Financing the life cycle of new satellite systems

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The last few years have seen the funding of billions of dollars of new satellite systems. The ICO, Iridium and Globalstar systems have lead the way for bankers and investors to get more comfortable with the technical and regulatory risks involved in this type of financing. What do investors look for in space? What financial phases must a project pass through to reach fruition? What types of risks are involved and how can these risks be mitigated?

Types of risks

Market risks involve the likelihood that the anticipated target market will be available when the satellite system is operable. This risk involves interaction with the other risks, especially the technology available to competitors, the regulatory issues, and the continued (or emerging) need for the service to be provided. In the Mobile Satellite Services (MSS) we are still waiting to see how large is the need for the Iridium, Globalstar and ICO 'phones. The continued growth of a lower cost, but not as widespread, coverage (by cellular and PCS) must be considered a risk.

Schedule risks are particularly critical for satellites – they tend to be late. This could make them too late for market.

The regulatory risks extend beyond simply applying to national and international (ITU) authorities for licenses and registrations for the space segment. Gateways and individual terminals, including handsets, may need to be registered and conform to various standards.

Interconnections need to be authorized between satellite and some terrestrial carriers. The transferability of a license is important in case of a reorganization (merger, joint venture or repossession). So far, the US regulatory authority (the FCC) has never blocked a license transfer, but conditions can be attached, as may be the case in the COMSAT/Lockheed Martin transaction.

Technical risks are well recognized and can be reduced by proper testing and incentives. If there are problems, they may not increase costs as long as the contracts are fixed price. Problems anywhere, especially technical, generally result in schedule delays. We prefer cases where proven (in orbit) technology is used in new ways to create innovative services.

The financial risk can be approximated as the ratio of how much has been raised to the total requirements. The availability of guarantees and warrants from a prime sponsor often are critical to obtaining financing during the start-up stage.

The strategic risk can be reduced by strong vendor teaming and investments, but a strong key sponsor is needed.

The management risk can be reduced if the team has (or can be augmented with) proven talent that is experienced in the field and knows where the pitfalls may appear and how to work around them.

Country risks abound in international systems, simply because of the number of countries where things can go wrong. These involve political risks and the convertibility (and export) of earnings in each nation to the system operator.

Through the use of due diligence experts, these risks can be identified and risk mitigation techniques evolved. Once the risks have been determined, progress milestones can be identified and used to dole out funds. In some cases there are rewards and penalties associated with early and late dates.

The business plan

Venture capital and other sources of private equity are flooded with proposals and plans. Only a few survive scrutiny. The business plan needs to be honest and complete. Just saying 'this is the next Internet', there will be 'billions and billions of users', etc., doesn't work. We have seen business plans that have a constant (or exponential) growth rate from initiation of service to the death of the satellite(s). Some plans assume that a subscriber never dies, never fails to renew a subscription, etc. The financial part needs to have thought behind it and disclose the basis for its estimates and show what provisions have been made for the unexpected (delays, failures, etc.).

Most venture and private investors that might finance a start-up want internal rates of return between 30% and 45%. Their interest in the project is often short-term (five years or less). They demand high rates to compensate for ➡

All risks are important, but some are more critical than others

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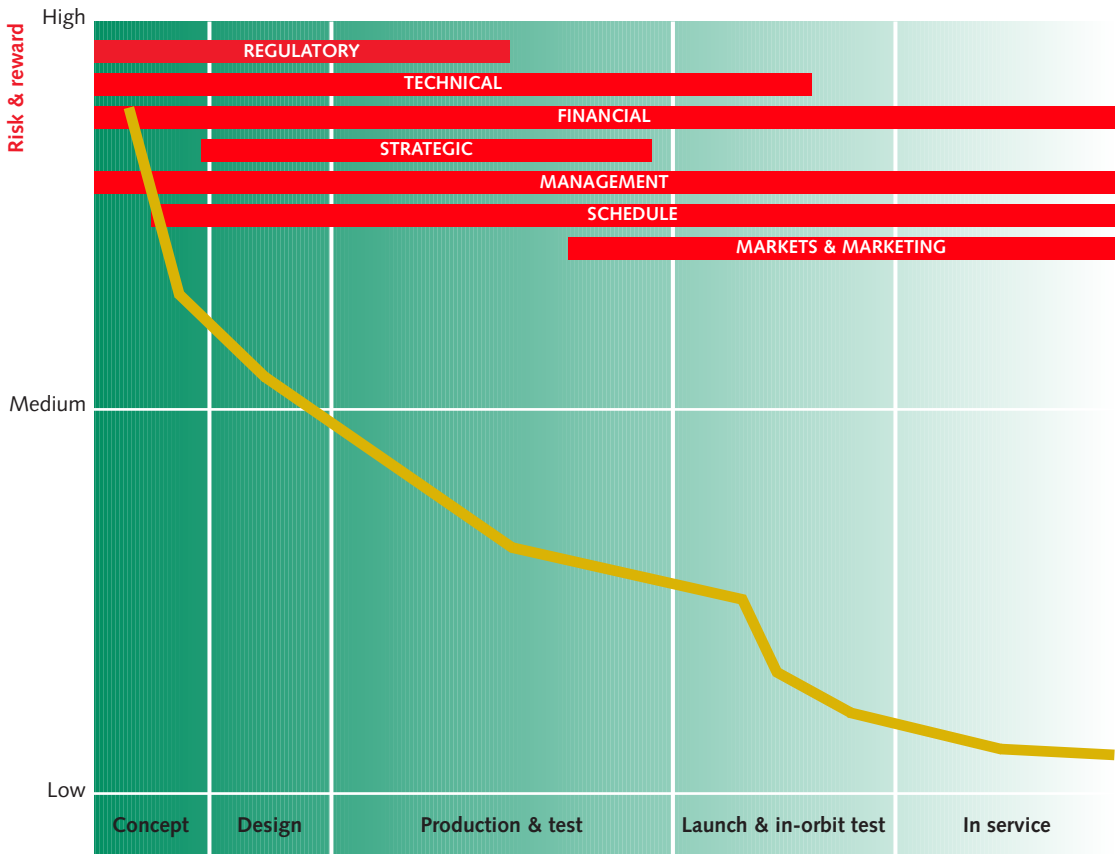
Fig 1 Risks, rewards and timing



Due diligence experts enable you to identify and mitigate risks

the high risks they must bear. Many of their investments may die; thus the good deals must compensate for the bad. Sponsors must be prepared to place their own fortunes at risk. Just having an idea is not enough in most cases.

A clear concept of the market is far better than claiming there are so many markets that any one will suffice. A niche market that can sustain the project and provide large returns is ideal – provided someone else doesn't get there first. It is rare that a niche is large enough for more than one player. If the plan is to invade an existing market, the management needs to be able to differentiate its service from the current providers. The market share needs to be identified – not just '10%' or 'only 1%'. If the market is new – who will be the customers? What is the value to them of this new offering?

Investors are generally interested in the big 'what if your plan fails and we are stuck with the satellite(s)?' What alternative uses could be made of the assets if the intended market fails to materialize?

Under construction

The Request for Proposals (RFP) for the spacecraft and other key components may request vendor financing. This is a form of back-loading the repayment or a conventional loan, lease, etc. Hardware is traded for a stake in the company. At least in theory, this should be an incentive to the builder to do a better job. It also is a demonstration of trust to the financial community. Since there still is a lot of risk, these are generally still sub-investment grade borrowings, and thus have a matching high yield.

The assurance of a space segment license (all the filings complete and a successful due diligence of the regulatory risks) may mark the entry of strategic equity.

If the sponsor is a public corporation with sufficient credit to permit at least partial

recourse, there may be an opportunity for an Initial Public Offering (IPO), as in the case of Globalstar and Iridium. In other cases the IPO must wait until after the launch of one or more successful satellites and the revenues start coming in.

Each of the steps described above is based on lowering the risks (see Table 1). As the risk is lowered, the cost of money drops and more sources become available. New, lower cost, money is used to pay off the earlier, more expensive loans. Variable rate bank financing (often tied to the LIBOR) and high yield bonds are retired and replaced with lower rate instruments.

Launch and in-orbit testing

Each launch is like the birth of a child – fraught with risk and unknowns. Fortunately the results are known quickly. This is the moment of truth in any satellite program. Insurance to cover the launch and subsequent years is widely available to cover these risks.

Most satellites have three life phases, not unlike people: infant mortalities, random failures and the wear-out of key parts. Within a month after launch, most infant mortalities are known. Wear-outs generally occur after the satellite has run out of fuel and been retired. In between there is a long useful time when random failures can occur.

Out of 206 FSS satellite transponders now serving the US, only three are classified as failed – and they were all infant mortalities – quite a record! In the US there have been two major full-satellite failures (Telstar 401 and Galaxy IV).

In most cases the completion of in-orbit testing marks the entry into this long and generally low risk era and the rates fall again with permanent bank financing and more stock offerings.

Due diligencies

The 1998 Flight to Quality brought on by the crises in Asia, Brazil and Russia means more attention is being given to the risk aspects. Due diligence investigations are used as a way to identify and reduce these risks. All due diligencies take time and can be costly, especially if space is just a sideline for the investigator. Even worse, a novice can be easily misled into ignoring key aspects. Not every problem can be detected, but many can be found and corrected before launch. Most of the risks can be detected by an experienced investigator who knows what questions to ask, and who can independently evaluate the answers.

Concerns

The regulatory area is changing rapidly and is becoming more complex. The ITU acts like a post office. It receives, publishes and distributes thousands of Advance Publication requests each year. These announce to the world that country X wishes to place a satellite at Y degrees East (or West) using certain frequencies. Later, a co-ordination request is published by the ITU with a full set of the parameters needed by operators of nearby satellites to determine if there is interference. Negotiations begin to eliminate or minimize interference between the satellites and their Earth stations. What happens if a nearby operator refuses to reach agreement with a competitor? What happens if the neighboring satellite is one of many (far beyond its anticipated needs) filed by nation Z? These are referred to as 'paper satellites'.

Investors should be beware of the system that makes no attempt to co-ordinate or has been unable to reach a full co-ordination with a system that filed earlier and has date priority, even if they have no satellites.

The registration process can take a long time. The nation selected for registration is important. Filings through the US, for example, are subject to review by the government and all of your competitors. Any satellite that emerges from this process with a license is considered more valuable (and thus more worthy of finance) than from some small nations where there is no vetting process.

Supply versus demand for financing

In general, the supply of money has kept growing about as fast as the demand, but as 1998 demonstrated, the flow is not consistent and can dry up due to external factors. This does not mean that all projects ➡

New lower cost money is used to retire high interest rate bonds and loans

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Capable, experienced management is vital at all stages

will be funded. Probably only one-third have a chance and they must compete among themselves for money. Huge MSS projects have absorbed large amounts in 1997 to early 1999. In 1999 and 2000, the multibillion dollar Ka-band systems will come to the market for funding. Only the fittest will be funded.

Only two or three systems will ultimately survive in each major field as the result of mergers and dropouts. Most interestingly, the pioneers are generally not among the survivors – unless they are a monopoly like Intelsat or Inmarsat – and even their days are numbered. SBi

Phase	Concerns	Mitigation	Remaining risk
Concept	Validity and depth of plan	Independent reviews	High
Business plan	Truth & feasibility	Due diligences	High
RFP & key contracts for key items	Adequacy – is anything missing?	Bids may indicate what is/is not feasible. Real prices and schedules a manufacturer is willing to accept. Milestone payments	Medium – high
Regulatory & legal	Licensing, coverage & protection	Where is the system filed? How much vetting will take place? Milestone payments	Medium
Construction	Technical feasibility. Capabilities of the suppliers	Independent reviews using consultants	Medium
On-ground tests	Adequacy of the test program	Test witnessing & analyses by knowledge-able third parties	Medium
Launch	Reliability of the launcher	Reliability record of vehicle	Medium
In-orbit tests	Adequacy of the test program	Test witnessing & analyses by knowledge-able third parties	Medium
Entry into service	Adequacy of the market and marketing skills	Experienced personnel and availability of consumer equipment	Low-medium

Table 1 – Phases of a satellite project