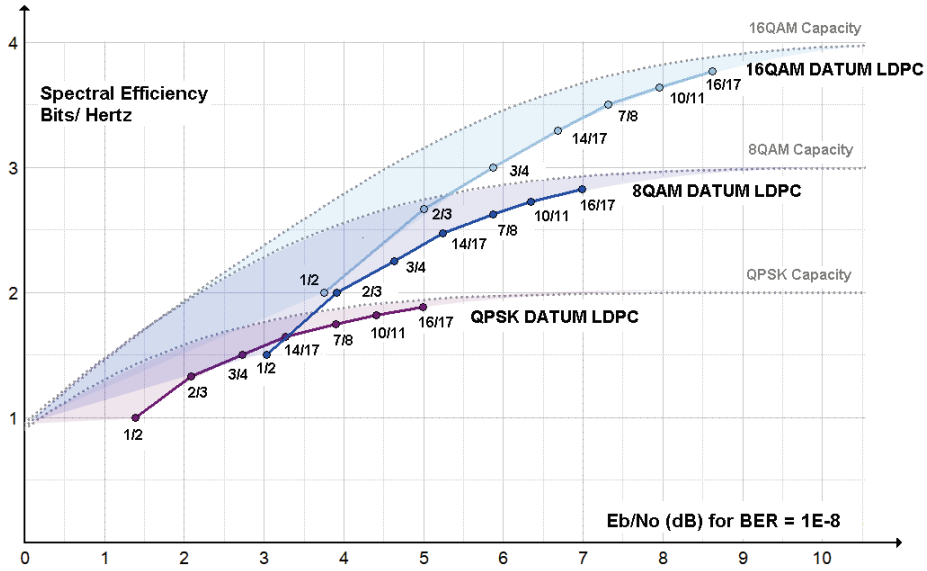
Lowering your Cost/Bit…Smart Choice for SCPC Efficiency and Flexibility

DATUM SYSTEMS

DATUM Systems has taken technology innovation to the next level with the introduction of Flexible LDPC coding. As demonstrated in optimization projects conducted by major service providers, DATUM's future-proof modem with granular LDPC coding provides industry's highest spectral efficiency and configuration flexibility.

DATUM Systems offers highly versatile and efficient SCPC modems, allowing service providers to optimize the utilization of expensive satellite spectrum resources. With a smoothly distributed configuration map, every single SCPC link using latest LDPC coding can be "personalized" to squeeze the most out of satellite's available bandwidth and spectral power, while keeping processing latency at the desired level.

Industry's Most Flexible and Efficient Advanced SCPC Modem.



Key advantages of DATUM's SCPC modems include:

LDPC FLEXIBILITY

Around 200 possible LDPC configuration combinations

Four Modulation Schemes:
BPSK/QPSK; 8PSK; 8QAM; 16QAM
Supports most possible satellite footprint and earth station equipment characteristics

Seven FEC Rates:
1/2; 2/3; 3/4; 14/17; 7/8; 10/11; 16/17
Granularity maximizes throughput, use of allocated satellite bandwidth and spectral power

Seven LDPC Block Size Options:
256; 512; 1K; 2K; 4K; 8K; 16K
Small-to-large block size distribution avoids fixed-block latency constraints and takes FEC processing latency to the exact desired level

- **Unmatched Configuration Flexibility:** In addition to supporting standard Viterbi, Reed Solomon and Turbo coding options, DATUM offers an unprecedented choice for advanced LDPC coding configurations. The multiplicity of modulation, FEC and LDPC block size options provides around 200 distinct "mod-cod-block" LDPC combinations for a very smooth and efficient spectral efficiency and optimal latency performance. Service providers thus can count on "Swiss army knife"- like utility to fine tune the link to the desired use of bandwidth, power and latency, or choosing to optimize available data throughput by managing trade-offs among these three design factors.

- **Efficient, Low OPEX Operation:** DATUM modems are engineered to provide superior spectral efficiency and high reliability /availability. When benchmarked against other SCPC modem manufacturers, DATUM has demonstrated to be the best performing SCPC modem in the Industry. High performance becomes synonymous to low operational expenses as DATUM allows links to closely match the limits of achievable channel capacity.

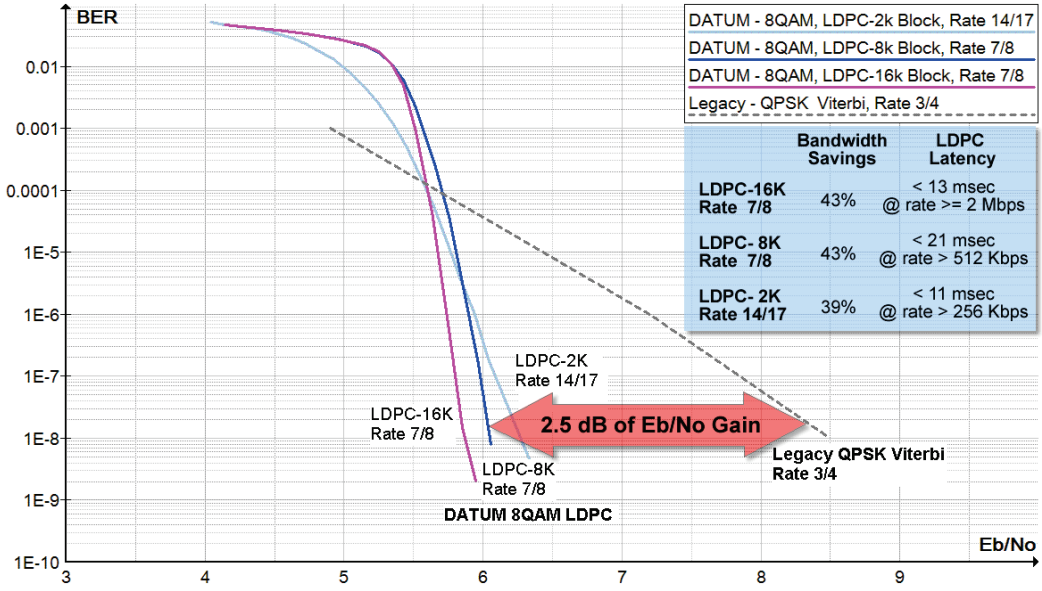
- **Low CAPEX, Future-Proof Modem:** Outstanding link performance does not prevent DATUM from simultaneously offering low CAPEX, reliable SCPC modems. DATUM modems are typically the low price winner in competitive bids because cost advantages derived from an efficient design are passed on to users. Moreover, with Flexible LDPC coding closely matching (within 0.5 dB) the maximum achievable capacity limits, DATUM modem purchases become future-proof, risk-free decisions.

Zero Incremental Cash Legacy Satcom Upgrades: No Risk, No Hassle…

DATUM's Flexible LDPC coding brings strong technical and economic advantages to satellite service providers. The low-OPEX, low-CAPEX combo directly translates into a high ROI and short payback cycle. Although most modem purchases are cash-based, the quantum leap in efficiency gain enables a variety of enhancing OPEX-for-CAPEX financing combinations including creative options for cash-constrained service providers; potentially enabling zero-cash, zero incremental OPEX upgrade projects.

Consider the example of legacy Viterbi Satcom networks. Legacy SCPC links such as those using standard QPSK modulation with Viterbi decoding can be efficiently replaced with DATUM's LDPC modems. An LDPC Eb/No gain of 2.5 dB (at BER 1E-8) allows the service provider to "jump" to a higher order modulation scheme and/or less robust FEC rate. As an example, when passing from QPSK Viterbi ¾ to 8QAM LDPC, bandwidth savings between 39% and 43% are achieved without an increase in carrier spectral power (same C/N), effectively freeing up satellite bandwidth and its associated spectral power. Vacated spectrum can then be reutilized for network growth, higher data throughput, or simply be returned to the satellite operator to lower operational costs.

The LDPC Coding Gain Brings Bandwidth Savings of up to 43% Without Increasing Carrier Spectral Power (same C/N)



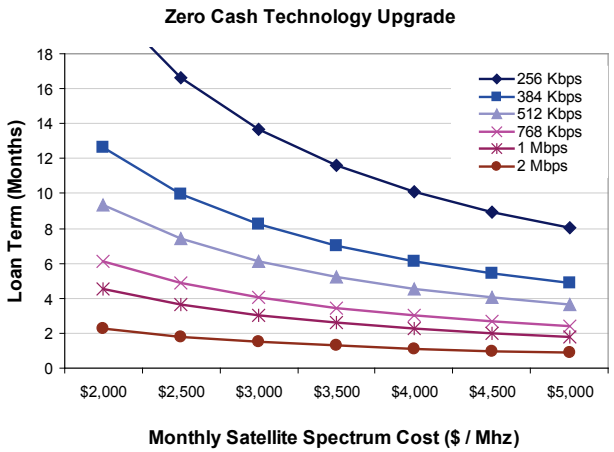
The LDPC block size can be configured to minimize processing latency for low-to-medium data rate scenarios. Thus, a 256 Kbps link can be configured with LDPC-2K block and FEC 14/17 to achieve processing latency of 11 msec, while a higher data rate link such as a 2 Mbps link can use 16K LDPC blocks with a processing latency below 13 msec. All shown coding options have equal C/N (real savings).

Even Cash-constrained Providers, Can Carry out Successful Replacement Strategies

Substantial LDPC-derived OPEX savings naturally lead to short payback cycles for cash modem purchases. However, with manufacturer and/or third-party financing, even cash-constrained providers can conduct successful replacement projects.

Next chart shows the minimum number of loan months required to pay off financed modem purchases using equal spectrum monthly savings (zero incremental monthly cash flow). As an example, with capacity costs at $3,500/Mhz; a two-modem purchase to replace a 256 Kbps symmetric link, financed at 10% annual interest rate, would require a 1 year loan and where the monthly loan payments would equal the satellite cost savings. Naturally, once the loan is completely paid, the service provider enjoys savings of 39% in recurring monthly costs in perpetuity, leading to clear positive NPV projects.

Likewise, an 8QAM, 8K block LDPC link operating at 512Kbps brings 43% bandwidth savings over QPSK Viterbi ¾ (and less than 12 msec of processing delay). This link would require a loan term of less than 6 months with monthly payments of the two-modem purchase loan to equal capacity savings.



Higher data rate replacements – naturally- lead to shorter payback cycles, given higher monthly savings: It would take between two and five months for a 1 Mbps modem replacement to pay back the investment, realizing monthly capacity savings of 43%.

Cash-constrained service providers can even lower their monthly cash outlays during the lease or loan term without any upfront cash, since longer loan terms can lead to an incremental cash-positive operating condition (at the expense of higher interest expenses).

DATUM Provides Advantages for Legacy Upgrades.

For providers wishing to conduct legacy replacement projects, it is important to point out that advanced DATUM modems bring a series of advantages over alternate technology upgrade options, such as shared (TDMA) satellite broadband systems or the use of IP-only SCPC modems. Such advantages include:

- **Symmetric High Data Rate Capability:** DATUM modems come with 5 Mbit/s rate as standard, with the ability to increase link data to up to 29 Mbit/s per link via software keys and upgrades.

- **Standard Serial Interface**: No need to redesign serial-based client networks since modems always provide a universal serial interface. Serial-based legacy modems (such as those using V.35 or HSSI) are replaced transparently. Legacy modems are replaced by advanced modems, providing exact same link functionality but using less spectrum.

- **Reuse of existing RF subsystems**: Thanks to the LDPC coding gain, bandwidth savings are achieved with no increment in carrier power, thus allowing the use of existing antenna and amplifier equipment.

Transparency and IP Enhancing Advantages over Alternate Technology Upgrade Options

- **Network Enhancements:** DATUM offers a number of enhancing options including the ability to replace multiple point-to-point links with consolidated point-to-multipoint systems, achieving outbound statistical multiplexing gains, higher download speeds and lower equipment cost (fewer modems).

- **IP Enhancements:** DATUM enhances IP links by supporting the use of an Ethernet interface that optimizes IP trunking links via TCP acceleration, HTTP pre-fetch, QoS prioritization and IP payload compression. These features lower link data rate requirements.

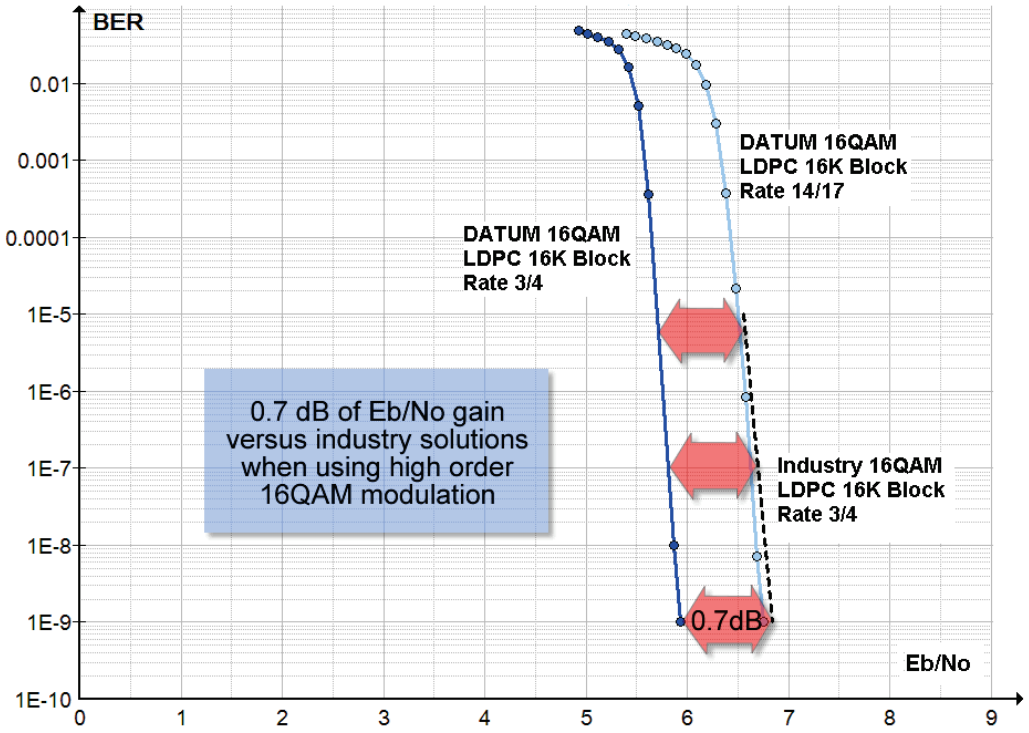
- **IP Transparency:** In addition to supporting IP routing, DATUM also offers the ability to use modem's Ethernet interfaces as bridging ports for IP layer transparency. End customer IP networks can thus propagate any IP routing protocol (e.g. OSPF. BGP) across the satellite link without intromission.

Tangible Benefits for New SCPC Networks.

DATUM Systems not only offers strong technical and economic incentives for legacy modem upgrades but also for new networks, with validated operational and capital savings against competing advanced coding alternatives.

The graph below illustrates DATUM's 16K block LDPC performance against typical industry performance. Thanks to DATUM's superior design, performance of a 16QAM LDPC-16K block FEC rate ¾ link can be achieved using a FEC rate of 14/17 on DATUM modems, without an increase in spectral power (equal C/N, equal BER), effectively bringing around 9% bandwidth savings over other advanced modems.

Industry's Best Performing 16QAM Modulation Results in 9% Additional Throughput



Never before in the history of SCPC has the efficiency leap reached so closely the theoretical efficiency limits. Datum's cost-efficient modem advantages, coupled with costly satellite capacity in most regions, provide an opportunity for small and large service providers to consider advanced SCPC technology for new network deployments and legacy SCPC upgrades.

With over 15 thousand modems shipped worldwide, DATUM SYSTEMS is proud to have had the opportunity to closely work with a number of leading service providers who are pleased with the quality of the DATUM SYSTEMS' modem and its industry-leading LDPC technology.

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DATUM SYSTEMS INC.
15 Great Oaks Blvd.
San Jose, CA 95119 U.S.A.
Telephone: (408) 365-9745
Fax: (408) 365-0471
Visit us at: www.DatumSystems.com