# Broadband VSAT Services-

# New Perspective for Oil and Gas Applications

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# Objective

- Explain why VSAT Satellite network is important to Oil & Gas operations

- Introduce VSAT open standard technology, DVB-RCS

- Highlight Oil & Gas industry as a potential market for VSAT Communications

- Highlight challenges facing DVB-RCS Technology

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# Option 3: 2-Way VSAT Satellite System

- Independent from Terrestrials
- Independent from the environment
- Services without limitation of:
  - Distance
  - Geographic areas
  - Locations
  - Number of sites
- Fast deployment
- Cost-Effective

Satellite
"Repeater in the Sky"

Microwave Repeaters

Coaxial or Fiber Optic Cable

Earth

Onshore Rigs
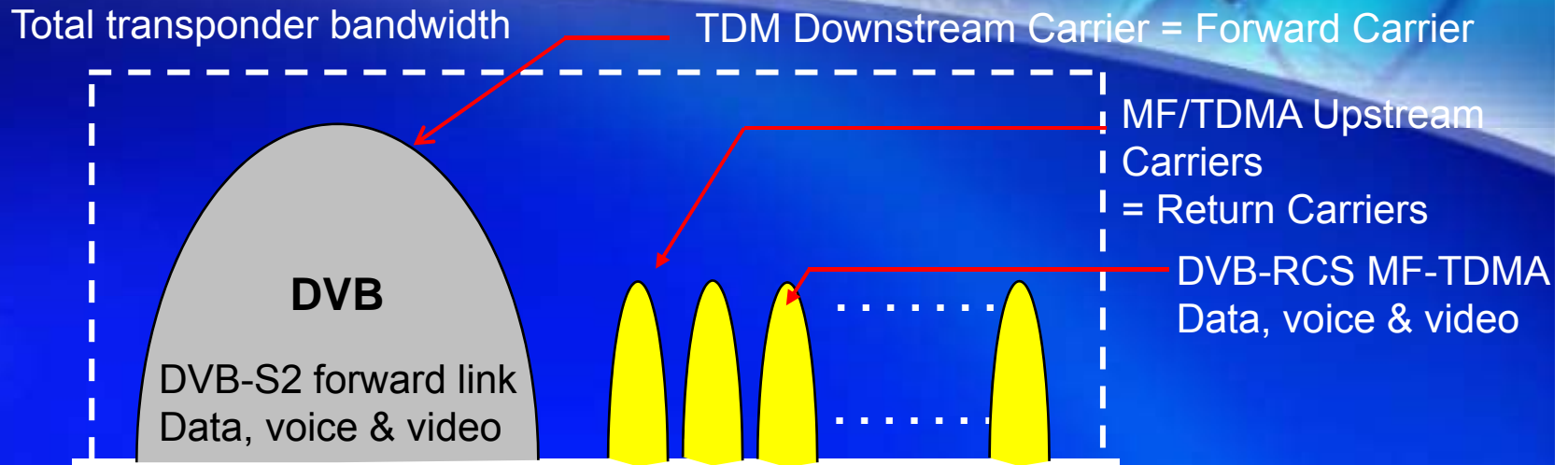
LAN Internet
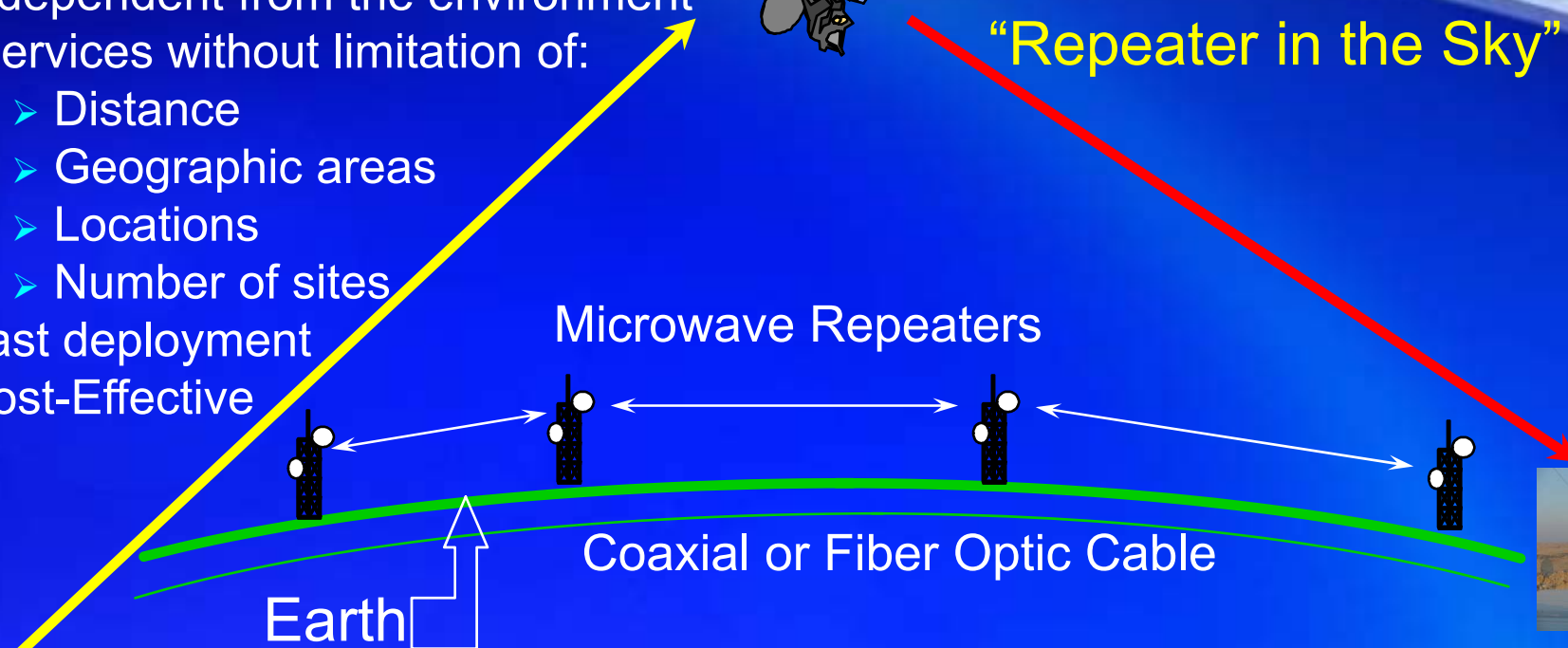
Data/Video

Voice

# 2 Way- Broadband VSAT Communications is Best Suited

- A symmetrical connectivity of high forward and return data links
- Used for transporting IP traffic over satellite
- Used for delivery of large volumes of data, voice and video to remote sites on a single infrastructure

# 2 Way VSAT System Architecture

Total transponder bandwidth

TDM Downstream Carrier = Forward Carrier

MF/TDMA Upstream Carriers = Return Carriers

DVB-RCS MF-TDMA Data, voice & video

**DVB**

DVB-S2 forward link Data, voice & video

**DVB** Forward Carrier

Return Carriers

**DVB- RCS VSAT Technology**
*(Open Standard)*

80 mb/s

4 mb/s

**Gateway**

**Remote Terminals**

# What is VSAT DVB-RCS?

- DVB = Digital Video Broadcast
- RCS = Return Channel via Satellite
- Open standard VSAT technology
- ETSI Standard **EN 301 790** established for interoperable VSAT networking in 2001 as worlds first two-way satellite standard
- There are approximately 100 fully compliant DVB-RCS Hubs & 20, 000 terminals worldwide
- **Satlabs**: Forum led by ESA grouping stakeholders of DVB-RCS (over 20 members) to ensure standard compliant & interoperability
- DVB-RCS Availability:
  - DVB-S
  - DVB-S2

**SatLabs Group**

http://satlabs.org

# Why Use DVB-RCS?

- Open Standard IP based VSAT Technology:
  - Forward data link from gateway to remotes up to 80mb/s
  - Return data link from remotes to gateway 2 – 4 mb/s
  - Multi-vendor competitive environment
  - Proven Interopera                 cost equipment
  - Ease of adding n             &, <span style="color:red">Scalable Hub</span>
  - DVB-RCS suppo           IP services
- Fading & Interferenc
  - Higher availability of terminal connectivity
  - Optimized use of satellite bandwidth

> **DVB-S2**
> *Latest Platform Technology*

> **Advanced Coding Schemes**
> - CCM – Constant Coding Modulation
> - VCM – Variable Coding Modulation
> - ACM – Adaptive Coding Modulation

# DVB-S2: Leading DVB-RCS Technology
## (ETSI: EN 302 307)

- Wide range of modulation schemes (QPSK, 8PSK, 16APSK and 32 APSK modulation)
- Variety FEC coding (LDPC): 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
- Supports 3 modes of modulations: CCM/VCM/ACM &
- Provides Ability to Dynamically Change Modulation: VCM/ACM
- Improves BW efficiency of 30% - 50% greater than DVB-S in CCM & ACM

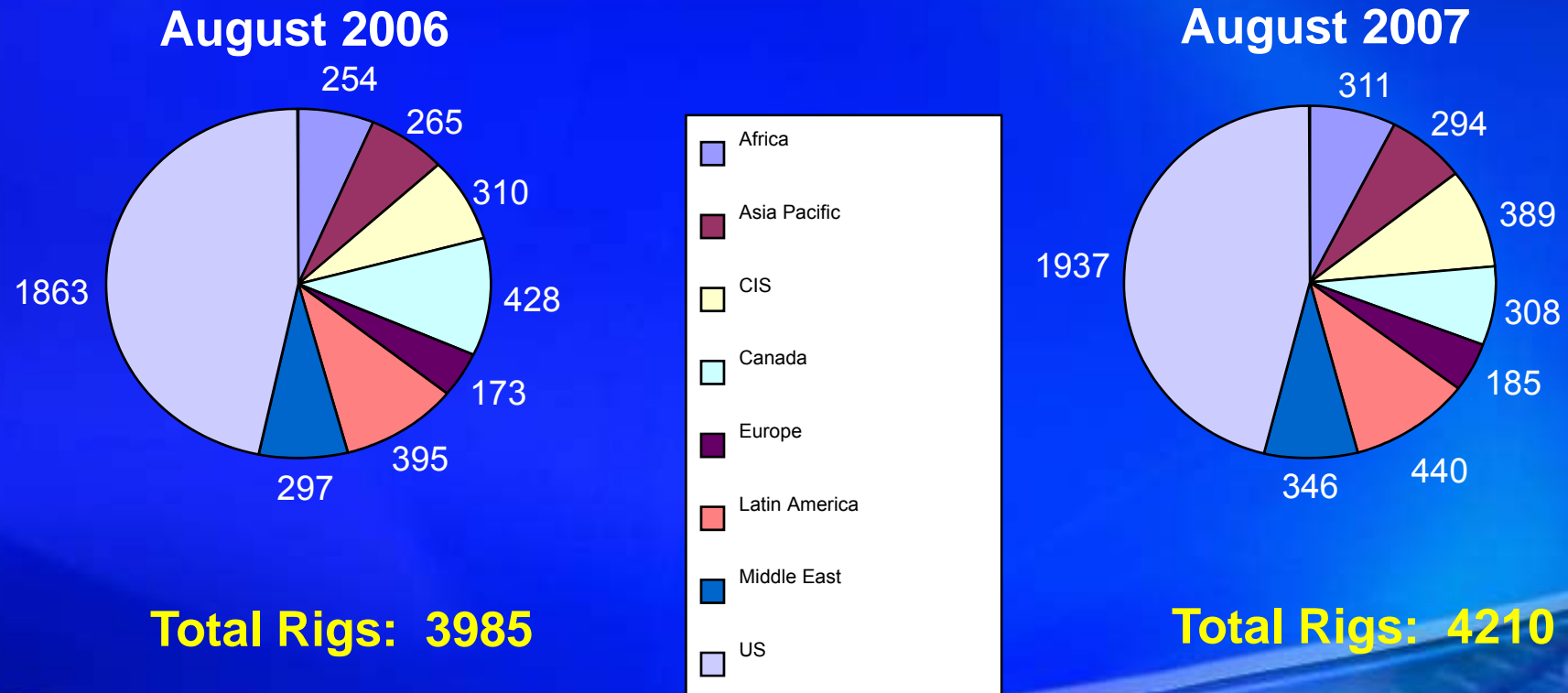ارامكو السعودية
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# DVB-RCS: Maximizing  Oil & Gas Operations and Performance

- Perform Drilling <u>Online Geosteering</u> real data analysis
- Perform Seismic <u>Online Quality Check</u>
- Introduced advanced drilling technologies:
  - Batching Drilling
  - Intelligent Well
  - Intelligent Field
  - Real Time Monitoring

# Booming Oil & Gas Market-
# More Drilling in Challenging Regions

**IEA:** Global demand for oil will increase to 116 million bpd by 2030

## Rigs Under Contract by Region

### August 2006

254
265
310
428
173
395
297
1863

**Total Rigs: 3985**

Legend:
- Africa
- Asia Pacific
- CIS
- Canada
- Europe
- Latin America
- Middle East
- US

### August 2007

311
294
389
308
185
440
346
1937

**Total Rigs: 4210**

# DVB-RCS Challenges

DVB-RCS VSAT Technology shall provide:

- Full DVB-RCS open standard up to high layers:
    - TCP/IP- HTTP Acceleration
    - QoS
    - NMS
- Full Interoperability
- Less expensive DVB-RCS systems
- VSAT terminals towards Oil & Gas Operations; Smaller/Lighter terminals

# Conclusion

- DVB-RCS VSAT technology meets Oil and Gas current and future requirements
- DVB-RCS organization shall continue improving the technology by providing:
    - Full Interoperable VSAT Systems
    - Higher Data Rates
    - Smaller/Lighter VSAT Terminals
    - More Competitive Prices

Drive Oil & Gas Industry to successfully implement and maximize performance of Oil & Gas applications
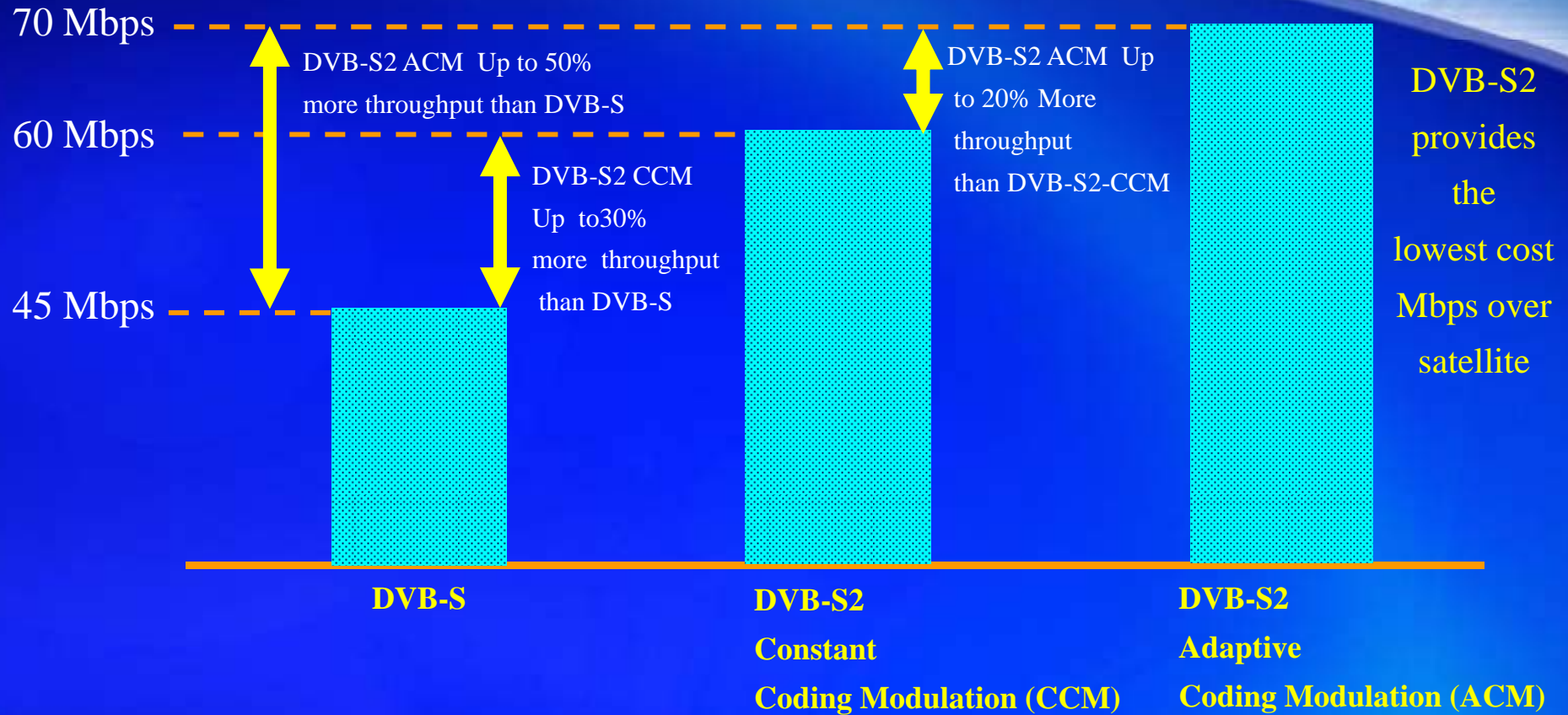
# Thank You
# Q&A

# Satlabs

- **International non-profit**
- **Committed to large-scale adoption and deployment of DVB-RCS**
- **Work of Satlabs:**
  - Interoperability
  - Cost Reduction
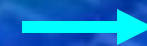  - Availability
  - DVB-RCS Awareness
  - Standard Evolution

# DVB-S2 ACM BW Savings



70 Mbps

DVB-S2 ACM  Up to 50% more throughput than DVB-S

DVB-S2 ACM  Up to 20% More throughput than DVB-S2-CCM

DVB-S2 provides the lowest cost Mbps over satellite

60 Mbps

DVB-S2 CCM Up  to30% more  throughput than DVB-S

45 Mbps

**DVB-S**

**DVB-S2**
**Constant**
**Coding Modulation (CCM)**

**DVB-S2**
**Adaptive**
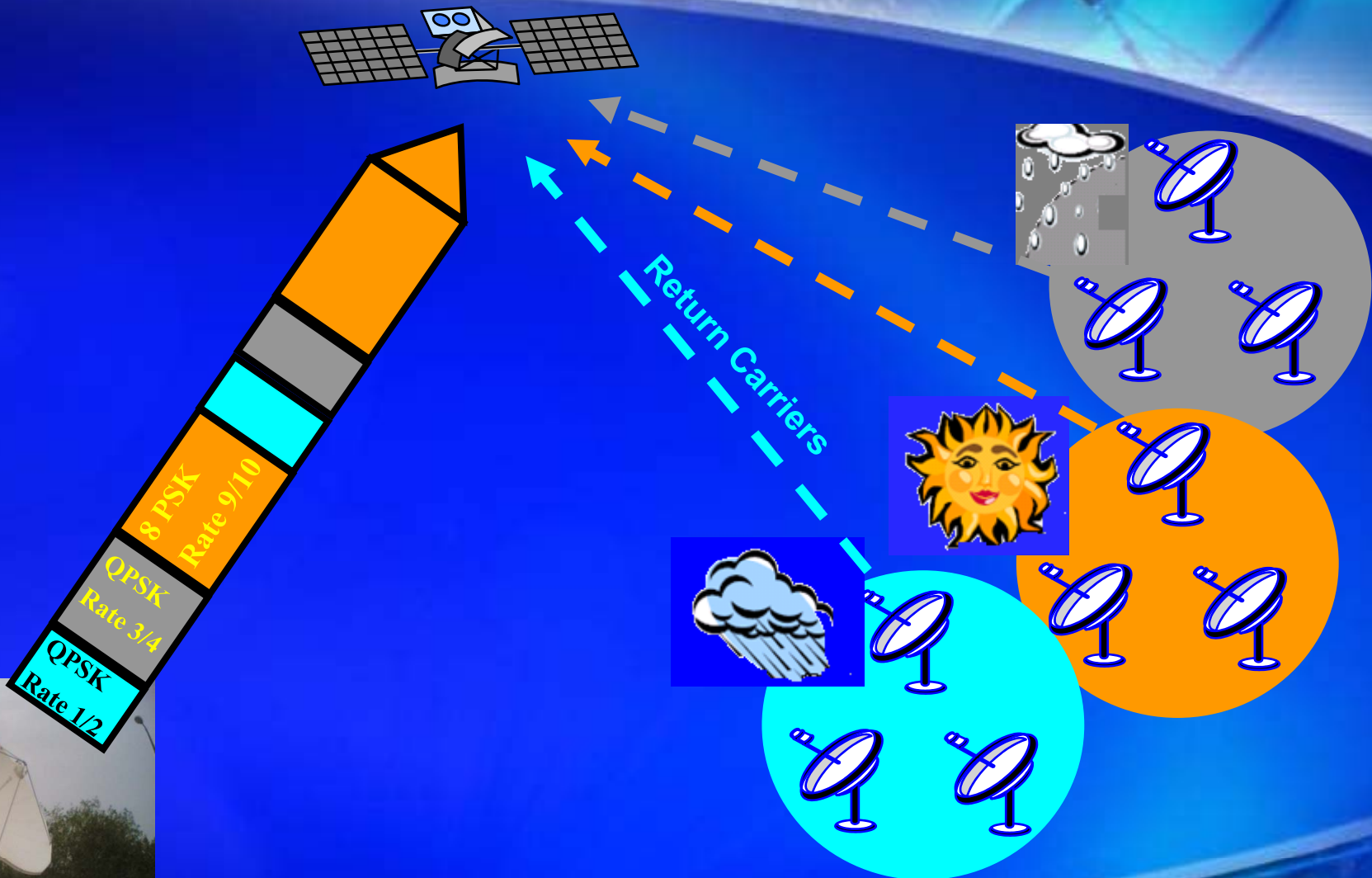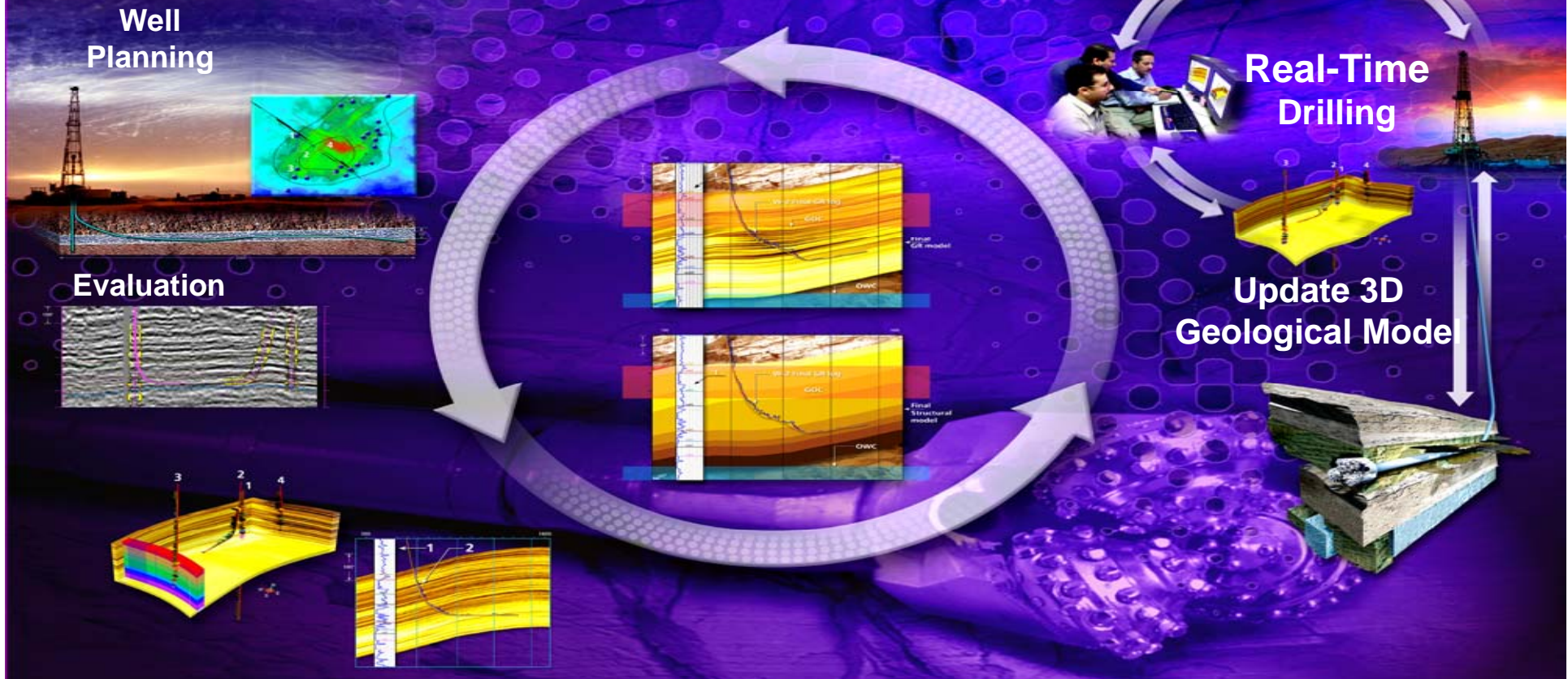**Coding Modulation (ACM)**

For the same amount of satellite capacity :

DVB-S2 ACM gives the most bandwidth efficiency or throughput

# DVB-S2 with VCM/ACM more throughput over outbound

8 PSK
Rate 9/10

QPSK
Rate 3/4

QPSK
Rate 1/2

Return Carriers

# GeoSteering Horizontal Wells with
# Real Time Data

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**Well Planning**

**Evaluation**

**Real-Time Drilling**

**Update 3D Geological Model**

## What is Geosteering
"the use of **real-time** geological and directional data to help guide or place a well"

## Why Geosteering
- Maximize reservoir contact
- Increase pin-point accuracy
- Optimize directional drilling