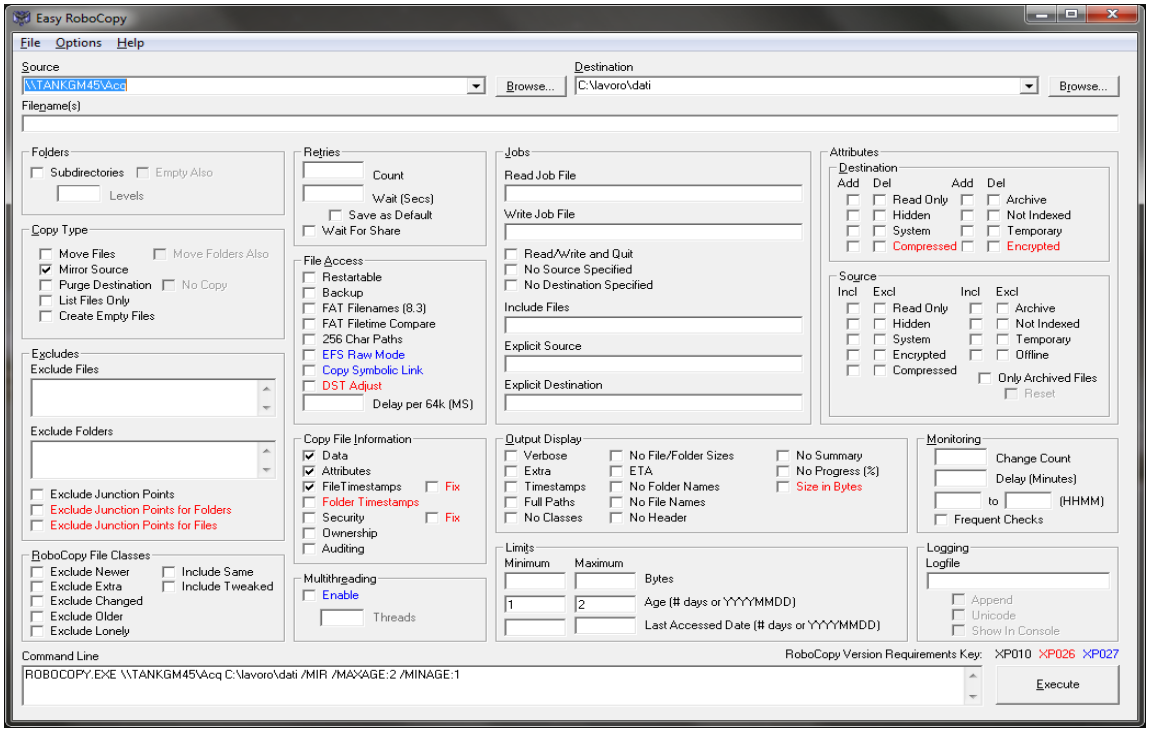

Fig 3

The enrico_copiada_tank.CMD (Fig.4) file batch is the file that the System Scheduler starts at a specified time (ROBOCOPY.EXE \\TANKGM45\Acq C:\lavoro\dati /MIR /MAXAGE:2 /MINAGE:1), and was created from *easy robocopy* interface.

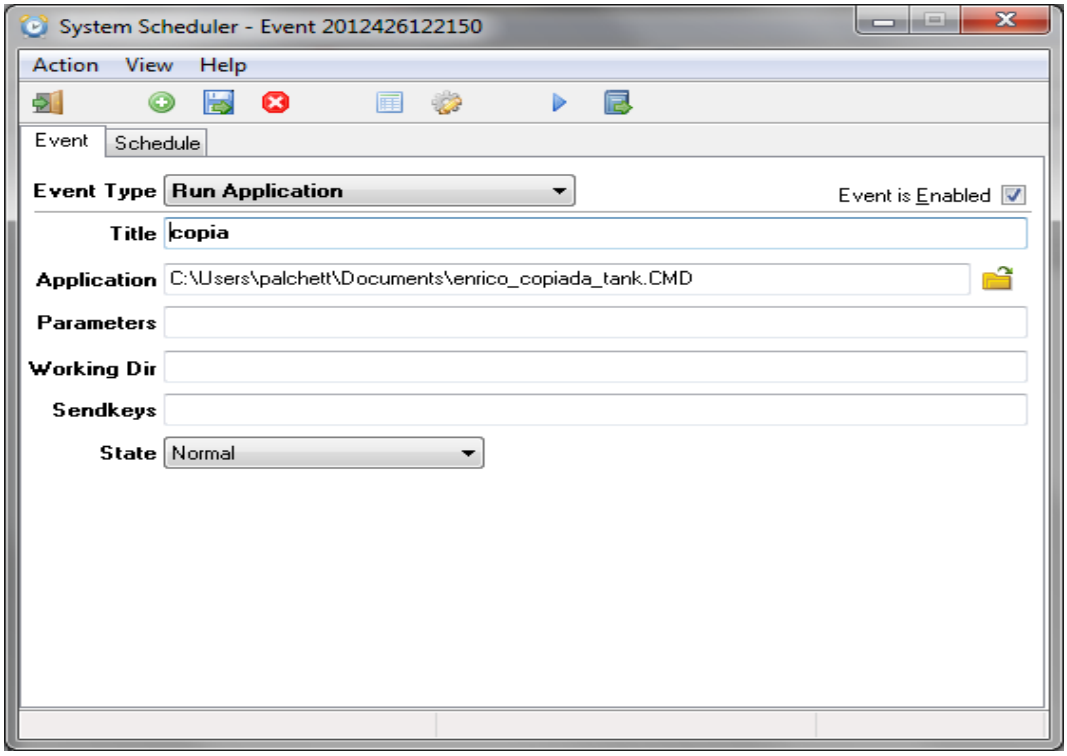

Fig 4

5) The System Scheduler will now call up the command comprime.cmd.
This is a string of commands that, by using the 7zip software compressor, will create a file with all the contents of directory c:\lavoro\dati having the prefix of number 2. The date of the current day will give the name of the file.
See the image below in Fig. 5

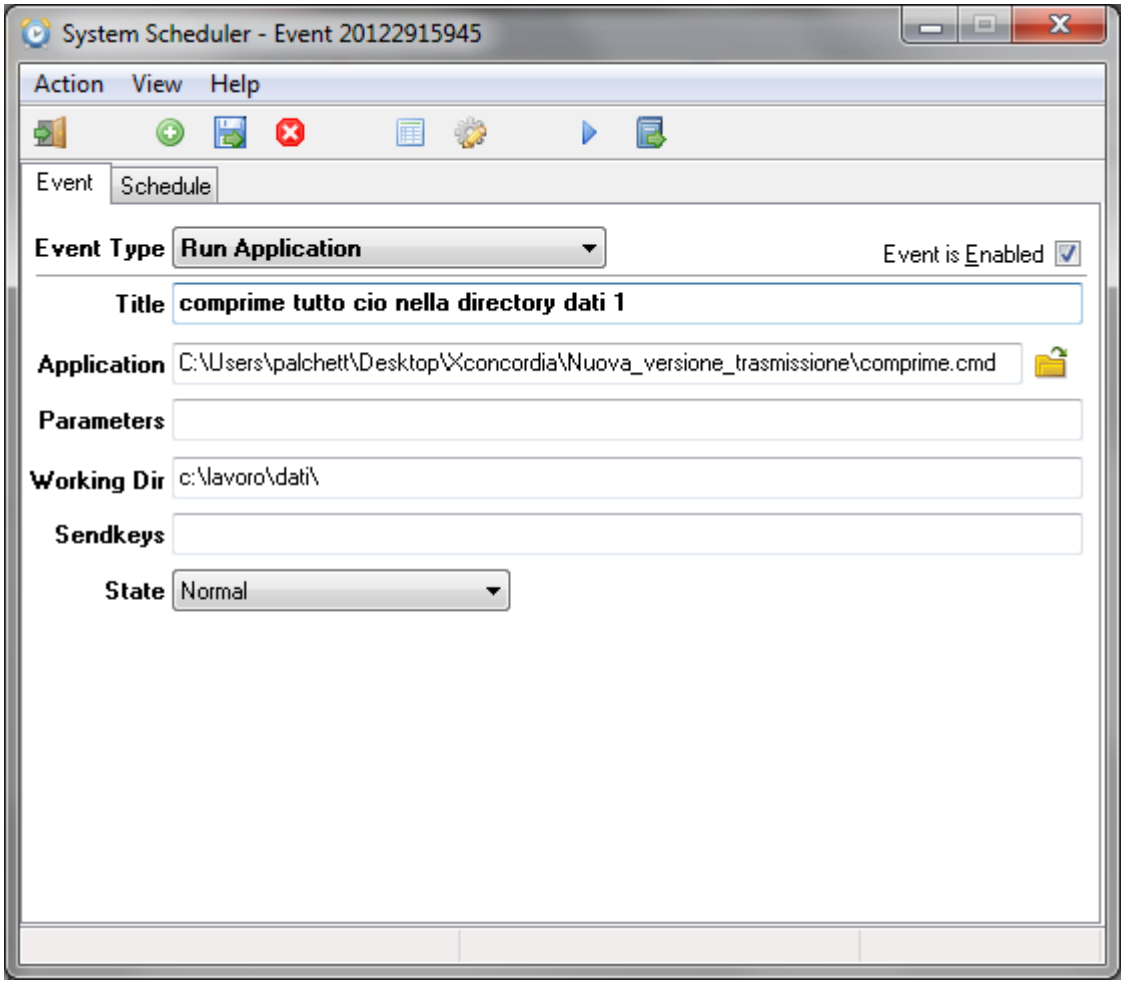

Fig 5

6) To forward the files to IFAC "NELLO CARRARA", we will again work in the c:\lavoro\dati directory.
In this directory, the *.zip file will be taken and sent as an attachment by using the automatic procedure called up by the system scheduler with the "blat" software (an e-mail client dos software).
The following example of Fig. 6 shows how, using the blat software, to send an e-mail message addressed to the user "xxxxxx@ifac.cnr.it" through the smtp server of Concordia base. What it is sent in the example of Fig. 6 is a message with object test and in attachment modality a file with the compressed data.
In this example, the body of the message is "dati antartide".
If necessary, the files can be sent to many user destinations. Just insert a comma in order to separate the user names.

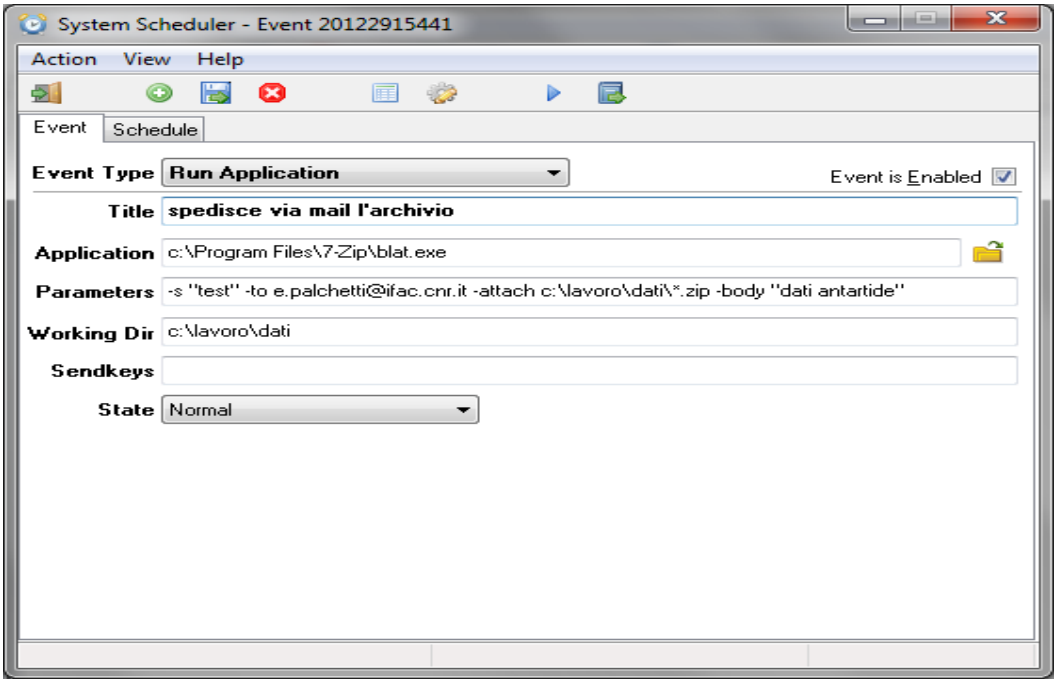

Fig 6

7) The final procedure cleans the working directory by deleting all the contents of the c:\lavoro\dati directory.
The batch command is del /q c:\lavoro\dati*.*
The use of this command could be dangerous if used typing it manually in command line mode, because it does not require any confirmation prior to deleting the files in Fig. 7

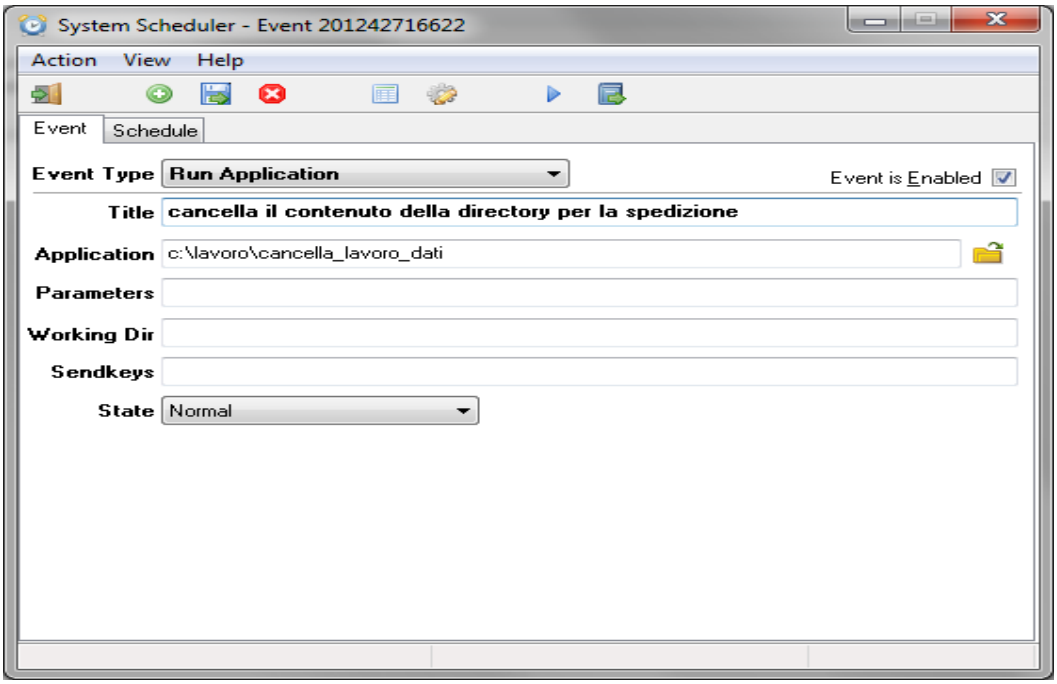

Fig 7

Other software tools for controlling the TANKGM45A (Desktop Access)

The remote access modality in Windows Xp was activated in order to remotely control the TANKGM45A personal computer (fig. 8) on the Tower at the Concordia Station Antarctic base.

In this way, a thorough control can be exercised over the instrument by means of a graphical interface, thus verifying the correct working modality of the instrument.

Each time that someone logs in on the Tankgm45A personal computer, the Login and Password will be required. The user needs to answer by giving login “administrator” and a …….. password in order to obtain access to the machine.

This work modality should be protected by the antivirus software tools that should be installed on the Concordia Base Intranet.

Another characteristic that is useful is the command procedure reboot.bat on the desktop of the Windows XP personal Computer on the Tower at Concordia, which can be activated for emergency use by means of remote control access

Fig 8 The TANKGM45A roughness personal computer inside the instrument on the tower

Conclusions

This new set-up procedure to send data in automatic mode from the Italian-French Concordia base to IFAC in Italy is an evolution of what I did on 14 January 1989 when, during the summer campaign at the Antarctic Base of Dumont D’Urville, Enrico Palchetti (author of this report), realized the first data transmission by modem (1200 Baud/s by Bitnet link) from the Antarctic base of Dumont D’Urville to the Institute for Research on Electromagnetic Waves in Florence, using e-mail transmission and the informatics tools available at that time (IROE Technical Report TR/ESI/90.4 “improvement of a data transmission link from the Antarctic-base of Dumont d'Urville to I.R.O.E. research institute” author Enrico Palchetti, August 1990).

After many years, the problem of verifying and monitoring the instrument in Antarctica is still a reality.

Today, by using Internet (which, however, can be used for only a few hours during the day, because the latitude of Concordia Base blocks the link with the satellite) and new informatics tools, the problem has been handled by using an easier approach than the one used so many years ago. However, the remote controls of instrumentation in remote places will always be requested in order to have a successful Antarctic campaign

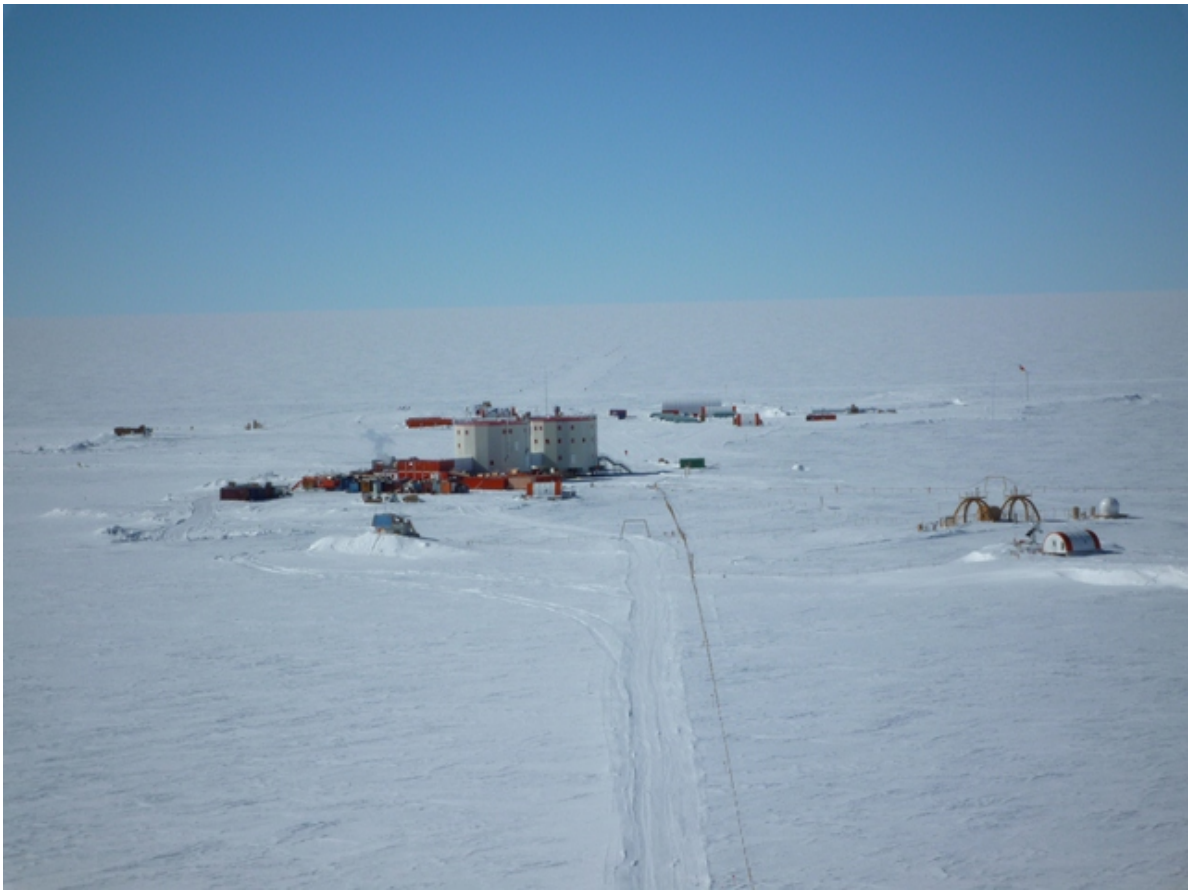

Fig 9 The Italian-French Concordia base. The main base is in the white cylindrical buildings. (IFAC)

Bibliography

IROE Technical Report TR/ESI/90.4 “improvement of a data transmission link from the Antarctic-base of Dumont d'Urville to I.R.O.E. research institute” author Enrico Palchetti, August 1990.

Giovanni MACELLONI, Marco BROGIONI, Simone Pettinato, Enrico Palchetti, IFAC- CNR, Florence, ITALY Technical Support for the Long-Term Deployment of an LBand Radiometer at Concordia Station, 17/10/2012 Deliverable of the contract: D1ESTEC Contract 4000105872/12/NL/NF