Make Budgets Go Further Offshore

A year ago, the oil and gas industry hit the panic button and everything came to a standstill. The combination of Covid-related travel restrictions that reduced fuel consumption and a price war between Saudi Arabia and Russia brought the oil and gas industry to its knees. Rigs were laid-up, new exploration was delayed, and the price of oil plummeted almost overnight. To cope with the situation, oil companies slashed CapEx spending and the prevailing strategy was to spend as little money as possible to try and ride out the crisis.

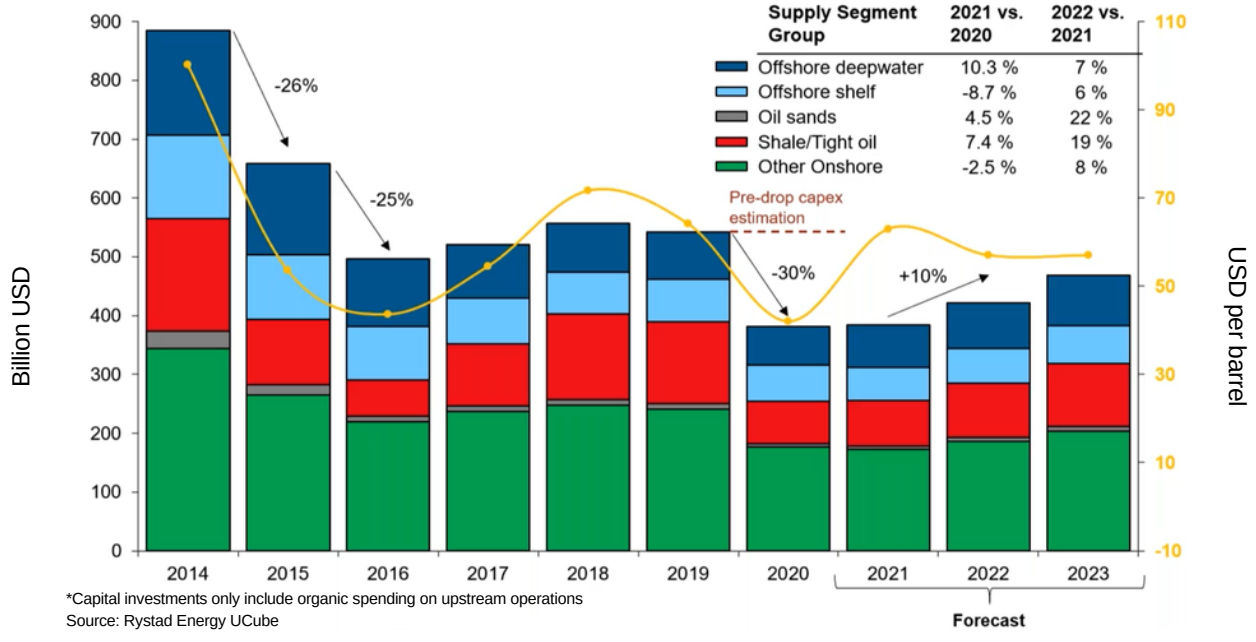
Oil and gas was hit harder than most other industries because it was still recovering from the last downturn in 2015-2016. Many of the VSAT networks were commissioned before this downturn, and while these are dated, they still work. Financially, most of them are fully depreciated. With CapEx budgets on hold, it seems like their replacements will have to wait a while longer.

Although this strategy seems intuitive, it ignores the real challenge: OpEx. In recent years, data rates have been growing faster than MHz prices have declined, so overall, bandwidth costs have still been increasing.

This trend has continued during the pandemic as companies have accelerated their digital transformation initiatives. There are key benefits to accelerating these projects. Firstly, these projects improve the operational efficiency of the underlying business. Secondly, transitioning to digital allows for more remote operations which reduces the number of crew offshore. Recently, Schlumberger reported that as much as 75% of their operations were being done remotely. For those remaining crew who are still needed offshore, having good Internet is really important for morale and welfare. All of this is driving the need for more connectivity offshore, even if it may seem counter intuitive in a market downturn.

FREE CASH FLOW & INVESTMENTS

GLOBAL EXPLORATION & PRODUCTION INVESTMENT BY SUPPLY SEGMENT VS BRENT OIL PRICE



*Capital investments only include organic spending on upstream operations
Source: Rystad Energy UCube

The VSAT networks that were commissioned in the "good old days" during the last upcycle are now technically outdated. When compared with the current generation of VSAT platforms, they are inefficient and have limited horsepower to provide new services. In many cases, they may not be able to support the data rate demands of today's digital world, with applications such as IOT generating high packet loads. Most importantly, these legacy VSAT networks are using more space segment than they should be, and that is inflating bandwidth OpEx costs, which eat into precious operating budgets.

With the focus on controlling CapEx, this is often overlooked, and many operators are unaware that their networks are wasting precious resources.

All of this leaves operators in a seemingly no-win situation. If you replace those legacy networks, then you have a CapEx issue, but if you don't replace them, then you have an even bigger OpEx issue.

How can you improve operational efficiency without incurring major CapEx?

Efficiency is the Answer

Many of our customers are finding the answer through the efficiency of Comtech's Single Carrier Per Channel (SCPC) technologies. The superior efficiency reduces satellite bandwidth and costs, giving much needed OpEx relief. The high horsepower provides support for demanding applications, including IOT, with its high packets-per-second loads.

There is no expensive hub, which minimizes upfront costs. Providers are moving their largest sites off legacy Time-Division Multiple Access (TDMA) networks onto more efficient SCPC technologies. The resulting bandwidth – and OpEx – savings provides them with the resources to fund the upgrade of additional sites.

Brazil Case Study

One of our customers in Brazil has benefited from this strategy. There was a need to significantly upgrade the connectivity offshore to expand the network to meet new national regulations for crew Internet. The legacy TDMA platform was inefficient and cost prohibitive to expand.

Migrating sites to Comtech SCPC improved the spectral efficiency by a massive 440%. This allowed the customer to increase the data rate of the link with the same antenna and amplifier while simultaneously decreasing the bandwidth and monthly space segment costs.

The service provider conducted side-by-side tests over the air to compare spectral efficiency, a measure of how much data is carried in a fixed amount of satellite bandwidth, of their existing TDMA platform and Comtech's high-performance SCPC modems. Testing demonstrated they were able to more than quadruple the link efficiency (from 1.75 bits/Hz to 7.7 bits/Hz) without having to change any of the stabilized antennas or amplifiers offshore, while improving link availability significantly.

The original TDMA platform was limited in both the forward and return directions so it was unable to take full advantage of the powerful Ku-band satellite. Not only was the Comtech solution able to achieve 32APSK in both directions, it was also able to use Doubletalk® Carrier-in-Carrier® to further reduce the required bandwidth.

Achieving 32APSK under a clear sky also significantly improves the link reliability since ACM maintains signal lock from 32APSK down to Quadrature Phase Shift Keying (QPSK), resulting in 12 dB of rain margin compared with only 4 dB for the original TDMA system.

Using the existing 1.5m stabilized antenna and Block Upconverter (BUC), they were able to upgrade the link to 25 Mbps duplex over Ku band with a link availability of 99.7% a year, even considering the region's notoriously challenging tropical storms.

The cost to upgrade the link was recovered with the savings in satellite bandwidth, including the modem hardware, spares and installation. The monthly OpEx savings was used to fund the upgrade of the next largest site, which was 18.5 Mbps duplex. This process was replicated and applied to the remainder of the network, which included nine Floating Production Storage and Offloading (FPSO) vessels.

A network operator can easily examine the performance of the existing network and identify sites with high traffic and/or lower oversubscription rates, which are the best candidates for moving to SCPC. In the case of the Brazil network, all the sites met the criteria and the entire network of nine FPSOs was migrated to SCPC.

	LEGACY TDMA	COMTECH SCPC
Modulation	16APSK/QPSK	32APSK
Carrier-in-Carrier	No	Yes
Spectral Efficiency	1.75	7.77
Data Rate	25/25 Mbps	25/25 Mbps
Bandwidth	28.6	6.5
Months to Payback Hardware	2 months	
Rain Margin	4 dB	12 dB

Efficiency is in our DNA

Our optimized coding and higher order modulation takes full advantage of powerful satellites and our Doubletalk Carrier-in-Carrier technology minimizes occupied bandwidth, making Comtech the partner of choice in the offshore oil and gas industry because it is so efficient for small networks.

VersaFEC®-2

Our unique VersaFEC-2 modulation and encoding uses a high-performance Low-Density Parity Check (LDPC) Forward Error Correction (FEC) specifically designed to optimize performance at low and mid-tier symbol rates. VersaFEC-2 long-block provides performance with significantly lower delay and lower overhead. Both Constant Coding Modulation (CCM) and Adaptive Coding Modulation (ACM) operation are supported using only a 5% roll-off factor.

Best-in-class link optimization

The most efficient way to support data is not to send it at all. We're the leaders in WAN optimization with header compression, payload compression and protocol optimization for both Internet and mobile traffic, which minimizes bandwidth requirement and maximizes the value of traffic carried over the link

Doubletalk Carrier-in-Carrier

Our patented adaptive cancellation technology transmits and receives carriers of a duplex link to share the same transponder bandwidth. DoubleTalk Carrier-in-Carrier is complementary to all advances in modem technology, including advanced FEC and modulation techniques. As these technologies approach theoretical limits of power and bandwidth efficiencies, DoubleTalk Carrier-in-Carrier utilizing advanced signal processing techniques provides a new dimension in bandwidth efficiency.

True bi-directional ACM

People tend to think of ACM only when it rains but it's just as important that it maximizes the throughput under clear sky. Our approach optimizes every site all the time, so there is no wasted capacity.

Regulations play an important role in the energy sector and have a significant influence on network design. Compliance with government-mandated connectivity requirements can be difficult to prove in an oversubscribed TDMA environment, where capacity might not always be available depending on traffic demands from other sites. Dedicated SCPC links provide guaranteed bandwidth for these requirements; sophisticated Quality of Service (QoS) support allows service providers to support a mixture of traffic types and still meet Key Performance Indicators (KPIs) on traffic.

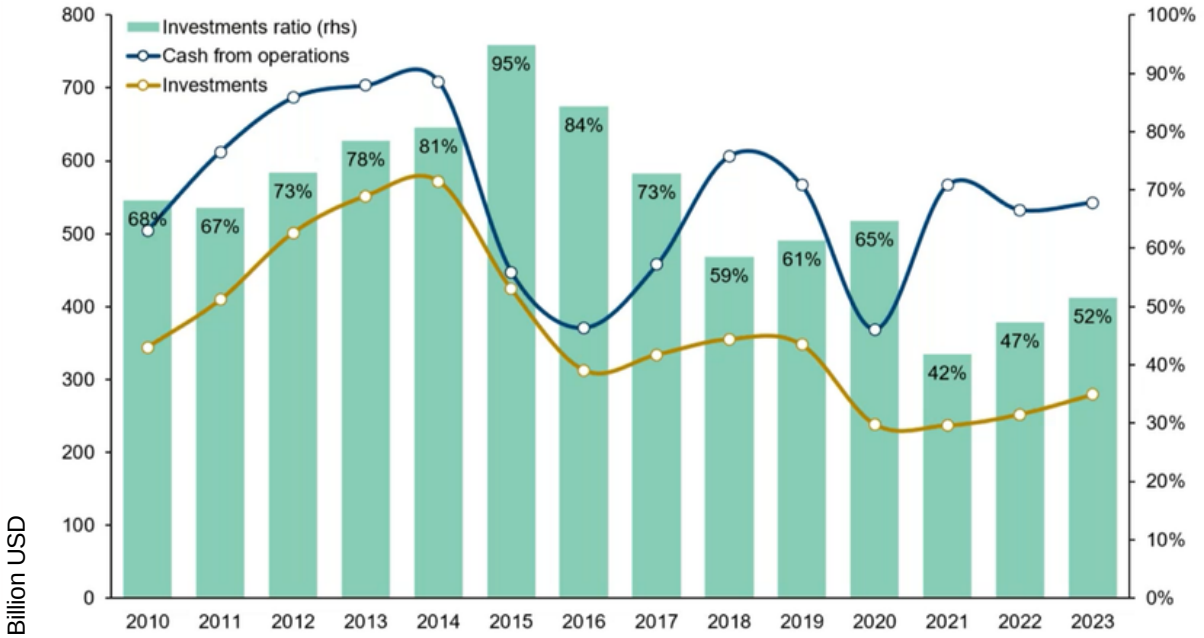
Preparing for Industry Recovery

Something that isn't very well known is that in 2021, cash flow for oil companies is predicted to be at record levels. This is because consumer demand has recovered significantly and the price of oil is in the $60s per barrel, but investment expenses for new exploration are down due to a significant number of deferred projects. This is depicted in the chart below, where there is a large gap starting in 2021, between the blue line with cash from operations and the yellow line with investment costs. The important thing to realize is that this cash flow is what will fund the next industry upcycle. Since projects have been delayed through two consecutive down cycles, there is now a significant pent-up need for new reserves, so the next upcycle is likely to be a big one.

It is important for operators who are navigating the current market complexities to also prepare for this next wave.

FREE CASH FLOW & INVESTMENTS

CASH FROM OPERATIONS, INVESTMENTS & INVESTMENT RATIO FOR PUBLIC EXPLORATION & PRODUCTION COMPANIES



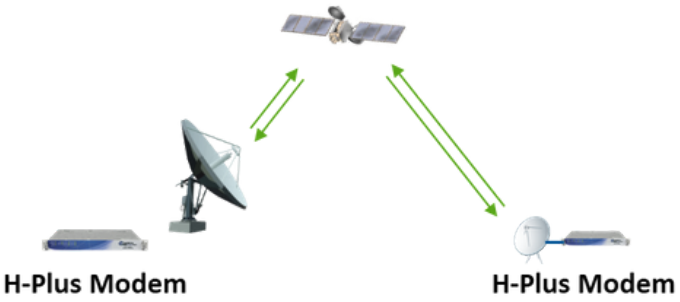
With cash flow from investing diverging from cash flow from operating, 2021 could become a record year for free cash flow.

*Capital investments only include organic spending on upstream operations
Source: Rystad Energy UCube

H-Plus Modem with Dual Mode Support

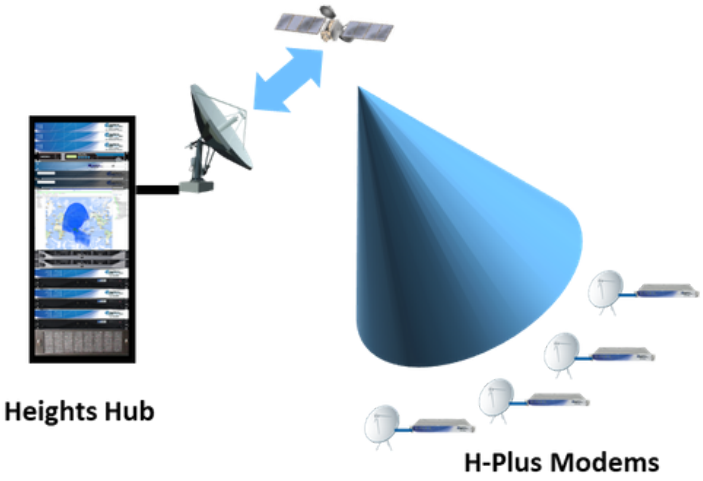
Our H-Plus modem provides a solution to the problem of preparing for the next upcycle while addressing the current cost-saving phase. The H-Plus modem supports both SCPC and Heights VSAT modes of operations. This allows operators to deploy a platform now as part the strategy of upgrading sites to SCPC, and allows those same modems to be reused as part of a Heights VSAT network when the network expands as part of the next upcycle. This investment strategy essentially doubles your viable product lifecycle return.

H-Plus Point-to-Point SCPC Mode



- Static SCPC TX and RX Carriers
- Supports Carrier-in-Carrier
- No Hub Needed

H-Plus Heights Network Mode



- Fully Managed Hub
- Shared Outbound
- Dynamic H-DNA Return Carriers

The Brazil case study showed the benefits of upgrading from legacy TDMA VSATs to Comtech's high-performance SCPC technologies. Comtech's dual mode H-Plus modem offers service providers tremendous flexibility. In point-to-point mode, the H-Plus modem offers the same functionality as Comtech's CDM-625A modem including high performance coding and Doubletalk® Carrier-in-Carrier® technologies and is even interoperable with CDM-625A modems. In addition, in Heights mode, the H-Plus can function as a remote modem as part of a managed point-to-multipoint Heights VSAT network, bringing the advantages of a shared Bandwidth-on-Demand network using Comtech's industry-leading H-DNA waveform.

Using the H-Plus modem, service providers are able to fully optimize the network by configuring sites to run with either high-efficiency point-to-point links using DoubleTalk Carrier-in-Carrier for high traffic sites, or configuring the site as part of a managed Heights network, allowing capacity to be efficiently shared by multiple sites with bursty traffic. As the network evolves, sites can be reconfigured from Heights to point-to-point mode and vice-versa, ensuring that expensive satellite resources are fully optimized. The H-Plus gives service providers the best of both worlds, enabling the most efficient use of satellite resources while minimizing the number of modem types that need to be supported.

Summary

There is no question that the oil and gas industry is facing challenging times, but as with all challenges there lie opportunities. For satellite service providers to navigate their way through these challenges, it is important to understand:

- Freezing CapEx budgets won't get you through the pandemic, and won't adequately support digital transformation projects
- Strategic investments in efficiency using Comtech's SCPC technology can support new digital applications while simultaneously reducing OpEx.
- The current industry high free cash flow will enable the next upcycle, so it is important to prepare now to avoid missing out.

Comtech's H-Plus modem with Dual Mode SCPC and Heights operation provides a cost-effective way for operators to modernize their networks today and prepare for a return to growth tomorrow.

Comtech EF Data is a leading provider of innovative and optimized satellite communications solutions. Our efficient and reliable ground equipment portfolio meets the unique demands of our mobile backhaul, government, mobility and enterprise customers on every continent, in 160+ countries and across every ocean.

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