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**OPERATIONAL MANAGEMENT, CONTROL,  
MONITORING AND COORDINATION**  
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# EUTELSAT S.A.

## SYSTEMS OPERATIONS GUIDE

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OPERATIONAL MANAGEMENT, CONTROL, MONITORING AND COORDINATION	
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# FOREWORD

The Eutelsat S.A. Systems Operations Guide (ESOG) is published to provide all Eutelsat S.A. space segment users with information that is necessary for successful operation of earth stations within the Eutelsat S.A. satellite system.

The ESOG consists of 2 Volumes. They contain, in modularised form, all the necessary details, which are considered important for the operations of earth stations.

Volume I concentrates on Earth Station and Antenna Approvals, System Management and Policy aspects.

Volume II describes the initial line-up of satellite links between earth stations and the commissioning of earth stations for Eutelsat S.A. services. The modules which are contained in this Volume relate to the services provided via Eutelsat S.A. satellites.

The ESOG can be obtained either by requesting a printed version to Eutelsat S.A. or in Acrobat format from the Eutelsat S.A. Web:

<http://www.eutelsat.com>

Paris, 30-07-2008

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# 1. INTRODUCTION

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Operational management and co-ordination of communications services are effected through the Eutelsat S.A. Headquarters, which is located in Paris, France.

The operational management includes but is not limited to the following:

- CSM Network Management
- Ground Network Definition and Analysis
- Earth Station Access, Approval and Type Approval
- Earth Station Verification and Assistance
- Control of System and Network Operations
- Service Monitoring and Performance
- System Discipline

This Module also describes how the above functions are translated into guidelines for the Communications System Control Centre (CSC), located in the Eutelsat Teleport in Rambouillet, to allow the day-to-day management and co-ordination of the system to occur.

## **2. COMMUNICATION SYSTEM CONTROL CENTRE (CSC)**

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The CSC is a manned centre responsible for the day-to-day control monitoring and co-ordination of the Eutelsat S.A. Satellite Communication Systems.

E-mail address, facsimile and telephone numbers for the CSC and the Systems Operations Division are as indicated in the table of contact numbers attached to each ESOG module.

The CSC staff is responsible 24 hours per day for controlling and co-ordinating all the activities described in the following paragraphs, which require use of the Eutelsat S.A. space segment.

### 3. COMMUNICATION SYSTEMS MONITORING (CSM)

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The CSC uses monitoring facilities located at various sites around the world (currently 10 different sites are in operations). The locations are driven by satellite beam coverages.

These facilities are principally dedicated to spectrum monitoring of the transmissions carried in the space segment for each available coverage of the Eutelsat Satellite Fleet.

The following parameters are monitored (non exhaustive list) in a round robin carrier scan:

- downlink EIRP (at satellite level),
- carrier-to-noise density ratio (C/No),
- bandwidth at -3 and -10 dB, for digitally modulated signals,
- occupied bandwidth,
- carrier centre frequency,
- power spectral density,
- transponder aggregate EIRP,
- detection of spurious signals (unscheduled carriers or interference).

Additionally, for some key locations, baseband monitoring of DTH services (analogue and digital) is also provided.

The following parameters are monitored (non exhaustive list) in a round robin TV-traffic scan:

Digital transmissions:

- CBER, VBER,
- Receiver Front-End lock,
- ETR 290 compliance,
- Errors in MPEG-2/DVB Service layer (PSI/SI Tables),
- Detection of missing PIDs, Services, Tables.

Analogue Transmissions:

- Signal Synchronisation,
- Signal-to-Noise ratio,
- FM Deviation

## 4. EARTH STATION APPROVAL AND VERIFICATION PROCEDURES

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Formal procedures for control of earth stations and VSATs to access the space segment are necessary to prevent interference to other users of the satellite system, to ensure the establishment of a proper interface with the space segment and to maintain system discipline.

Request for approvals have to be sent on-line via an interactive application available on the Eutelsat S.A. Extranet, at the following address: <http://services.eutelsat.fr>.

See also Annex A.

The verification of certain mandatory performance characteristics of earth stations antennas may be required before access to the Eutelsat S.A. satellite system will be granted. Therefore, special test facilities have been made available in order to assist earth stations and/or Eutelsat S.A. in the completion of this task.



## 5. INITIAL OPERATION AND COMMISSIONING OF AN EARTH STATION

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When an earth station is ready to commence operations, the following steps should be taken:

- a) The earth station operator must ensure that the operational equipment parameters are properly adjusted and that in-station checks have been completed **AND** all operational and control facilities are functioning normally.
- b) The operator shall inform Eutelsat S.A. that its earth station is ready for testing.
- c) After co-ordinating with the participants, Eutelsat S.A. will then schedule the ESOG line-up and issue the appropriate line-up test procedures and/or any supplementary information that might be required.
- d) Line-up tests will be carried out under the direct control of the Eutelsat S.A. CSC and/or TVCSM (Detailed test procedures for line-up of Eutelsat S.A. services are contained in the ESOG, Volume II series of documents.
- e) Upon satisfactory completion of the mandatory line-up procedure the earth station operator can assume that Authorisation to Operate (ESOG Module 110, § 3.2 refers) will be granted. This allows the commencement of normal commercial operations.

## 6. COMMUNICATIONS WITH THE CSC

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### 6.1. Single Point-of-Contact

Eutelsat S.A. requires each earth station operator to provide a permanently available (24 hours a day, 7 days a week, 365 days a year) contact point for each earth station.

In the case of earth station operators that operate more than one earth station, Eutelsat recommends such operators put in place a Single Point-of-Contact for all earth stations under their control.

**IT IS OF VITAL IMPORTANCE TO HAVE THIS MEANS FOR IMMEDIATE CONTACT AND EXCHANGE OF DAY-TO-DAY MANAGEMENT, ROUTINE, EMERGENCY AND CONTROL INSTRUCTIONS BETWEEN THE CSC AND THE OPERATIONAL EARTH STATIONS.**

The single point of contact can be a designated person or entity (i.e. NCC or MCR).

### 6.2. Responsibility of Single Point-of-Contact

The entity nominated by the user as the Single Point-of-Contact - e.g. NETWORK CONTROL CENTRE (NCC) - must ensure it has the necessary control of the earth station's transmissions it is responsible for. This is indispensable to react to any request received from the CSC.

The ultimate request could be in emergency cases to cease transmissions immediately. Therefore any Single Point-of-Contact must ensure it has communications and control access available immediately to all its earth stations (particularly any unattended earth station).

## 7. EARTH STATION CONTROL

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All transmitting earth stations must be controlled such that they can respond immediately to any request from the CSC to turn off their transmit carriers. This requirement should therefore be satisfied as follows:

- a) **Manned Earth Stations:** These earth stations are considered to be permanently attended (24 hours a day, 7 days a week, 365 days a year) throughout their operations by qualified operating personnel capable of adjusting frequency and EIRP or in general to follow CSC Operational requests.
- b) **Unattended Earth Stations:** These earth stations must have remote control facilities available such that the respective Network Control Centre (NCC) can turn off any transmit carrier immediately whenever requested by the CSC to do so.

It is further recommended to have the following remote capabilities:

- Control of EIRP and Frequency.
- Ability to de-point the Earth Station's antenna.
- Adjust Polarisation.
- Switch HPA on Dummy Load or Mute.

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## 8. SYSTEM DISCIPLINE

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The principal concern of Eutelsat S.A. is to establish and maintain a high quality and availability of service via all satellites.

As the Eutelsat S.A. system becomes more complex, any unauthorised or out-of-tolerance transmissions are likely to cause interference to an existing service. Therefore, during an interference situation earth station operators or NCCs may be instructed by the CSC to:

**SWITCH OFF THEIR HPA'S OR IF FEASIBLE DEPOINT THEIR ANTENNAS BY ABOUT 3° IN ELEVATION AWAY FROM THE OPERATIONAL SATELLITE.**

**THIS INSTRUCTION MUST BE IMPLEMENTED IMMEDIATELY.**

The following paragraphs indicate additional rules that must be followed in order to maintain system discipline:

- a) **RF CARRIER ACTIVATION:** Earth station operators must only activate RF-carriers under the direct control of the CSC. Derogations may be agreed on a case by case and can be revoked with no notice by the CSC Manager if required by Operations.
- b) **PRE-TRANSMISSION LINE-UP:** A pre-transmission line-up must be effected when accessing the satellite for the first time **OR** when any change to the earth station transmission parameters or equipment settings occurs, **OR**, in the case of transportable earth stations, a change of their location.
- c) **DEVIATION FROM OPERATIONAL PARAMETERS:** When the above situation is observed by the CSC, any instruction given by the CSC to restore parameters to nominal (e.g. excessive EIRP level) **MUST** be followed immediately **AND** any formal message regarding the above situation must be acknowledged by earth station operators and given the appropriate attention.
- d) **SPURIOUS TRANSMISSIONS WHILE TESTING IN-STATION:** When in-station maintenance or testing is being effected, the earth station operator should ensure that spurious transmissions do not occur, by

monitoring the spectrum at either the HPA Output or Antenna Feed Input where this is feasible

The following information must be provided when contacting the CSC for pre-transmission line-ups:

- Station code (Eutelsat S.A. registration).
- Satellite.
- Transponder.
- Channel/Slot Number.
- Telephone contact point.

This will reduce to the minimum the delays related to the line-up procedure.

See also Annexes B and C.

## 9. CESSATION OF TRANSMISSIONS

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Whenever transmissions are completed, the earth station operator should ensure that earth station equipment is configured such that further unwanted transmissions cannot occur (HPA off and/or antenna depointed about 3° in ELEVATION).

The following measures are also recommended when testing transmit equipment:

**When earth station operators are conducting in-station tests on transmit equipment, consideration should be given to taking the following additional precautionary measures:**

- a) **Inform by e-mail or by fax Eutelsat S.A. CSC in advance of the test schedule for the earth station.**
- b) **De-pointing the antenna under test about 3° in ELEVATION away from any operational satellites while ensuring that no radiation of transmissions can occur.**

See also Annex D.

## 10. INTERFERENCE MANAGEMENT

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### 10.1. Interference Reporting

Uncontrolled radiation by earth stations in the direction of a satellite can cause significant damage to existing services.

When disturbances to commercial traffic have been observed, which may be related to interference, the earth station operator and the CSC will proceed as follows:

- a) **A special interference report shall be sent immediately to the CSC by completing the special form (Annex E) in the prescribed way.**
- b) The following elements should be included in the report:
  1. Detailed spectrum plots of the anomaly at Radio Frequency (if only Intermediate Frequency is available, provide Up Converter and Local Oscillator Frequency settings.)
  2. Time behaviour
  3. Date/Time of the start of the anomaly
  4. Periodicity of the anomaly
- c) The report should categorise the interference according to the following types:
  1. Type A = Service completely disrupted.
  2. Type B = Service is seriously degraded with the quality reduced to below acceptable standards.

The CSC will then investigate the situation and respond to the earth station operator to keep him advised of the situation with a formal message whenever significant progress has been made.

**The CSC will on its own initiative initiate the above procedures if its own monitoring processes detect any interference.**

### 10.2. Interference Procedures

Upon reception of an interference report or the detection by the CSC of interference the standard operational interference management procedure will be activated.

The first and immediate step of this procedure is to restore any disrupted service.

A step by step investigation is undertaken and includes standard steps such as:

- Checking if any match with historical events exists,
- Search of existing services for any correlation,
- Check of affected satellite and adjacent satellite environment, including contacting other satellite operators as required,

- Use of geo-location systems to reduce size of target search area and when necessary use of the final search solution (with helicopter flying over the search area).

Eutelsat S.A. maintains strong links with other service providers and equipment providers for information sharing on any potential interference problem.

During such events Eutelsat S.A. requires the whole community of operators to fully assist in investigations.

**OPERATORS MAY BE REQUIRED TO COMPLETELY POWER DOWN ALL TRANSMIT EQUIPMENT IMMEDIATELY UPON CSC INSTRUCTION. OPERATORS SHOULD NOTE THAT THIS REQUIREMENT IS FOR THE BENEFIT OF THE SATELLITE COMMUNITY AS A WHOLE AND CAN ONLY BE EFFECTIVE IF ALL OPERATORS COMPLY WITH CSC INSTRUCTIONS IMMEDIATELY AND AT ALL TIMES.**

See also Annex D.



## **11. OPERATIONAL ASSISTANCE FROM THE CSC**

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During operation, if an earth station operator detects any problem with the communication link utilising Eutelsat S.A. space segment, the CSC should be immediately contacted as it can provide the following assistance:

- a) **Confirmation as to whether a current service anomaly exists.**
- b) **Provision of additional information to localise the trouble.**
- c) **Access and use of the service monitoring facilities.**
- d) **Communications with other earth station operators.**

The use of the CSC assistance will ensure that the problem is correctly diagnosed in a quick and efficient manner and any action co-ordinated in respect of the satellite link.

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## Annex A - Information concerning Eutelsat's Earth Station Approval Procedures

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### 1. Formal procedures for Earth Station Approval exist to:

- Maintain the integrity of Eutelsat Space System
- Minimise the risk of interference to other users and satellite operators
- Ensure the relevant standards of Earth Station performance are met

### 2. The process of Earth Station Approval establishes:

- The rights of the applicant requesting approval
- The identity of the Earth Station operator (*including operational contact and escalation points*)
- The technical performance with respect to the Eutelsat Earth Station Standards (*EESS*)
- The type of planned service

### 3. The Eutelsat Specified Mandatory Characteristics for Earth Stations cover:

- Antenna performance
  - Off axis radiation
  - Polarisation discrimination
- Acceptable noise interference levels
- Transmission parameters
  - Operating frequencies
  - Power & frequency stability
  - Carrier bandwidth

### 4. Earth Stations are required to meet the Eutelsat standards:

- Earth Station Minimum Technical and Operational Requirements (*Standard M, EESS 502*)

For more information on the Eutelsat Earth Station Standards, please contact: [esapproval@eutelsat.fr](mailto:esapproval@eutelsat.fr)

<b>Eutelsat Earth Station Approval Office, Paris, France</b>	
<b>Tel: +33 1 53 98 39 25 / 46 13</b>	<b>Fax: +33 1 53 98 37 41</b>
<b>E-mail: <a href="mailto:esapproval@eutelsat.fr">esapproval@eutelsat.fr</a></b>	<b>Web: <a href="http://www.eutelsat.com">http://www.eutelsat.com</a></b>

**Refer to ESOG for further details. Full details concerning Earth Station Approval procedures can be found in ESOG Vol I Module 110 and on the Eutelsat Web: [http://www.eutelsat.com/satellites/4\\_5\\_2\\_1.html](http://www.eutelsat.com/satellites/4_5_2_1.html)**

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## Annex B - Information for Earth Station Operators on Eutelsat's Line-Up Procedures

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All uplink Earth Station operators should be able to communicate and follow instructions given to them in English.

### The operator must:

#### 1. Check:

- Correct transmission time
- Satellite pointing towards correct satellite
- Polarisation alignment
- Transmit frequency
- All other transmission parameters (e.g. EIRP, Deviation, Bit rate, FEC etc.)
- Eutelsat Earth Station code

#### 2. Call the Eutelsat CSC (Network Control Centre) or your own contact point who will call the CSC

#### 3. Communicate:

- Eutelsat Earth Station code
- Satellite + transponder to be accessed
- Transmit frequency or carrier id. and/or transmission plan number
- Contact telephone number during the transmission

#### 4. On the CSC request:

- Transmit clean carrier
- Typical EIRP of the clean carrier = Nominal -10 or -20 dB

#### 5. Adjust transmission parameters, only if instructed by the CSC to do so:

- Peak the antenna
- Adjust the antenna polarisation
- Adjust the transmit frequency

#### 6. On the CSC request:

- Increase EIRP to nominal
- Apply modulation

#### 7. Terminate communication with the CSC only when the transmission has been confirmed as OK.

<b>Eutelsat CSC, France - Contact Numbers:</b>	
<b>Tel: +33 1 45 57 06 66</b>	<b>Fax: +33 1 45 75 07 07</b>
<b>E-mail: <a href="mailto:csc@eutelsat.fr">csc@eutelsat.fr</a></b>	<b>Web: <a href="http://www.eutelsat.com">http://www.eutelsat.com</a></b>

Full details of Line-up procedures can be found in ESOG Vol II Module 210. See also Universal Access Procedures ITU-R SNG.1710.

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## Annex C - Information for Earth Station Operators on Eutelsat's System Discipline

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All uplink Earth Station operators should be able to communicate and follow instructions given to them in English.

### **IMPORTANT POINTS TO REMEMBER:**

#### **1. RF Carrier Activation and De-Activation:**

- Must only be done under control of the CSC

#### **2. Pre-Transmission Line-up (PTLU) MUST be implemented:**

- When accessing the satellite for the first time
- When a transportable SNG station changes location
- When making any change to transmission parameters  
(e.g. EIRP, Deviation, Bit rate etc)
- When changing any settings of the transmission equipment

#### **3. Deviations from Nominal Operational Status:**

- Any instruction given by the CSC to restore parameters to nominal must be implemented immediately  
(e.g. to reduce excessive EIRP or eliminate crosspolar interference)
- Any formal requests must be given appropriate attention  
(e.g. SOPN – System Operating Notice)

#### **4. When performing in station maintenance or tests:**

- Depoint the antenna if possible
- Monitor the HPA output or antenna feed input to ensure no spurious transmissions occur

<b>Eutelsat CSC, France - Contact Numbers:</b>	
<b>Tel: +33 1 45 57 06 66</b>	<b>Fax: +33 1 45 75 07 07</b>
<b>E-mail: <a href="mailto:csc@eutelsat.fr">csc@eutelsat.fr</a></b>	<b>Web: <a href="http://www.eutelsat.com">http://www.eutelsat.com</a></b>

**A full description of System Discipline can be found in ESOG Vol I Module 140. See also Universal Access Procedures ITU-R SNG.1710.**

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## Annex D - Information for Earth Station Operators on Eutelsat's Interference Management Procedure

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All uplink Earth Station operators should be able to communicate and follow instructions given to them in English.

**If an interference is detected, the Eutelsat CSC will immediately take steps to:**

- Restore affected service
- Identify and localise the interference
- Eliminate the interference

### **1. Restoration of affected carrier(s) to ensure continuity of services:**

- Increase transmit carrier power
- Move services to another frequency slot, if possible
- Other (e.g. Gain step adjustment)

### **2. Identification, localisation and elimination of interference:**

- Perform Transmitter Location System (TLS) measurements to identify source of interference
- Search for earth station(s) suspected of generating the interference and contact the concerned operators to identify and isolate problems
- Perform helicopter search, if required
- Elimination of faulty equipment

### **3. What you can do to avoid and help to resolve interference issues quickly:**

- Strictly adhere to Eutelsat's line-up and System Discipline Procedures at all times
- Regularly verify your Earth Station equipment and ensure that it is working properly
- Assist the Eutelsat CSC in all interference related activities, whenever requested

**ANY INSTRUCTION GIVEN BY THE CSC MUST BE IMPLEMENTED IMMEDIATELY.**

**ANY FORMAL REQUESTS MUST BE GIVEN APPROPRIATE ATTENTION (e.g. SOPN - System Operating Notice, Interference Notification etc).**

**ANY INSTRUCTION TO CEASE TRANSMISSION GIVEN BY THE CSC MUST BE COMPLIED WITH IMMEDIATELY WITHOUT DISCUSSION.**

**Eutelsat CSC, France - Contact Numbers:**

**Tel: +33 1 45 57 06 66**

**Fax: +33 1 45 75 07 07**

**E-mail: [csc@eutelsat.fr](mailto:csc@eutelsat.fr)**

**Web: <http://www.eutelsat.com>**

## **Annex E - Interference Report Format**

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In case of interference, complete the form on the next page and send it to the Eutelsat S.A. CSC at the indicated fax number.

**URGENT = URGENT = URGENT = URGENT**

**INTERFERENCE REPORT**

From : ..... Date : .....  
.....

To : Eutelsat S.A. CSC  
France  
Tel No: +33 1 45 57 06 66  
Fax No: +33 1 45 75 07 07  
E-mail: csc@eutelsat.fr

We have observed interferences that are characterised as follows:

Satellite : ..... Position: .....

Transponder No. : .....

Rx Frequency and/or Slot No. : .....

Bandwidth : .....

Modulation/CW : .....

Power level (absolute EIRP or relative to interfered signal, sat. beacon, adjacent signals etc.) : .....

Interference Type (A or B ) : .....

Affected Service : Slot: .....  
Frequency: .....

Impact on Service : .....

- Start of the anomaly (Date/Time) : .....

- Periodicity : .....

Remarks : .....  
.....  
.....

Spectrum Analyser plot attached : Yes/No

Best regards

## EUTELSAT S.A. OPERATIONS CONTACT POINTS

<p><b>Eutelsat S.A. CSC</b> e-mail: <a href="mailto:csc@eutelsat.fr">csc@eutelsat.fr</a></p>	<p>Voice: +33-1-45.57.06.66 Fax: +33-1-45.75.07.07</p>
<p><b>Ground Segment Operations</b></p> <p>Earth Station Approval and Line-up Office e-mail: <a href="mailto:esapproval@eutelsat.fr">esapproval@eutelsat.fr</a></p> <p>Type Approval e-mail: <a href="mailto:typeapproval@eutelsat.fr">typeapproval@eutelsat.fr</a></p>	<p>Voice: +33-1-53.98.48.11 Fax: +33-1-53.98.37.41</p> <p>Voice: +33-1-53.98.39.25 +33-1-53.98.46.13</p> <p>Voice: +33-1-53.98.48.16</p>
<p><b>Resource Engineering Group</b></p> <p>e-mails : <a href="mailto:dsvplan@eutelsat.fr">dsvplan@eutelsat.fr</a></p> <p><a href="mailto:ltplan@eutelsat.fr">ltplan@eutelsat.fr</a></p>	<p>Voice: +33-1-53.98.42.50 Fax: +33-1-53.98.30.00</p>
<p><b>Eutelsat S.A. Booking Office</b> e-mail: <a href="mailto:booking@eutelsat.fr">booking@eutelsat.fr</a></p>	<p>Voice: +33-1-53.98.47.07 Fax: +33-1-53.98.37.37</p>
<p><b>Mailing Address</b></p>	<p>Eutelsat S.A. 70, rue Balard F-75502 PARIS Cedex 15 FRANCE</p>
<p><b>Eutelsat S.A. Corporate Web</b></p>	<p><a href="http://www.eutelsat.com">http://www.eutelsat.com</a></p>
<p><b>Eutelsat Extranet (password protected)</b></p>	<p><a href="http://services.eutelsat.fr">http://services.eutelsat.fr</a></p>