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...that's where the money is.

Willie Sutton, Bank Robber the Hard Way

## 1. Executive Summary

### Mission

**Light can circle the Globe seven times a second. Why can't money?**

**CAT\$-i (cat's eye)** will cycle two months of World GDP in one second.

CAT\$-i is the working title for the **FSO GLOBAL** Free Space Optics Proposal, our challenge to undersea and overland fiber-optic cable networks and now compromised telephony. CAT\$-i will involve a global enterprise to provide FSO ground and space-based stations for a secure closed network between participating financial institutions.

*How it works:* Free Space Optics (FSO) refers to the transmission of modulated visible or infrared light through space (or the atmosphere) to achieve high-speed optical communications. As with fiber, FSO uses lasers to transmit data, but instead of enclosing the data stream in a light-speed impeding glass fiber, it is transmitted through space in a *carrier beam*, an uncontained light path. FSO works on the same basic principle as infrared television remote controls. Information transmitted on this closed optical network is not subject to skillful intrusion. Because there are no *repeaters* and no encryption or code signing delays, the carrier beam is distinctly faster than fiber.

Satellite Laser Ranging stations currently use our Fixed Shutter Dome (FSD), a practical and proven enclosure to hermetically seal the laser equipment in a clean-room environment. The expertise needed for CAT\$-i is broadly available, abundant, and eager to tackle the challenges.

*Host Cities:* Our prime focus is the global financial market where security is critical. Review of regional financial centers has discovered that, with the exception of the expanse of the Pacific, these money hubs are less than 6000 kilometers apart. Seven such regional centers are identified:

London, giving access from Iceland across the entire European Union, to  
New York, from Panama to Toronto, to  
Los Angeles, covering the West Coast from Anchorage to Mexico City, to  
Honolulu, isolated by ocean, to  
Tokyo, giving access to Korea and China, including Taiwan, to  
Singapore, covering Indochina, India, and the Archipelago, to  
Dubai, with access to the Emirates, Arabia, and developing markets in Africa.  
Each Host City can branch out to adjacent regions as demand expands. South America can link to New York, and Tokyo can link to Australia.

*Orbits:* With the typical 6000 kilometer distance between Host Cities, orbital mechanics was utilized to determine an orbital array that covers regional pairs of Host Cities simultaneously. Polar orbits were elected for coverage of northern and southern latitudes. Polar orbits are a fixed loop in space under which the Earth turns, exposing the entire surface to each satellite. This is the favored orbit for imaging satellites. Equatorial orbits do not cover the entire surface

of the Globe. Geosynchronous orbits are at such great altitude that access is costly and maintenance and upgrading is impossible.

*Altitude:* Low Earth Orbit extends from 200 to 2000 kilometers. This is an operational range for satellite placement and service. An 1800 kilometer orbit provides the needed range.

*Range:* Three orbits provides a 8000 kilometer range.

*Mirror Ships:* Satellite laser links have been demonstrated experimentally, and pose the primary cost challenge to CAT\$-i.

*Time:* Fewer high-altitude orbits offer more exposure time over each region. Mirror Ships move over the regional markets. With three orbits and 18 Mirror Ships, exposure to each Mirror Ship is 24.3 minutes before the upcoming Mirror Ship is acquired.

*Cost:* The driving cost of FSO Global is orbital access. Altitude costs \$100,000 per kilometer for each Mirror Ship.

*Constraints:* FSO has its limitations. Rain, snow and hail, along with smog, can slow the system. Multi-wavelength lasers will deal with atmospheric conditions, but direct exposure to extreme elements can damage the laser lenses. In such conditions the Oculus will rotate under the fixed shutter to protect the lens. Transmission ceases.

CAT\$-i couples the speed of light to the speed of money, while undersea cable, our direct competitor, slows your money both in the fiber, and in the many repeaters needed to amplify the carrier beam as it meets resistance in the glass. Undersea cable has other limitations too; anchors, trawls, seismicity, submersibles, and outright piracy pose no threat to CAT\$-i. Flippers and clippers can cut the cable at Suez.

## Objectives

The objective of this business plan is to validate the proposal in one market. Our Host Cities of choice are London and New York. We will then develop an FSD/FSO and satellite interface for secure transmission of FSO to financial institutions in five global markets. The FSD has proven effective in protecting large laser telescopes for institutional and defense applications. The two-moving-part FSD is able to be serviced in place. The satellite fleet (Mirror Ships) is numerous but light, serviceable, expandable, and upgradeable.

## 1.1 Company Summary

FSO GLOBAL is an outgrowth of MONOPTEC Corporation, which is being dissolved after 23 years. MONOPTEC was founded in 1989 in California and reorganized in 2009 as an S-Corporation in Nevada, to represent US Patent 4,840,458 for the FSD. The FSD is an enabling technology in laser and telescope enclosures and satellite laser ranging (SLR) for astronomy, defense, and laser communications. FSO GLOBAL licensed FSDs to the CRL in Tokyo for seismic early warning and to the Canberra Observatory at Mount Stromlo in Australia for satellite laser ranging.

MONOPTEC is currently closing out The Dual Telescope Project, part of the Boeing Innovative Research and Optical Site Support program for the US Air Force at Starfire Optical Range in New Mexico. Two 7.2-meter FSDs have been installed to house 1-meter laser telescopes. Our experience and access to experts in astronomy, aerospace, and defense will be brought to bear on design and production issues at FSO GLOBAL as they arise. We continue to seek out and solve applications for education and science.

### FSO GLOBAL Ownership

FSO GLOBAL will be a C Corporation registered in California.

Manufacturing will take place in the United States, Brazil, Canada, Western Europe, India and China. For this reason, the FSO GLOBAL engineering office is well placed in the Bay Area.

FSO GLOBAL will manage the overall CAT\$-i project under the President.

- A. Operations
  - a. Scheduling
  - b. Estimating
  - c. Contracts
  - d. Value Engineering
  - e. Testing
- B. Design
  - a. Theory
  - b. Specifications
  - c. Integration
- C. Management
  - a. Finance
  - b. Strategic Partnerships
  - c. Market Expansion
  - d. Contract Management

## 2.0 Products and Services

### Products

The FSD is an evolutionary approach to enclosure design which brings maximum security and flexibility to technology for observatory, interferometer, satellite laser ranging, and FSO projects. In addition to protection from high winds, rain, sand, snow and ice, the FSD has the ability to fit an optical window into the sphere, an option not open to conventional slotted or clamshell domes. This makes the FSD ideal for FSO applications.

MONOPTEC projects are situated in Japan, Australia, and the United States. The 7.2-meter FSD is in production and available for \$1,450,000. The CAT*\$-i* FSO will be a new smaller product. FSO GLOBAL will provide the FSD ground stations, and a subcontractor will provide the Mirror Ship satellites. Launch services will be bid, as there are now multiple launch opportunities for the Mirror Ships.

The Mirror Ships will provide the communications links between FSD ground-stations. Orbiting in separate time zones, Mirror Ships are large truss structures below which are hung Mirror Cells that receive the Carrier Beam from the sending FSD and beam it down to the receiving FSD.

CAT*\$-i* will evolve over time into smaller and ever faster hardware. As pointing and drive accuracy improve with machine technology, the orbiting Mirror Ships will be refit with smaller and more numerous Mirror Cells to respond to ever-increasing demand.

Ultimately CAT*\$-i* FSDs will be replaced with static "glass" spheres with diamond hard drives glowing with information for another generation. A quantum internet has been proposed, for which FSO is the secure choice for connectivity.

### Services

Services include consulting on enclosure design and specialized applications for the FSD patent, such as satellite laser ranging and FSO.

### 3.0 Market Analysis Summary

Skillful intrusion (hacking) is persistent and evolutionary. Whether state-sponsored, syndicated, or individual, all are determined to seize your assets. A trusted and then unemployed programmer is the next recruit. A screwdriver gives access to fiber pathways. An iPad sees everything. And it will never stop! The cybercrime economy is growing daily.

Financial institutions are chary to discuss their security methods or their failures. The Focus Group protocol for security directors and their financial partners will determine whether or not they would subscribe to CAT\$i. The subscription rate will also be determined by the reviewers. The conclusion of the Focus Groups will be a Go/No Go decision to proceed to *beta* test assembly.

Hackers target and CAT\$i focuses on large banks and brokerages in the World's major banking centers. Economies of scale in financial intermediation and spatial configurations of activities give these institutions the clout necessary to prevail in their catchment area, and to exchange organizational presence in others.

We expect major institutions to maintain constant contact with both regional and distant centers. Thus London would serve as the hub for the Euro Zone and maintain organizational presence in other time zones. This would mean an FSD ground station in New York, London, Frankfurt and Dubai at a minimum for a single bank in London. Mirror Ships orbiting in separate time zones are the critical nodes of this money web. Corporate internal security is maintained in this closed system, as the data circuitry does not leave the headquarters where it is monitored by seasoned security hands.

#### Market Segmentation

Ten major banks in each Host City are our prime subjects for market exploration.

- North America, from New York and Anchorage, including Central and South America,
- Asia, from Singapore and Tokyo, including China and Australia,
- The Middle East, from Dubai, and including South Africa,
- Europe, from London, and throughout the Euro Zone and Switzerland.

Mutual forbearance notwithstanding, every financial institution will need to be linked or miss the financial times.

#### Target Market Segment Strategy

The London - New York *beta* test market has the advantage of language. Every action can be tested against submarine communications cable to confirm accuracy most immediately in English. As the language of technology, English will be supported by the sharpest people from all corners of the planet, leading to agile teams, fewer mistakes, and quicker solutions. The metric system will prevail in all calculations.

## 4.0 Strategy and Implementation Summary

The prime focus of the CAT\$-i proposal is the financial market place. Crafting focus groups in the financial sector will provide the strongest funding source for the very real costs of implementation worldwide. *Beta* testing will forge the link with the financial interests of the institutions daring to be first.

Future applications will extend to common markets in diverse regions such as Indo-China, private investors, corporations, and smaller governments. One can see CAT\$-i ultimately working to beam entertainment to every venue on the planet. World news will be truly instantaneous.

### SWOT Analysis

**Strengths:** MONOPTEC's long experience with strategic partnerships has polished our capacity to expand CAT\$-i development across the geopolitical and financial spectrum. We know how to identify good companies and people who love to work on cutting edge questions for which solutions are not immediately obvious. Invention is the name of the game. Driving companies and people ahead of their expectations is our strength.

**Weaknesses:** As an intellectual property enterprise, MONOPTEC's basic business support has been left to service industries. The establishment of FSO GLOBAL with our own staff of experts under the President will add depth to leadership.

**Opportunities:** Money needs to meet time. CAT\$-i gives a financial institution three advantages;

**First:** Instantaneous data flow; Instantaneous and enormous bandwidth is on the cusp of application. Femtosecond Pulse Modulation (a quadrillionth of a second) and, a bit further in the future, attosecond pulses will allow information to slip through time itself.

**Second:** Independence from open network overloads and interruptions; Carrier Beam capacity is constantly improving to the point that machine speed will be the determinant. Quantum computers are projected within four years, the CAT\$-i timeline.

**Third:** Absolute privacy; Free Space Optics will elude every effort to intercept its contained information. The Carrier Beam is never in the same place.

**Threats:** Time and crisis.

**First:** Competitors will arise as the need for more bandwidth and security drives financial institutions towards this daring solution. Defense systems are very close to instant communications technology. Defense contractors may stumble upon the commercial applications at any time.

**Second:** Only experienced investors can stomach the risk of a rocket launch component to a network. Time of delivery, not insured cost, is the risk.

## 4.1 Competitive Edge

FSO GLOBAL can turn on a dime. As a catalyst for the CAT\$-i FSO Project, we have the neural network to control design, production, and implementation of all components as they evolve. Our leadership role is to keep the project moving. Thirty years of experience has honed that skill.

### Security

Search <hack bank> and weep. Every day new failures in security are revealed, including the recent breach at Scotland Yard. Attila the Hun posed no greater threat to Europe than the hordes of hackers in all categories of wireless communication do today. FSO GLOBAL has the vision to assemble a strategic partnership of diverse manufacturers and suppliers of very unique services to place a secure FSO global network in place in four years.

### Bandwidth-Spectrum

Time and vision is the competitive edge in network communications. Financial institutions just cannot wait to discover if bandwidth and spectrum have limits in science or technology. Demand will test both at an exponential rate. FSO GLOBAL has chosen to leap ahead of this real or imagined dark moment in the history of electromagnetism and cable infrastructure. Variable optical wavelengths avoid this all together.

At this time no other non-governmental enterprise is attempting as extensive a plan to create low-latency secure communications for a worldwide financial network. CAT\$-i can be upgraded to quantum transmission rates without changing the Carrier Beam system. As pulse modulation reaches quantum speeds, also the goal of major computer manufacturers, CAT\$-i simply changes laser modules in the FSD ground stations. No changes are required at the Mirror Ships.

### Property Values

CAT\$-i requires multiple but well understood launches that may be bid across nations, now including China and India. The Mirror Ships are straightforward satellite platforms. There is nothing unique to the Mirror Cells; just very many of them.

Extra-terrestrial real estate is only now coming into focus. Demand is high for Geosynchronous (GEO) equatorial stations by the over-subscribed wireless networks. Huge and very expensive satellites transmit radio waves to be intercepted by anyone. Mirror Ships roaring silently through polar orbits will sweep tens of thousands of square kilometers of real space every two hours. Competitors will be crowded out of the most economical orbits.

*FSO GLOBAL has the time and vision to see opportunity across the full spectrum of creative people and cutting-edge components to execute CAT\$-i.*

## 4.2 Marketing Strategy

The *beta* test will link a London-New York banking enterprise. Holding the leading banking institutions in the world, establishing a successful link between any two such banks will garner the plaudits necessary to demonstrate the femtosecond advantage of the **FSO GLOBAL CAT\$-i** closed system. We expect that speeds will well exceed the 125,000,000,000 bytes per second of SEA-ME-WE-4 submarine communications cable, and even exceed the 4,976,625,000 bytes per second of OC-768 SONET data channel. We intend to exceed computer interface speeds of 12,000,000,000 bytes per second. With the success of the **CAT\$-i beta** tests, our Focus Group exercise will discover exactly how financial institutions will use the service. Their needs may be as imaginative as our inventive solutions.

The target market is made up of leading financial institutions, in particular large brokerage houses involved in High Frequency Trading, and major banks involved in international finance. Money never sleeps, and it can't catnap with **CAT\$-i**.

Security of data is the key feature of FSO. The Carrier Beam cannot be intercepted as with splitters on fiber networks. Encryption, Code Signing, or SSL Certificates are not required, eliminating translation time in the femtosecond world. Nothing will interrupt the machine speed transmission of data worldwide. The absolute privacy of transactions will lend trust to lenders.

Major players will need more than one FSD ground station to maintain global contact. Each FSD will require a subscription to the Mirror Ships to reach multiple locations. After sales of the ground stations, subscriptions to the Mirror Ships will be the long-term profit generator.

### 4.3 Sales Strategy

Pricing is subject to the perceived demand generated by a brisk marketing campaign starting at the focus group stage. There are two components to **FSO GLOBAL CAT\$-i** sales:

*First:* Ground Stations consist of the FSD transceiver at the buyer's sites. The anticipated sales price for FSD ground stations is \$200,000, a good car. We expect 500 units of first year demand in the US alone. Worldwide first-year demand is anticipated to be 1,500 more. Total sales will be at least \$300,000,000 the first year.

*Second:* Subscription Fees will provide access to the orbiting Mirror Ships necessary for FSO links. Subscription fees are based upon positioning multiple Mirror Ships in polar orbits. Service contracts are projected to be \$75,000 per month for a single Mirror Cell. Each Mirror Cell pairs with two FSDs, generating \$900,000,000 in subscriptions the first year.

#### 4.4 Milestones

The attached CAT\$-i Critical Path Schedule details each step of the Milestone process.

The attached Orbital Mechanics and Cost graphs shows the potential balance between overall **Cost**, maximum **Range** between ground stations, the duration of contact **Time** with a single Mirror Ship at maximum range, and number of **Orbits**, each with as many Mirror Ships as the orbit count.

The Starting Date is October 2012.

The Feasibility Phase will be initiated with Placement 1 of \$500,000.

Placement 2 will cover the Full-scale Development Phase with \$40,000,000. The first **GO/NO GO** decision follows this Phase.

The *beta* testing Application Phase is in Placement 3 with \$20,000,000 for all of the design and fabrication of components for two FSD ground stations and one Mirror Cell.

*The beta* Testing Phase is covered in Placement 4 with \$15,000,000, based upon launch costs. The *beta* Mirror Cell will be tested on an equatorial orbiting satellite such as the International Space Station, lifted as part of a load on a Proton rocket.

#### Go-Ahead

The Placement Phase is a seventeen-billion dollar proposition over the following twenty-four months.

#### Break-Even

The break-even point between costs and sales and subscriptions for FSD ground stations and Mirror Cells is October 2018.

## 5.0 Management Summary

FSO GLOBAL will remain a small company with inventive solutions to large opportunities.

The founder and inventor of the Fixed Shutter Dome, Ethan W. Clifton, has drawn together a strategic partnership that has provided the FSD to government agencies of Japan and Australia, and to the US Air Force.

The strategic partnerships for the CAT\$-I Proposal are being drawn together from our known resources in composite construction and fabrication, and new partners drawn from our review of experts in Free Space Optics and other critical industries.

FSO GLOBAL needs to acquire the fundamental elements of business from personnel to finance to execute CAT\$-i. The current economic environment makes capture of the required skills much more likely and timely. Our Bay Area facility brings qualified people close. They need to be identified and retained for the development period.

Upon Startup, FSO GLOBAL will vet individual experts in lasers, telemetry, mirrors, space structures, rocketry, and the interstitial knowledge from academic areas where the forefront of technology is found. This source will eliminate conflicts of interest when contractors are selected.

### Personnel Plan

FSO GLOBAL intends to remain small by fitting the best people to very specific tasks and not lingering on the results. Turnover will be high as each task on the schedule is solved. This is particularly advantageous to the academics serving in the principal research categories.

To date, CAT\$-i team members include a nuclear physicist and a former Pentagon program manager. We are working with our aerospace collaborators to select the best qualified orbital mechanics team for satellite programming.

The Design Phase will conclude. There will be no legacy systems to support over time. The handoff to the engineering teams will be precise. Teams of contractors, both negotiated and bid, will then execute the design and deliver CAT\$-i to the marketplace under the supervision of our contract managers.

**Get out in front and stay there.**

Frank Tomsick, Skipper *Juggernaut*

**6.0 Financial Plan****CAT\$-i is a racing assumption**

The laser communications industry is made up of highly competitive smaller units, often supported by defense contracts. Once selected for CAT\$-i, a large number of these smaller entities will be contractually and realistically limited to providing only to CAT\$-i.

Launch capacity will grow to meet the demand of Mirror Ship placement and maintenance. We expect to absorb every launch site on the Planet for at least a year.

A competitor would need to capture other suppliers, key in equal financial energy, develop new launch capacity, and still be well behind on delivery.

Time is of the essence.

**Duration**

The feasibility phase of the CAT\$-i Proposal requires twenty-four months of research and prototyping, ending in a full scale *beta* test of a pair of ground stations, one at New York and one at London, and one space-based Mirror Cell.

Upon Notice to Proceed, the manufacture of FSD ground stations and Mirror Ships will require another twenty-four month period to produce the initial 4,000 FSDs and to build, launch and position the Mirror Ships in multiple orbits.