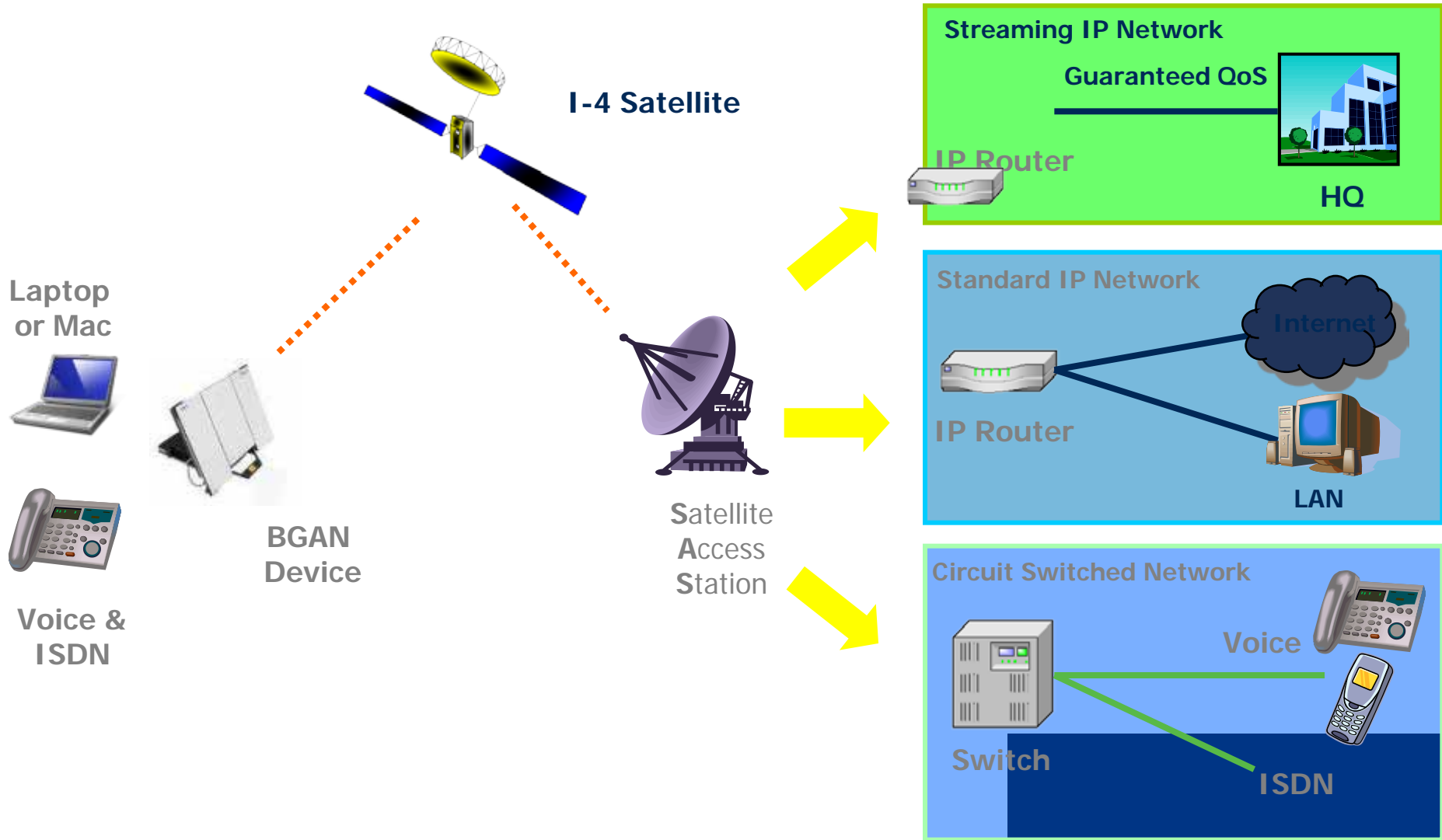


# BGAN: One device, three networks



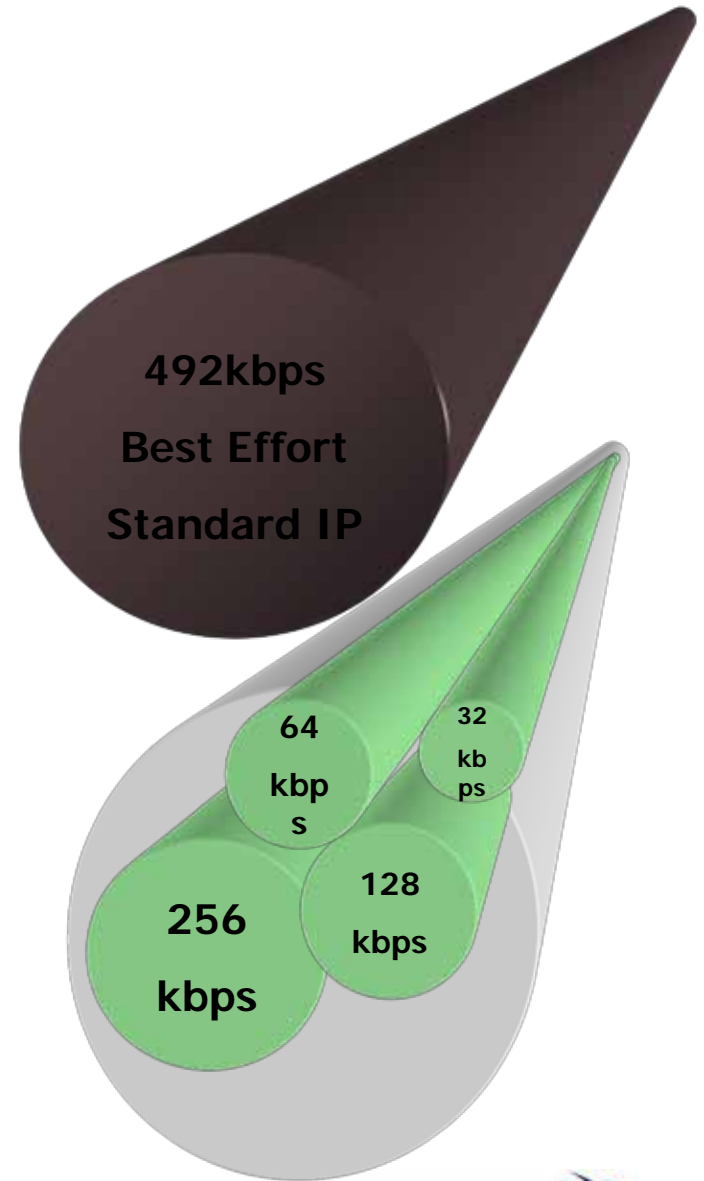
# On Demand IP Connection

## STANDARD IP

- Up to 492Kbps via shared channel (Best Effort)
- Dynamically assigned by the network on demand
- User pays for **Volume** of data sent and received (per MB)
- Suitable for most popular applications like email, file transfer, internet/intranet access

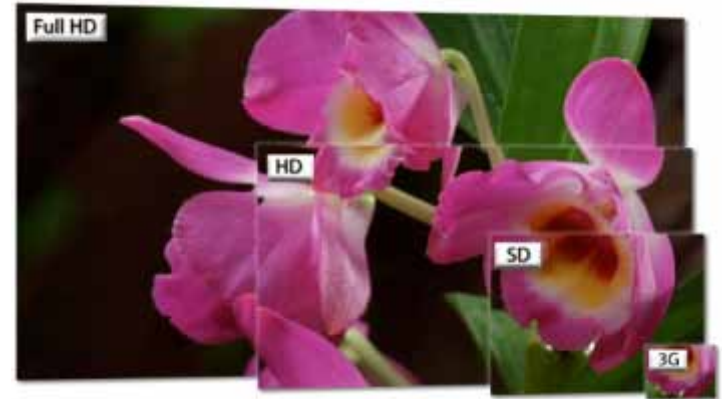
## STREAMING IP

- **Guaranteed data rates of**  
32, 64, 128, 256 Kbps (symmetrical)
- User pays for **Time** of connection (per minute)
- Suitable for user applications where Data has guaranteed time of arrival



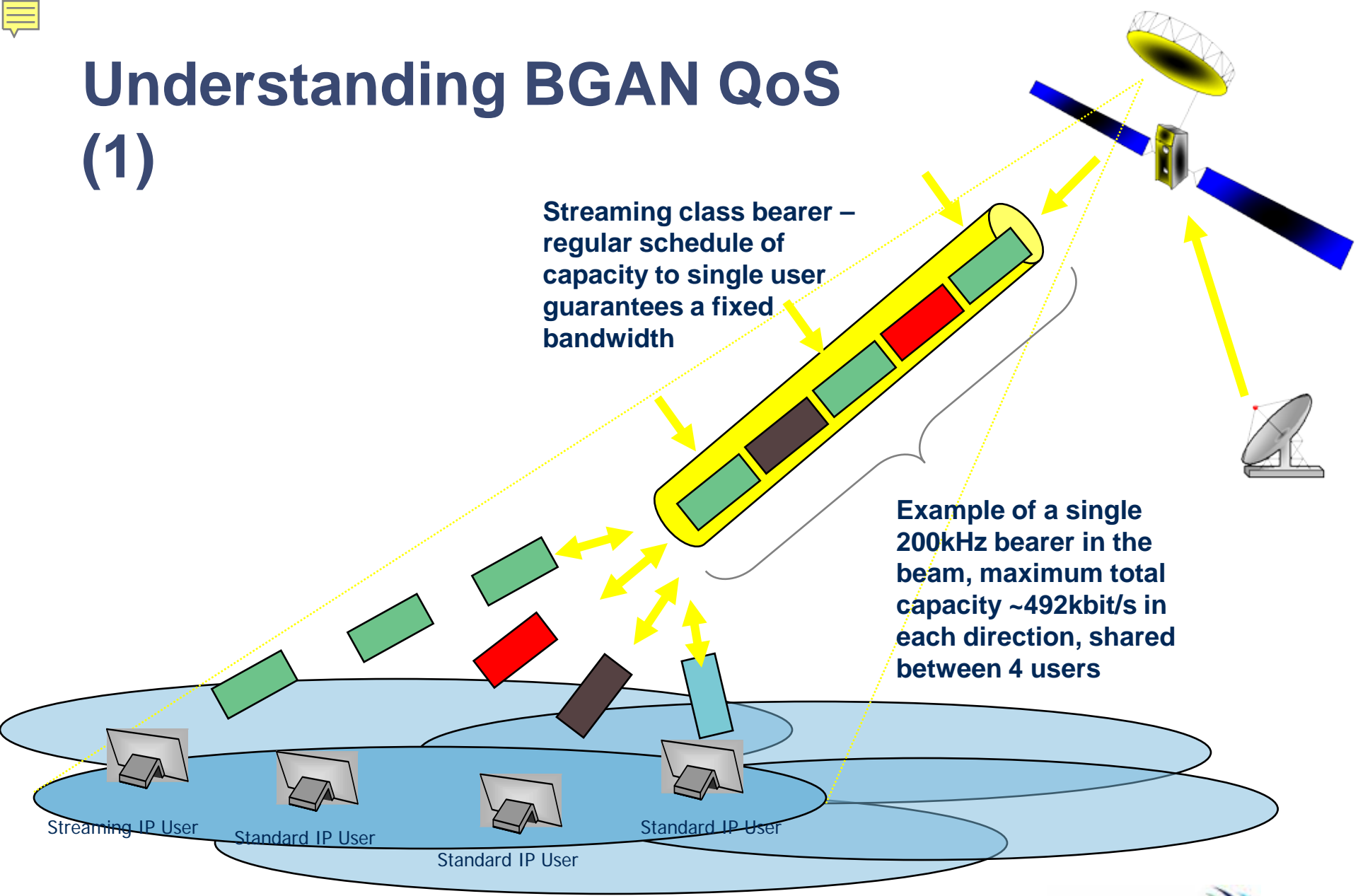
# Key Consideration for Live Audio/Video over BGAN IP

- ➔ Understanding BGAN QoS
  - Last Mile to preserve end to end QoS
  - End to End Latency
- ➔ Understanding transport protocol over IP
  - Using right transport protocol
- ➔ Understanding solution behaviour
  - CBR or VBR
- ➔ Performance over BGAN
  - Understanding solution codecs and Compression
  - Motion, resolution and speed
  - Selecting right bit rate within solution for transmission over BGAN streaming IP
- ➔ Selecting right BGAN service for desired operation i.e. S&F or Live
  - Choosing right UT with desired QoS
- ➔ Video format and play out interface i.e. SDI or Composite
- ➔ Ease of use
  - User in the field are usually untrained



# Understanding BGAN QoS

(1)



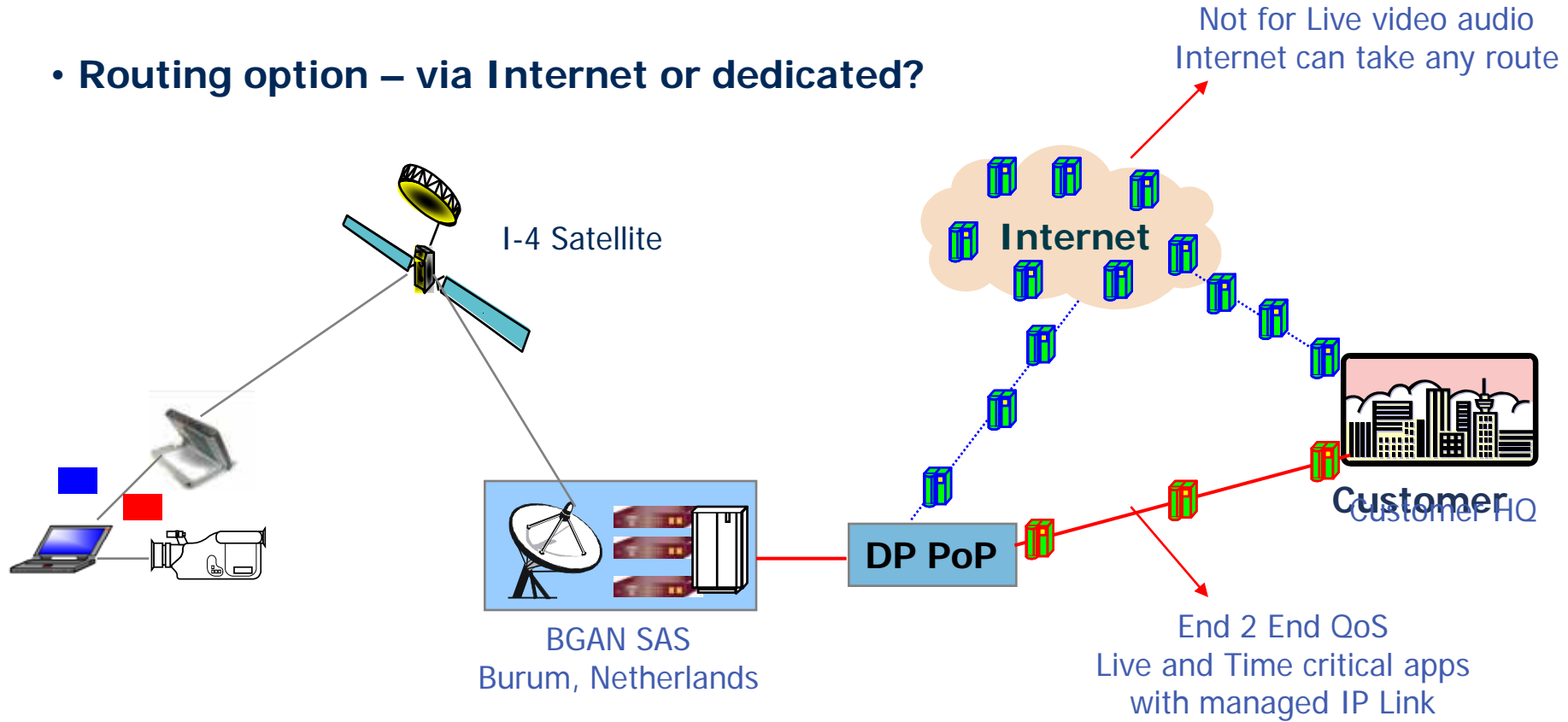
Streaming class bearer –  
regular schedule of  
capacity to single user  
guarantees a fixed  
bandwidth

Example of a single  
200kHz bearer in the  
beam, maximum total  
capacity ~492kbit/s in  
each direction, shared  
between 4 users

Streaming IP User    Standard IP User    Standard IP User    Standard IP User

# Understanding BGAN QoS (2)

- Routing option – via Internet or dedicated?

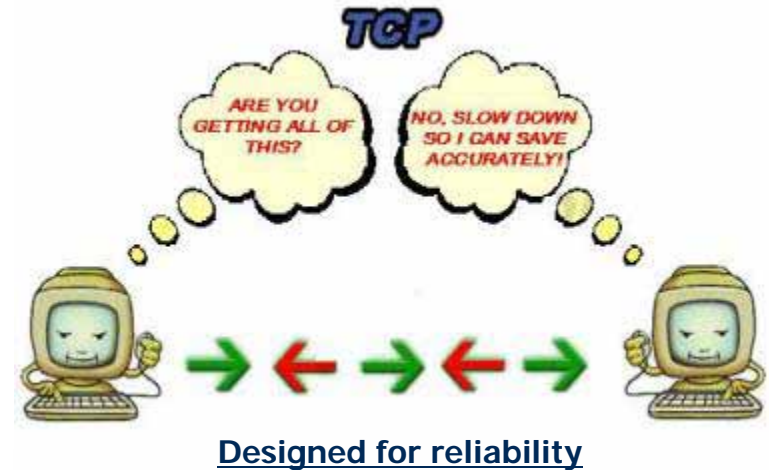


- General Office Applications recommended over Standard IP via Internet
- Live Audio Video Applications recommended over Streaming IP via managed IP link from DP POP

# Understanding Transport Protocol over IP

## TCP

•TCP provides a reliable data-transfer service, and is used for both bulk data transfer and interactive data applications. TCP is the major transport protocol in use in most IP networks, and supports the transfer of over 90 percent of all traffic across the public Internet today.



## UDP

•UDP is a lightweight protocol that allows applications to make direct use of the unreliable datagram service provided by the underlying IP service. UDP is commonly used to support applications that use simple query/response transactions, or applications that support real-time communications.



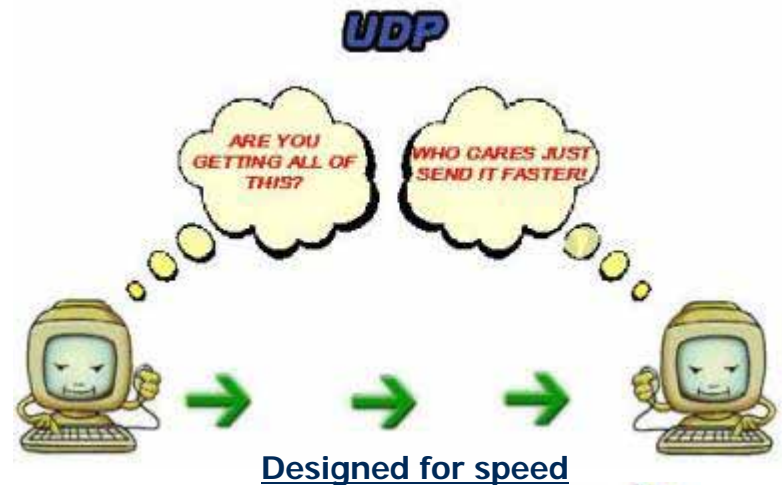
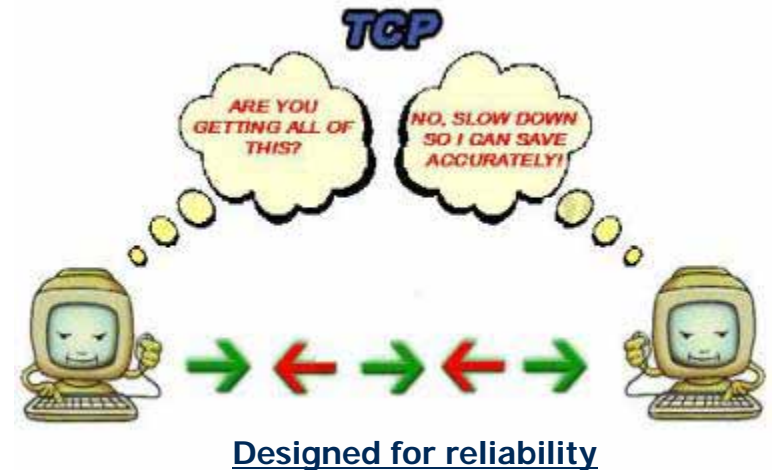
# Understanding Bit Rate

## Variable Bit Rate (VBR)

• Variable bit rate is designed to cope with variable network bandwidth, such as that provided by ADSL or the BGAN standard IP connection, which adjust audio/video quality according to the available bandwidth.

## Constant Bit Rate (CBR)

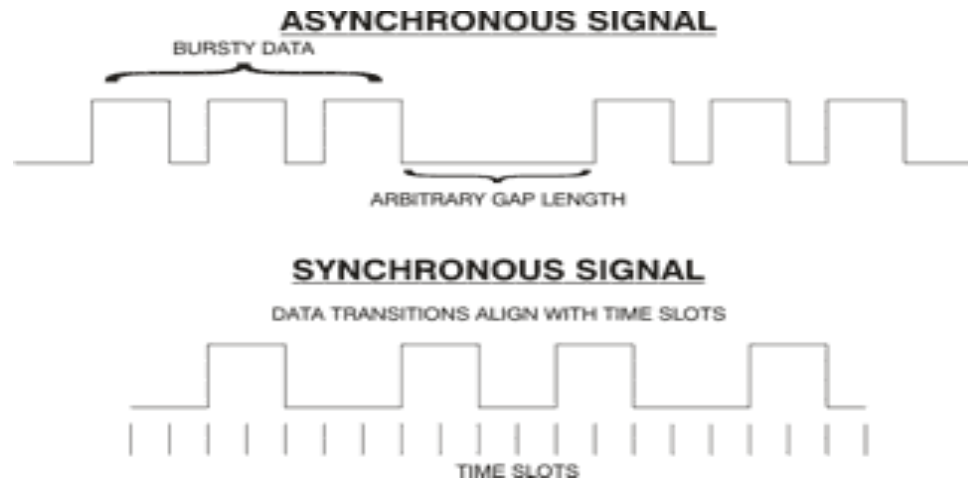
• Constant bit rate is recommended for use with streaming applications over the BGAN streaming IP service as the output from the codec is sent in a steady stream with a fixed bit rate.





# Synchronous Vs Asynchronous

- ➔ ISDN is well tested but not available to every desktop
- ➔ Good for video conferencing but no integrated application experience
- ➔ ISDN termination cost is expensive and availability is limited
- ➔ Global reach -IP is available to every single desktop in the organisation
- ➔ Allow e-collaboration applications to work along side video applications
- ➔ No handshake or termination cost



# Delivering Live Audio/Video Solution over BGAN

Why BGAN

Key Considerations

**BGAN Latency**

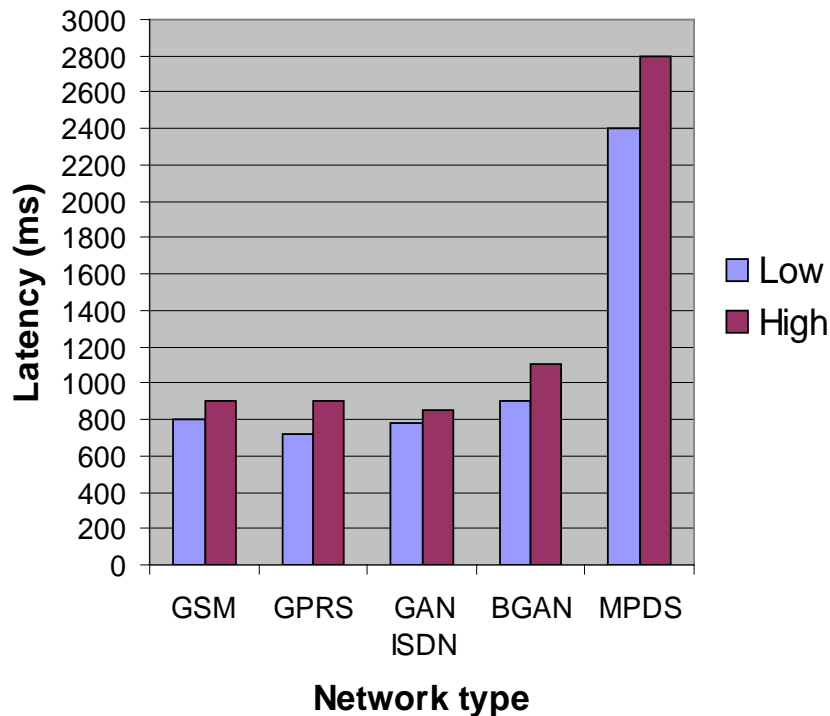
Steps for live broadcast

Optimum user experience

Deployment Scenarios

LIVE DEMO

# BGAN Latency



- Latency is a critical consideration for applications performance & User-Experience
- Always take into account End-to-end Latency.
- Be aware of double-hop possibilities!
- Streaming IP – 900 – 950ms
- Standard IP – 800-1100ms

# Performance over BGAN- S&F

Encoding rate used to compress file	Approx. compressed file size	Approx. transmission time over BGAN 256kbps connection
750kbps	6MB	4-5 minutes
1Mbps	8MB	5-6 minutes
1.5Mbps	12MB	7-8 minutes
2Mbps	16MB	9-10 minutes

Actual transmission time is determined by a number of factors including:

Data channel rate, video sequence length, physical signalling overhead, Layer 4 transport and transmission protocol overhead (i.e. TCP overhead), error checking, protocol headers and handshaking negotiation procedures like "TCP slow start". Also, the transmission speed varies between solution to solution due to the different type of compression and transport protocols used.

# Performance over BGAN- Live

BGAN QoS	Recommended Target bit rate	Throughput achieved over BGAN
256Kbps	220-235kbps	240kbps
128Kbps	110-115kbps	112kbps
64Kbps	56-58kbps	58kbps
32Kbps	26-28kbps	28kbps

Live transmission quality is determined by a number of factors including:

Target bit rate, video codec, Transport control protocol, BGAN error checking/Packet retransmission, **Managed last mile connection**, Packet Size, CBR or VBR, Good signal strength on BGAN UT

# Delivering Live Audio/Video Solution over BGAN

Why BGAN

Key Considerations

BGAN Latency

Steps for live broadcast

Optimum user experience

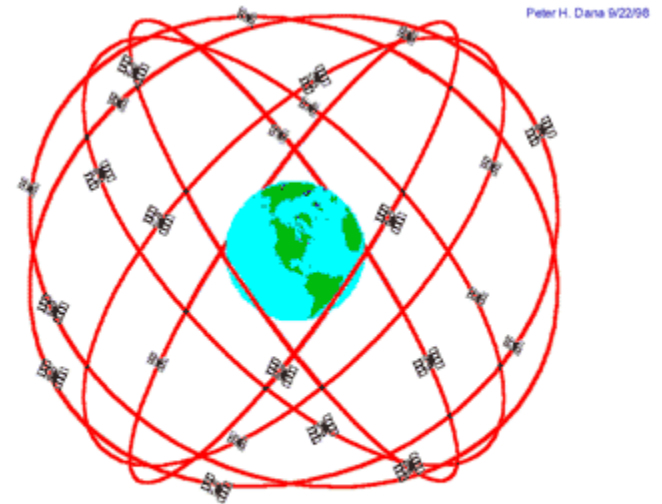
Deployment Scenarios

LIVE DEMO



# Steps for live broadcast

1. GPS
2. Pointing
3. Switching off packet re transmission
4. Network Registration
5. Activating IP or Circuit Switched Data services
6. Launching live video/audio broadcast application



**GPS Nominal Constellation**  
24 Satellites in 6 Orbital Planes  
4 Satellites in each Plane  
20,200 km Altitudes, 55 Degree Inclination

# Delivering Live Audio/Video Solution over BGAN

Why BGAN

Key Considerations

BGAN Latency

Steps for live broadcast

**Tested Solutions**

Deployment Scenarios

LIVE DEMO

# Inmarsat Solution Development Programme



## Audio Video Solutions

### 4 Key areas

1. Broadcast solution – professional
2. Audio/Video Conference – hardware based
3. Audio/Video Conference – software based
4. Video surveillance – IP camera

# Inmarsat Solution Development Programme



## Broadcast solution

Tested and optimised for BGAN

- Livewire - Live & S&F
- Clipway – S&F
- Streambox – Live & S&F
- Quicklink – Live & S&F
- Comrex - Audio encoder – Live



# Inmarsat Solution Development Programme



## Audio/Video Conferencing Hardware solution

1. Scotty Mobile
2. Tandberg Tactical MXP & 1000
3. D-Link DVC 2000 IP Video Phone
4. Aethra Theseus IP Video Phone
5. Motion Media MM 156
6. 7E IP Phone

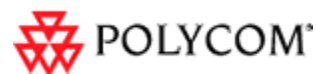


# Inmarsat Solution Development Programme



## Audio/Video Conferencing Software solutions

1. Livewire
2. Streambox Video Conferencing
3. Emblaze vpoint HD
4. Polycom PVX
5. ichat



# Inmarsat Solution Development Programme



## Audio/Video Surveillance solution

1. Frontline
2. Wi-Fi Web cams – Link Sys, D-link
3. Axis LAN camera
4. Sony surveillance camera



# Delivering Live Audio/Video Solution over BGAN

Why BGAN

Key Considerations

BGAN Latency

Steps for live broadcast

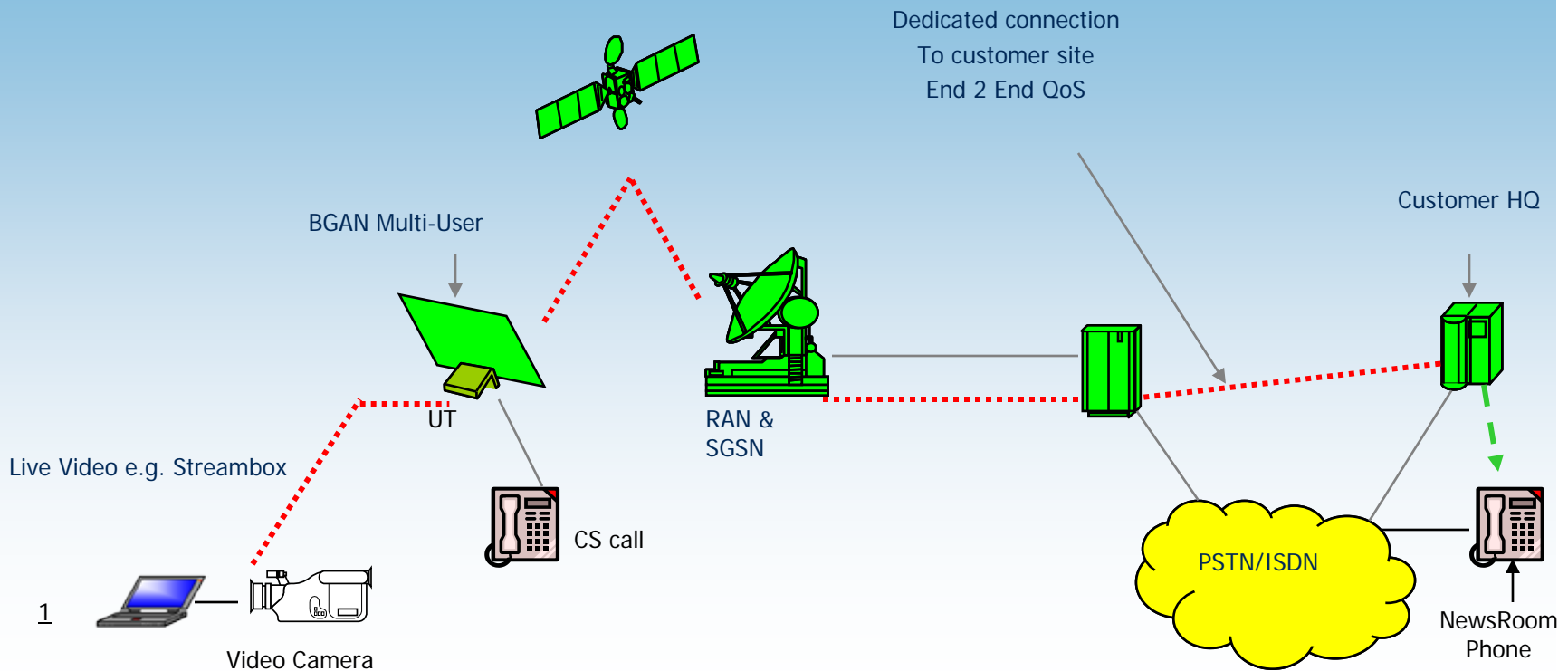
Optimum user experience

**Deployment Scenarios**

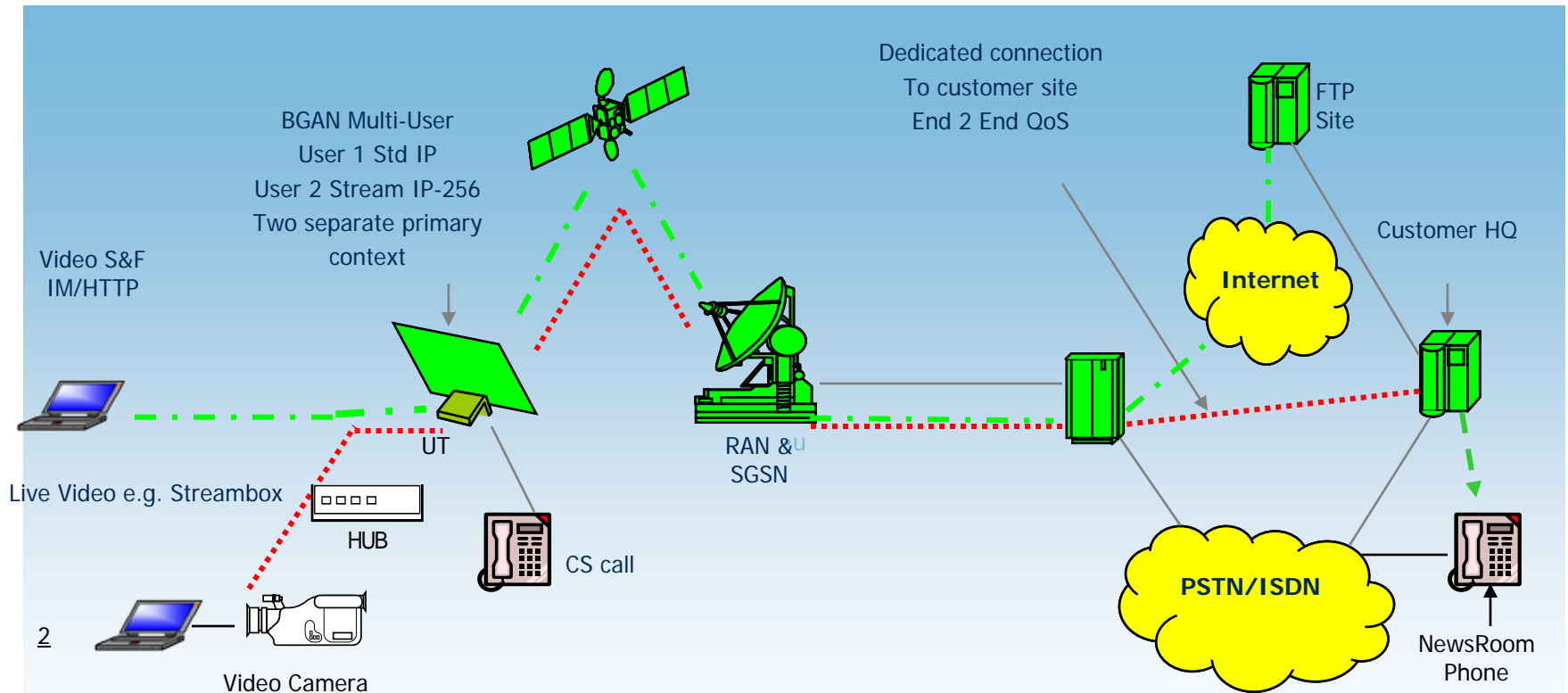
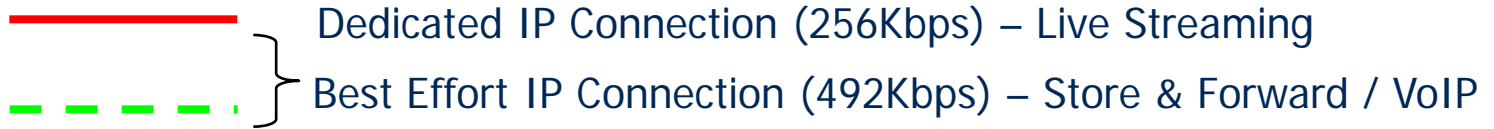
LIVE DEMO

# Single user – Live news gathering

Dedicated IP Connection (256kbps) – Live Streaming

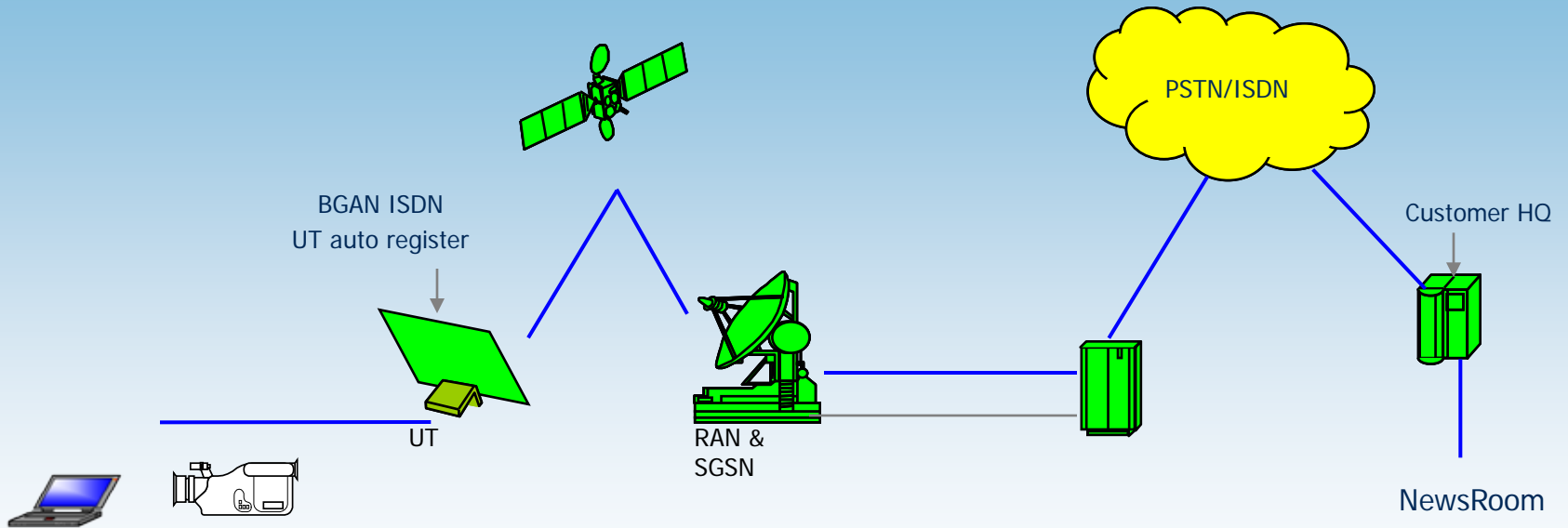


# Multi-user – Live news gathering



# Live Video broadcast – IP to ISDN termination

– Live Video broadcast



Live Video – Streambox etc.



# General Recommendations

- Make sure that you have pointed the terminal correctly – the terminal must have unobstructed line of sight (untinted windows) and maximum possible signal strength before network registration
- Make sure you are using a higher streaming IP class QoS for higher quality video.
- Make sure the connection has dedicated last mile connection to ensure end-to-end QoS,
- Use the Ethernet Interface to achieve high speed transmission speed.
- Make sure that you have chosen the correct protocol, i.e. UDP transport.
- Make sure for live broadcast (UDP-based) you switch off packet retransmission for your streaming class connection within BGAN Launch Pad
- Make sure you switch off any windows or MAC auto download while doing live broadcast
- Test your solution before take it out in the field.
- Use a correct format camera, that is PAL or NTSC
- Configure your decoder with a static IP address.
- Inmarsat recommends that you do not use any VPN connection for live broadcast as it can add extra VPN overhead of between 10-40% based on your VPN application

**Thank you**