# Satellite-Based Data Communications and Dissemination

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# ADVANTAGES OF SATCOMS

- **Wide coverage (even remote areas)**
- **Broadcast capability**
- **High speed**
- **Flexible network set-up**
- **Mobility**
- **Fast installation**
- **Reliability**
- **Low-cost solutions available**



SESAT at 36 degrees East

0°
5°
10°
15°
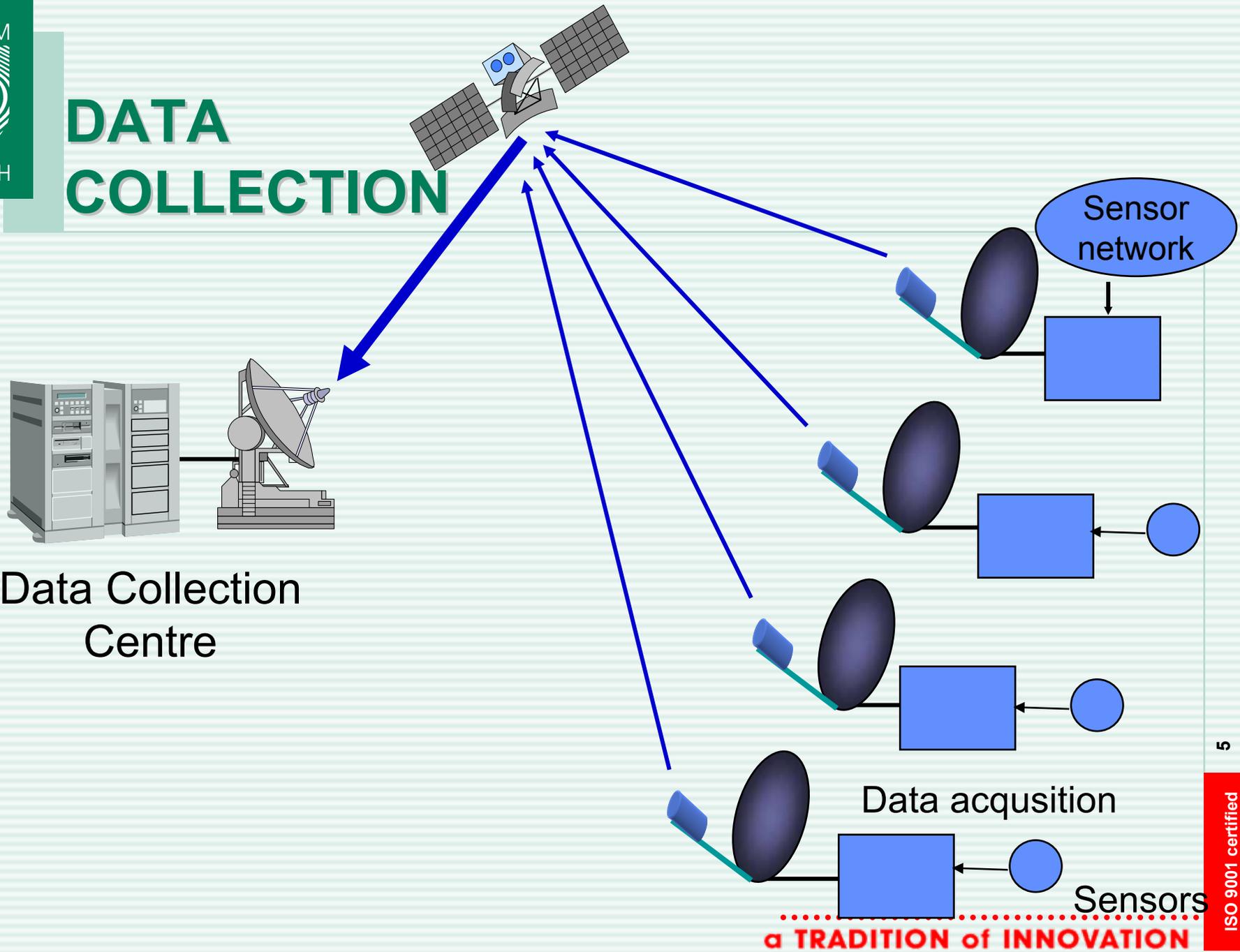20°

48 dBW
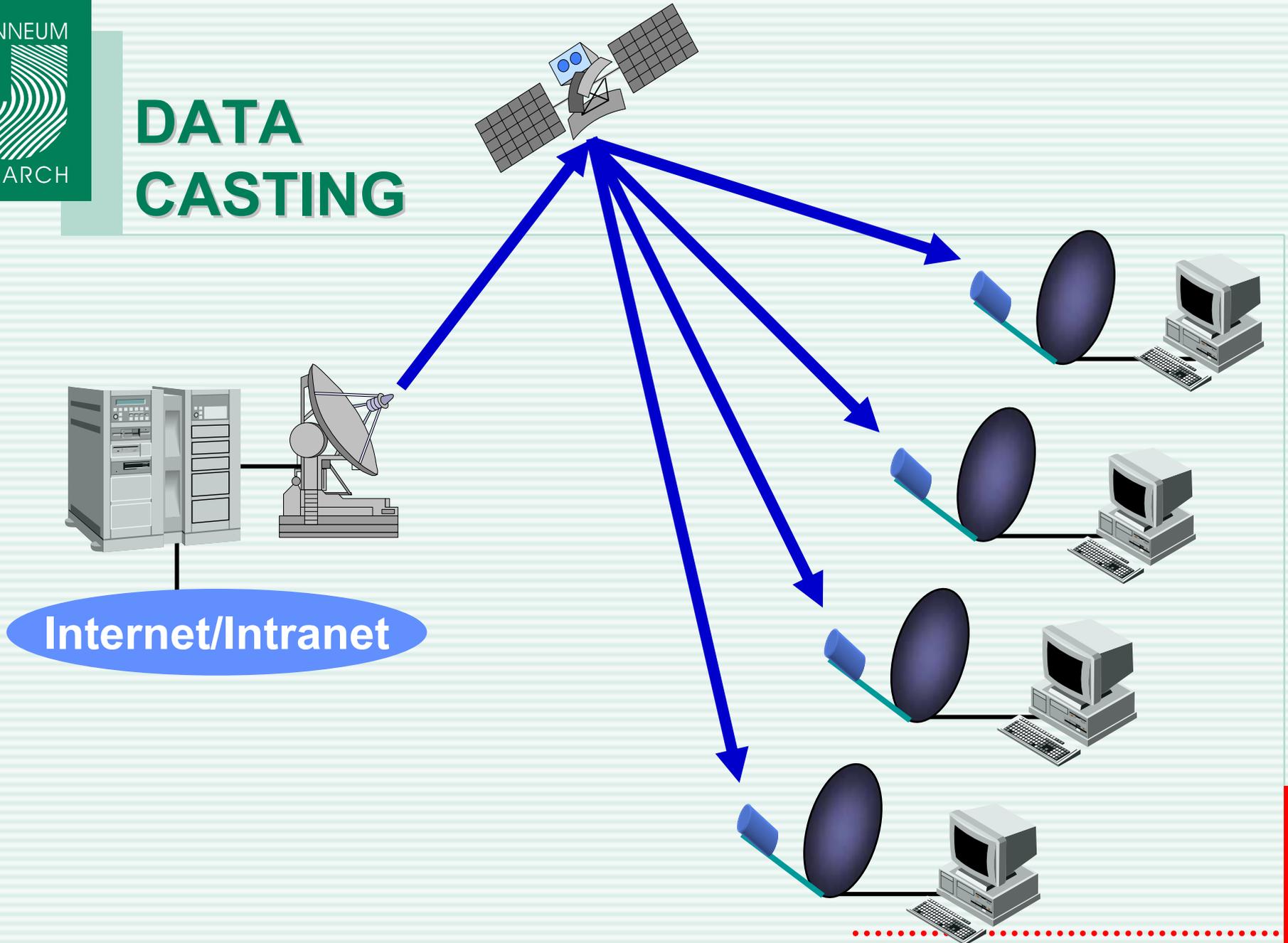47 dBW
45 dBW
43 dBW
40 dBW
38 dBW
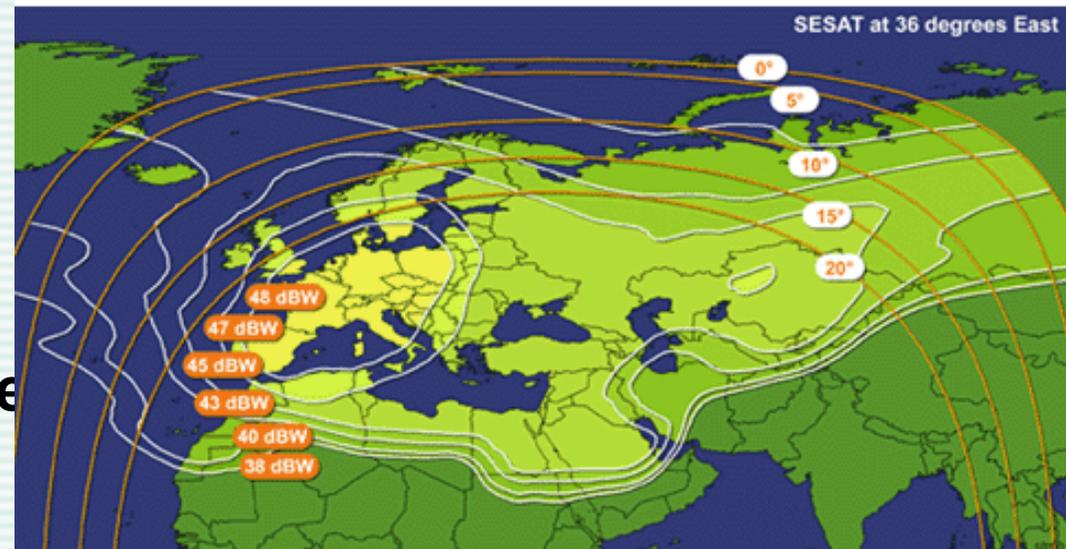
# SCENARIOS

- **Environmental monitoring: data collection on ground**

- **Data dissemination: processed remote sensing or meteorological images (example: EUMETCAST station)**

- **Internet access: everywhere, even without terrestrial communications infrastructure**

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# DATA COLLECTION

Data Collection
Centre

Sensor
network

Data acqusition

Sensors

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# DATA CASTING

**Internet/Intranet**

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# 2-WAY SYSTEM

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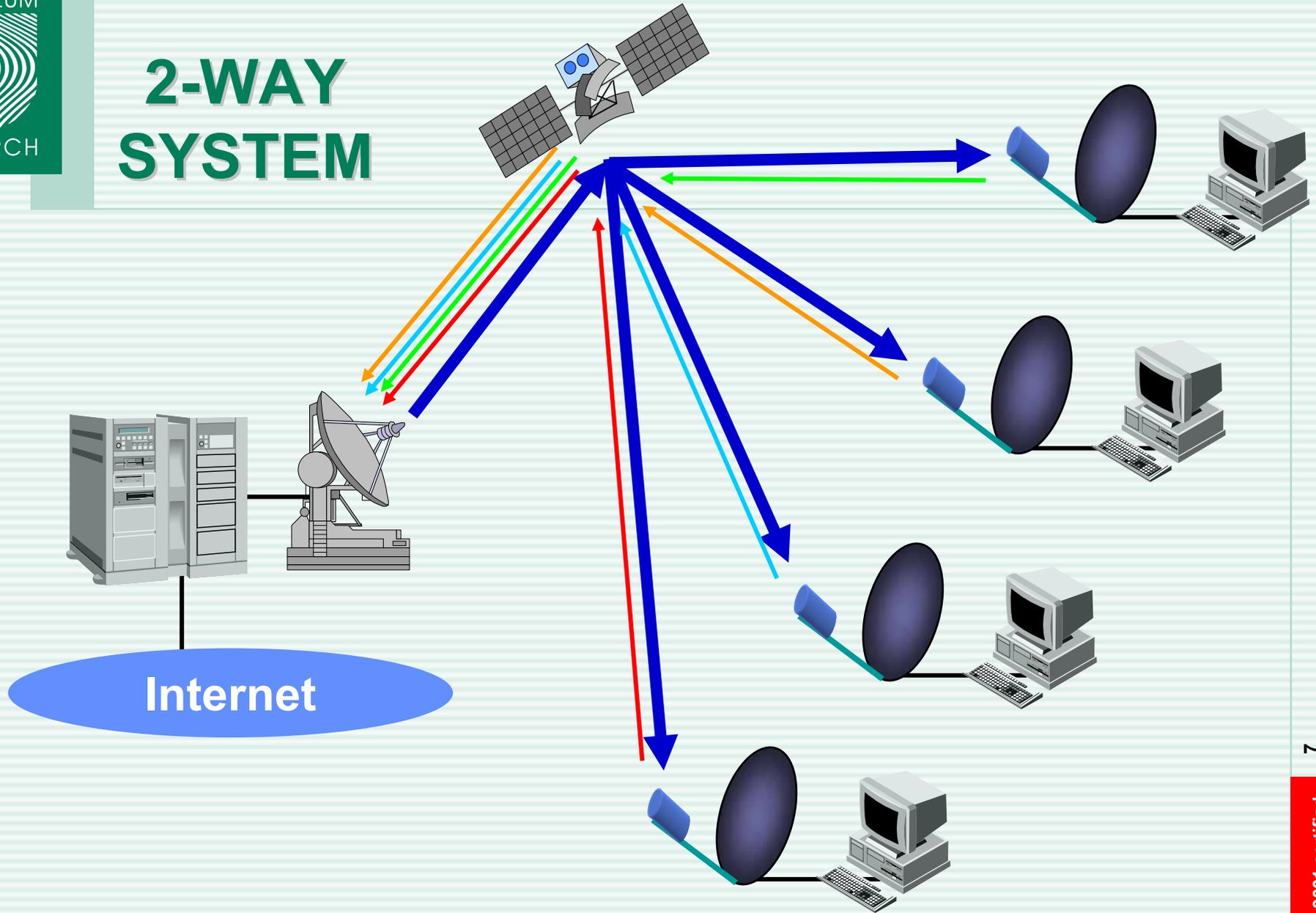
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# DEVELOPMENTS

- **Interactive VSAT (Very Small Aperture Terminal) networks available for many years**
  - ➜ Telephony
  - ➜ File transfer
  - ➜ Video conferencing
  - ➜ Internet access
- **Used to be rather expensive**
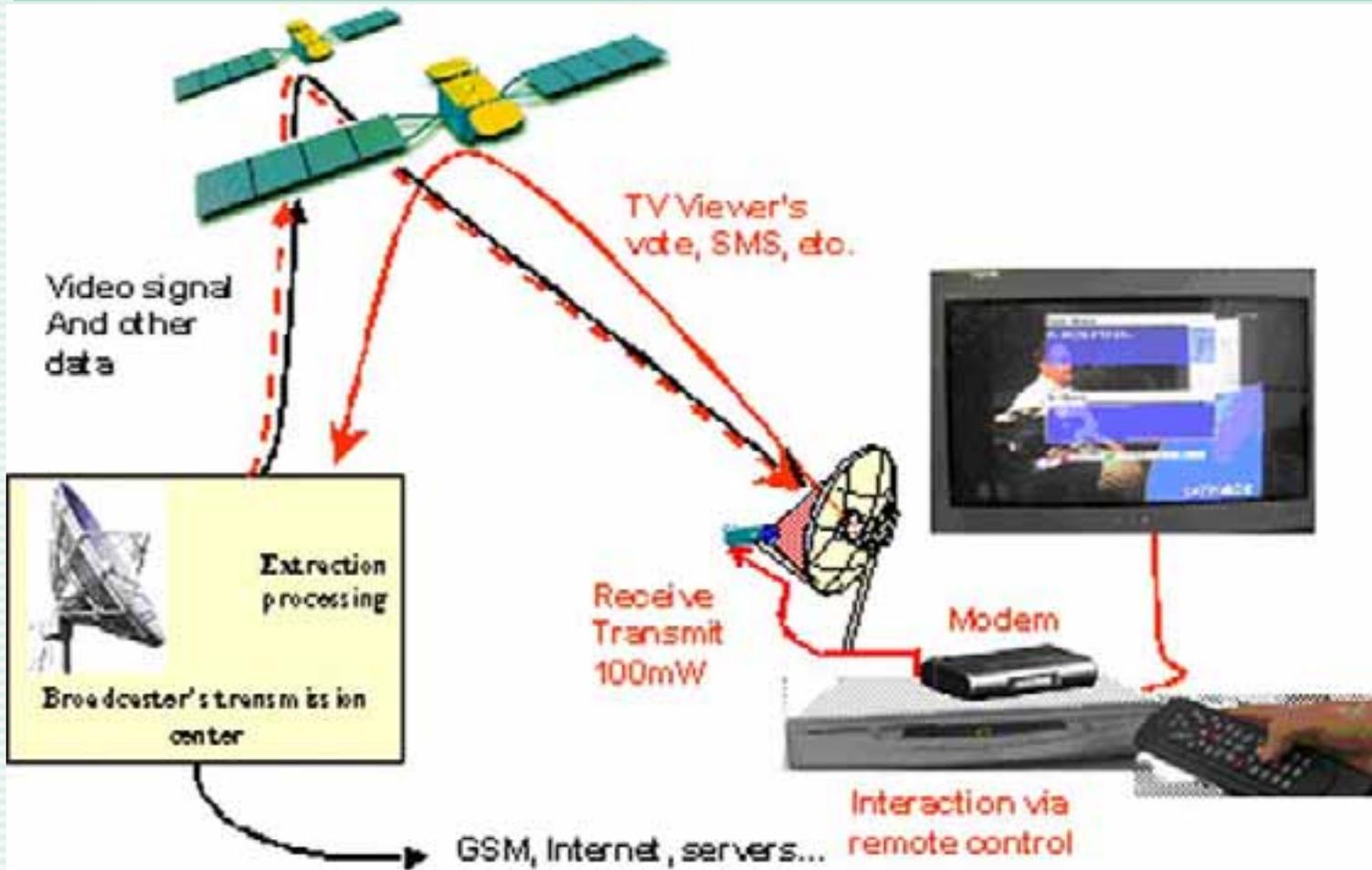  - ➜ Several 1000… 10.000 $

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# LOW-COST SYSTEMS

**Developed in the last few years**

➔ DVB-RCS (Europe)

➔ US, Japanense, Korean solutions

**Fast Internet access via satellite**

**Target: several 100 $ per terminal**

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# INTERACTIVE TV (SATMODE)



TV Viewer's vote, SMS, etc.

Video signal And other data

Extraction processing

Broadcaster's transmission center

Receive Transmit 100mW

Modem

Interaction via remote control

GSM, Internet, servers...

Source: ESA

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# SATMODE

- **Initially an interactive TV solution**

- **Slow-speed return channel (16 kbit/s) for commands from retor control**

- **Tele-voting, tele-shopping applications**

- **Later: upgraded to higher speed**

- **Application: Internet access**

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# ESA PROJECT CAMPNET

- **Internet Access, Voice over IP and digital television for tourists and campers via low-cost satellite Internet terminal with self-aligning antenna**

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# SAT3PLAY SYSTEM



Outdoor Unit:

Dish: ca. 80 cm
as for TVRO

Low-Noise Converter

0.1…0.3 W Transmitter

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# SAT3PLAY SYSTEM



Indoor Unit:

Modem
like DSL modem

provides
Ethernet connection

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# SELF-ALIGNING ANTENNA

INNOVATION

# SERVICES

**Nomadic Internet Access**

- → Downlink: 1 Mbit/s (can be higher)
- → Uplink: 128 kbit/s (can be incerased in near future)
- → Internet traffic is asymmetric (1:10)

**Voice over IP (VoIP)**

**Digital television**

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Antenna

VoIP telephone

Ethernet

Modem

Laptop

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Antenna

Modem

WLAN
Access
Point

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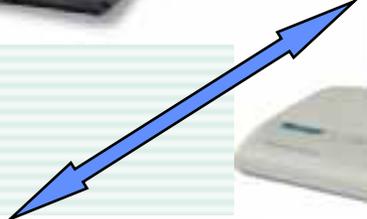
# Example: Disaster Management



Delivery of situation
maps from
disaster zone
to emergency
centre

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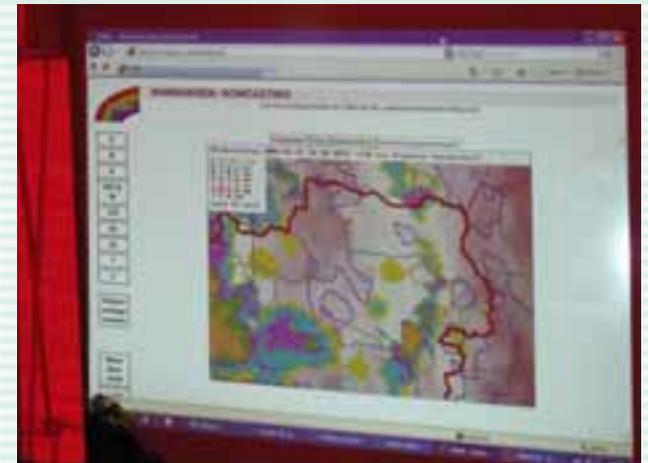
# OTHER APPLICATIONS

- **Data collection in remote areas**
  - ➔ e.g. water level measurement

- **Automatic delivery to a data collection centre**

- **Voice, data provision in remote areas**

- **Access to remote sensing databases in remote areas**

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# SUMMARY

- **Satellite communications system can provide high-speed Internet access and voice services in remote areas**

- **Data collection & data dissemination**

- **Low-cost solutions with suitable speeds available as products**

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# AKNOWLEDGEMENTS

- **Michael Schmidt (Project Manager for CAMPNET/IAS)**

- **Harald Schlemmer (VoIP developments)**

- **Peter Schrotter (operations support)**

- **Max Richter (operations)**


- **ESA (Project Initiator)**

- **IpCOPTER (Germany)**

- **NEWTEC (Belgium)**

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# WEB SITES

- **[www.joanneum.at/ias](http://www.joanneum.at/ias)**

- **[www.iks.tugraz.at](http://www.iks.tugraz.at)**