THE YEAR 2000 TITAN

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Recently a teacher, a garbage collector, and a lawyer wound up together at the Pearly Gates. St. Peter informed them that in order to get into Heaven, they would each have to answer one question.

St. Peter addressed the teacher and asked, "What was the name of the ship that crashed into the iceberg? They just made a movie about it."

The teacher answered quickly, "That would be the Titanic." St. Peter let him through the gate.

St. Peter turned to the garbage man and, figuring Heaven didn't really need all the odors that this guy would bring with him, decided to make the question a little harder: "How many people died on the ship?"

Fortunately for him, the trash man had just seen the movie. "1,523," he answered.

"That's right! You may enter."

St. Peter turned to the lawyer. "Name them."

(Author Unknown)

Because of the blockbuster movie, much is being said about the ill-fated inaugural voyage of the Titanic, which sank in the North Atlantic in 1912. Here we had the technological marvel of its age, the largest, most luxurious ship built up to that time --the "unsinkable" Titanic. Still, on the night of April 14, 1912, the Titanic struck an iceberg and sank in the unforgiving and icy waters of the North Atlantic claiming 1,523 of her passengers. The ship traveled with a mere 20 lifeboats. The 20th century was still new, and yet there was an unreasonable, almost unquestioned acceptance of new technology and its ability to make life easier and better.

JUST HOW "UNSINKABLE" WAS THE TITANIC?

Going beyond the Titanic's hype, we know that some ships built even fifty years earlier were, in fact, much stronger and more "unsinkable." Ships such as the *Great Eastern*, a mammoth liner, had a double-hull, higher bulkheads, two longitudinal as well as 15 latitudinal bulkheads, which together made as many as 45-50 watertight compartments; furthermore, these bulkheads had no doors in them.

The Titanic on the other hand, had only a single-hull, so there would be more space available for the 1st class passenger amenities. There were only latitudinal watertight bulkheads, 15 in all for the entire ship (yielding 16 compartments). The bulkhead tops were comparatively lower then Great Eastern's. There were also doors in many of these bulkheads, to allow waiters and valets quicker access to their charges. (It is important to note that many of these doors were opened as the ship was sinking, in order to allow the pumps to work, but also allowing even more water in as a result).

What is most interesting about the Titanic are the lessons learned from this tragedy, and how these can help us to better prepare us for the Year 2000 Computer Crises. The catastrophe of the Titanic was not so much in its sinking, as it was in the loss of well over 1,500 innocent lives.

OBJECTIVES

I believe the catastrophe could have been avoided at three different times:

- Before the ship struck the iceberg
- After the ship struck the iceberg, but was still afloat
- After the ship sank

Like the Titanic, the year 2000 crisis also has three different points in time of avoidance or minimization of catastrophic results:

- ✓ now (i.e., before the first waves of Year 2000 failures occur);
- ✓ on the date of 1/1/2000, and
- ✓ during the 18-24 months after that date.

During each of these timeframes, it is possible to minimize the potential disastrous impact of y2k on your organizations and our lives; it is important to realize that the damage will be worse the longer you wait.

In this article, I hope to allow you and me to peer into the terrible, yet avoidable circumstances and mistakes, that caused the Titanic cataclysm, so that you may better navigate similar icebergs on your own Year 2000 horizon – and steer clear. I will attempt to ferret out the hype and myth from the reality surrounding these calamities. Lastly, I will present a series of "icebergs" that your "Corporate Year 2000 Ship" must *skipper* in order to weather the Year 2000 storm. I believe that while most of the iceberg lies hidden underwater, and big chunks of "ice" may fall in your path at any time, knowing where the potential dangers lie and what you can do about it should help you better steer your course, stay afloat, and allow you to reach your destination.

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BEFORE THE CRASH

Before the Titanic ever struck the iceberg, it had received a total of seven iceberg warnings from other ships' wires. These warnings (all coming within twenty-four hours of the event), indicated that the Titanic's particular route posed abnormally high risks, due to an exceptionally cold winter and the presence of atypical ice flows. The last warning, was not even delivered to the ship's captain so he wouldn't be disturbed while entertaining passengers. These risks were ignored and not managed.

So too, many executives and even CIOs have ignored the press and consistent warnings of impending doom from industry pundits, experts, television, magazines, radio, video tapes, conferences, newspapers, my son's Junior High school newspaper — almost everywhere. In 1998, some of the early failures have become popularized and related to false expirations of loans, magazine subscriptions, credit cards, etc.

However, most companies still do not believe that this crisis will affect them, or are otherwise paralyzed from moving. Numerous respectable surveys show that less than 15% of all companies in the United States are beyond the awareness and planning phases! It is simply too late to first become aware and plan for Y2k in mid-1998. The only hope (the only possible "silver bullet") will be contingency plans that will allow companies to "muddle-through" in the year 2000 and 2001, while they get the rest of their "act" together. There are still some who claim that it is a "non-event", meant to create work for consultants and lawyers. Unbelievably, there are others who are convinced Bill Gates will not let the industry sink and that he will provide the silver bullet at the last moment.

A psychological attitude of massiveness, safety, and pleasure in the day's activities pervaded the Titanic and its passengers. No real thought was ever given to the possibility of tragedy or other common maritime calamity.

Many, if not most, company executives today still believe "It cannot happen to us", or "how hard can it be?" The mix of "unsinkability" still is alive within such companies. They believe computers have always worked even though they frequently had some problems. Staff or consultants, have always been able to address those problems, even in production. This denial of the reality and immensity of the year 2000 problem—and its ability to impact <u>all</u> systems, PC's, embedded chips, telecommunications, infrastructure, etc., is simply denied.

No boat drills ever took place on the Titanic that would have allowed the passengers and crew to practice the procedures to follow in the event of a crash or need to evacuate.

Likewise, virtually no companies as of today have a fully documented, tested, and communicated contingency plan that outlines the steps, procedures, logistic, systems, and people necessary to keep the company going in the event that mission critical systems are severely impacted or are not Year 2000 compliant in time.

Trying to decide if a ship is sinking is clearly not the best time to strategize and execute a plan! The Titanic carried only 20 lifeboats (including four smaller inflatable lifeboats).

These lifeboats, even if fully loaded, couldn't hold 50% of the passengers. That's NOT a contingency plan! However if the ship is "unsinkable," why worry?

You worry because with so much at stake, it is critical to plan for the unexpected! Yet many companies today are afraid or unwilling to accept that the Year 2000 fix can, and in many cases, will require huge resources in dollars, outsourcing, facilities, tools, management, planning, doubling up staff to implement concurrent contingency plans and remediation efforts, public relations, etc. For instance, why are some more progressive banks and companies budgeting $250,000,000 to $500,000,000 while other similarly situated companies are budgeting only $20,000,000 to $40,000,000? Which group is heading for the Y2K iceberg?

The Titanic's crew was not privy to the evacuation/load performance test results before the ship was launched. These tests, performed months earlier, proved that the Titanic's lifeboats (based on the Titanic's mechanics, divots and lowering units) could be safely and fully loaded (60-65 persons) before lowering away. This becomes terribly important later when in fact the crew ordered several boats to lower away half loaded (or less), for fear that the boats might otherwise break off and crash into the sea.

Just how many test results, and systems and operations limitations are being communicated today to company users and operators of systems, so that they will fully appreciate the limits they can expect from their systems when Year 2000 comes?

A nearby ship, the Californian, within line of sight (approximately 16 miles away), actually tried to send a message to the Titanic to alert it, prior to the time it stuck the iceberg. Titanic's own wireless office, in a very atypical message, replied "Shut-up, shut-up" and wouldn't accept the message. The Titanic's operators were sending greetings from its passengers to the shore and did not want to be disturbed. The Californian's wireless operator then went to sleep, which was normal in the year 1912 (there was no requirement for a twenty-four hour wireless monitor). The Californian did not realize the Titanic was in trouble until several hours after the Titanic sank and the Carpathia was finishing retrieving survivors.

This parallel to the Year 200 crisis is striking. At first many CIO's clamored for Board support but many Boards would not or did not want to hear to hear bad news, high impact problems, and requests for crushing budgets. Now however boards are clamoring for more information about the Year 2000 icebergs but the CIOs, technologists, and consultants have yet to finish accurate and complete assessments. Who is asleep NOW?

AFLOAT AFTER THE CRASH

After the Titanic first struck the iceberg, she sank within a couple of hours. Frantic calls for help were responded to by many, but the nearest responding ship was almost five hours away. By then approximately 1500 passengers would freeze to death (not drown) in the North Atlantic waters waiting for rescue. Unfortunately the Californian was asleep at the wheel with an unattended radio and provided no help and saved no lives.

As of Mid-1998 over 50% of companies surveyed by prestigious pollsters and researchers including Andersen Consulting, Howard Rubin, Capers Jones, the Gartner Group and others have not even completed their assessment phase. Frantic calls for help to overworked consultants (who are unable to give guarantees in any event) have created backlogs of requests. The Big-6 Accounting/Consulting Firms announced in July 1998 that they are ALL getting out of the Year 2000 remediation business because of time constraints, staffing conflicts (one said Y2K "work is boring and provides no growth for its staff"), and potential litigation. In some industries such as entertainment, competitors are actually joining forces to help each other share systems solutions. Similarly, companies in the securities industry are also participating in cooperative efforts. Yet, in many cases even if you can get help, it will be too late to make the 1/1/2000 cut-off date. Thus contingency and degraded interim systems will have to be employed to keep the organization afloat and alive until the real remediation systems (the rescue ships) arrive.

The Titanic was unprepared for the disaster. Because of the lack of testing and communication, many passengers were at first instructed to go down to "B-deck" to board the lifeboats. After herding them down, the Captain realized that the boats must launch from A-deck because of recent glass paneling enclosures that were put in to keep passengers warmer. They all had to return to "A-deck" from where the lifeboats were actually launched – after losing precious time.

Many companies are still losing precious time trying to determine what the best tool or methodology is to launch their assessment and remediation efforts. These companies should just settle on one of the better tools in each category (scanners, parsers, capture playback tools, test bed and test suite tools, test data generators and comparators, etc.) and get started! Some start, then change, and then change again. No one vendor has the corner on the market. And no one tool will do it all. So start now and get the benefits that each can bring by automating some of the process NOW!

The belief of "unsinkability" proved to be a continuing problem on the Titanic as well. When the ship struck the iceberg, passengers exhibited no fear, sought no haste, and gave no importance to the incident -- still believing the ship "unsinkable." This false belief proved even deadlier as time went on, because passengers refused to board the lifeboats. They exclaimed, "Why risk our lives in the cold and freezing Atlantic adrift in a tiny dark lifeboat, when we are already on this warm and safe 'unsinkable' ship?" The belief in the ship's hype, and the disbelief that such a tragedy could happen to oneself personally, cost many lives.

The later it gets the more some companies today believe that they missed the boat and become further paralyzed. Get off it! Do what you can now! Sell off parts of your business if you must. Simplify your product lines; outsource certain capabilities; change the fundamental way you do business to buy time while remediating your systems. The key is to save as many of your company's assets, customers, suppliers, contracts, relationships, competitive advantage situations, etc., as possible, until the time the remediated or replacement systems become available.

Ad hoc and unrehearsed plans also caused loss of life on the Titanic. For instance, the crews on the half-empty lifeboats (that were lowered prematurely for fear of toppling the

boat during lowering) were instructed (ordered) to immediately row to one of several designated gangplanks to pick-up more of the passengers to fill the life boats. Testimony shows that no single passenger was picked-up from a gangplank once the boats were lowered. The lifeboat survivors, afraid of being swamped by others, continued to move away from the sinking Titanic. The inter-dependency of each group to the other in the chain was broken; the main crew, the staff lowering the lifeboats, the crews in the lifeboats, the passengers remaining on the ship, and the panicked passengers in the water never really appreciated their inter-dependency – and their need to work together -- costing yet more lives.

Other important rules were not followed, or not known. The starboard side crew followed a "women and children first" rule, allowing male passengers on to a lifeboat that had available space when no more women or children were available. The port side crew, however, practiced a "women and children only" rule. This meant that, on the starboard side, once a wife and child got into a life-boat, even if there was still room left and the husband or an older brother were ready and waiting, they would not be allowed to board the lifeboat.

I see a similar misapplication of corporate and Information Technology rules such as the "triage rule." This rule usually calls for: (1) mission critical applications and utilities to be worked on first, (2) other less critical systems to deferred temporarily, and (3) still others to be abandoned altogether. With time running out however, many companies are only planning time and resources for the first group. But, the truth is that time must also be spent on working with the less important systems to assure that these don't inadvertently corrupt the "fixed system" with bad or ambiguous dates. Importantly, systems that will be abandoned must be stopped in a planned and careful manner so that their former users can still get their work done without these systems. Just think how your work day would be affected if I took some of your desktop systems away on 1/1/2000 without warning, re-training, or giving you other means to get the tools, data and information you need to do your job?

The Titanic sank with only 12 square feet of its total area damaged by the iceberg (a few inches wide but for some 200 feet long). So little was ruptured, significantly less than 1% -- but in all the "right" places! Had the Titanic struck the iceberg 15 seconds earlier or 15 seconds later, some experts say catastrophe very likely would have been avoided. Moments earlier, an impact would have allowed the Titanic to strike the iceberg head-on and likely would have resulted in flooding to only 1 or 2 compartments at most. An impact 15 seconds later would have hit the ship further back (or almost not at all) and destroyed at most 3 bulkheads (or 4 watertight compartments) – a rupture the Titanic could have withstood.

The Year 2000 project is an insidious bug requiring meticulous remediation. In systems that handle thousands or millions of transactions per day (or more) even a less than 1% error can mean hundreds, thousands or even more errors made daily. If you are "lucky," your systems will fail fully so that at least you know you have a problem. If you are not so "lucky" it will take longer for your files to be corrupted slowly. Rebuilding them can be a mammoth effort in many environments.

AFTER THE SHIP SANK

All of the lifeboats except one refused to return to help other passengers in the freezing water onto their lifeboats for fear of capsizing their small vessels. Only six passengers of the 1500 in the water were saved in this manner. Most survivors lived with that guilt for the rest of their lives.

The Year 2000 analogy again is that not enough companies are assisting or otherwise obtaining compliance assurances from their partners, to guarantee the ongoing flows of goods, supplies, services, money, etc. A Company cannot just sail forward into the sunset on its own. It must stay/go back, and carry along with it those other critical organizations that allow it to continue to survive and thrive. It must share its Y2K plans, know-how, secrets, staff, resources with those partners that are not as far along or are unable to do it on their own. What good is surviving if your suppliers can no longer supply you, or your vendors are out of business? What if your customers can't pay because of non-compliant systems that don't allow them to collect their own receivables? What if you lack your key contracts? We can only survive if we help others, and stay in synchronization with their solutions and challenges.

It seems that just as the lifeboats never returned to pick-up passengers, we in management and information technology are not learning from our mistakes either. We seem not to have learned that virtually all non-trivial systems fail and have "bugs". We seem to have forgotten that it always takes longer to develop a system than we originally plan. Over eighty percent of all large projects are either behind schedule, over-budget, or lack intended functionality. We forget that new technologies and tools themselves contain "bugs" and errors, and oftentimes a high learning curve. We forget that our "fixes" will introduce still new errors. (Like in Russian Roulette, changes made to short 50 lines program modules typically result in one out of six of those modules having a new error introduced during the correction process.)

Lastly, according to international maritime rule in 1912, rockets fired high up into the air that burst and came apart like "flying candles," constituted signals for help that must not go ignored. For reasons that are still unclear (after their testimony at the subsequent hearing(s)), the Californian misinterpreted those rockets as "party rockets" and therefore never came to the aid of the Titanic.

It is unclear what Boards and management must be thinking by ignoring the SEC rules and requirements to adequately disclose Year 2000 problems and efforts in 10K, 10QW, and 8K filings. Most companies included dismal boilerplate disclosures, or half-disclosures, or no disclosure within their March 1998 SEC filings. Ignoring truthful--even potentially blockbuster disclosures--won't stop the fireworks; instead, it will more likely blow up in their faces and potentially lead to more litigation, more jobs lost, and more lost investments.

There's a lot that can be learned, about the hype of unsinkability and infallibility, but it's not consistent with history. And those who refuse to learn from history, are doomed to relive it.

In another look at the “women first” lesson, it is still amazing to me that most companies who are developing plans and budgets still have not adopted and communicated standards, methodologies, and a Project Office that they intend to follow throughout the year 2000 remediation, including techniques and procedures for developing and testing contingency plans. With no well-developed and/or well-communicated directives and standards in place, different solutions implemented throughout the company may never work together, and will cost much more in dollars.

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THE Y2K "TITANIC" DISASTER COMPARISON

THE TITANIC	*YOUR Y2k CORPORATE SHIP*
BEFORE THE CRASH	**BEFORE YEAR 2000**
✓ Multiple, sustained warnings of icebergs ignored.	✓ Multiple and sustained warnings of Year 2000 problems/crisis ignored.
✓ No lifeboat drills ever performed with crew and passengers.	✓ No contingency plan developed and tested.
✓ Not enough lifeboats. (Not believed to be required)	✓ Not enough resources. (Lack of belief that they are required)
✓ Actual assessment of lifeboat loading capabilities never reported to crew.	✓ Actual Y2K impact assessments performed too late, or results under-stated.
✓ No proper communication undertaken while help was in sight on the horizon.	✓ No proper communication with Boards (who could authorize appropriate help).
AFLOAT AFTER THE CRASH	1/1/2000
✓ Asking for help (from other ships) too late; laziness/miscommunication causes help not to mobilize	✓ Asking for help (from staff, trading partners, industry groups, experts) too late; Shortcut mentality prevails.
✓ Misinterpreting the rule "Women and Children FIRST" to mean "Women and Children ONLY"	✓ Misinterpreting the rule of "Mission Critical Systems FIRST" to mean "Mission Critical Systems ONLY."
✓ Not knowing how to evacuate in the midst of the catastrophe with minimal confusion, loss of time, and loss of life.	✓ Not knowing how to fix errors while keeping production/operations afloat in the midst of mounting Y2k problems.
✓ Unreasonably holding onto belief that ship was "unsinkable" as it sank. (This continued belief paralyzed people from taking action.)	✓ Unreasonably holding on to belief that the Year 2000 Crisis is either a non-event or somehow would pass them over.
✓ Only 12 sq. ft. (1.12 m^2) of the ships total area was damaged by the iceberg. That fractional percent was enough to allow 7 million liters of water to pour through (per second) and quickly sink the ship.	✓ The Year 2000 problem is insidious and requires meticulous remediation. Having only a 1% error rate (i.e. a 99% fix) can sink your organization as uncaught errors begin to slowly corrupt your databases.
✓ Based upon survival statistics, 1st class passengers were given preference; 2nd and 3rd class passengers received information later and died at much higher rates.	✓ SEC disclosure rules are ignored. Shareholders and others are treated like 2nd/3rd class citizens.
AFTER THE SINKING, BEFORE THE RESCUE	**YEAR 2000 and BEYOND**
✓ Only one lifeboat goes to pick up brothers, husbands, and fellow passengers… the loss and guilt of survivors lasts forever.	✓ Companies failing to help trading/business partners are unable to recover from the losses.
✓ The Rules of the Sea change after Titanic (laws require enough lifeboats for all; 24 hr. wireless service; sky bursting rockets mean distress and must be answered, etc.).	✓ Will companies change their practices re: information technology problems, testing, quality assurance, acquisition/use of tools, estimating in the future?

YOUR Y2K SHIP: "UNSINKABLE? UNTHINKABLE!"

To help your corporate "ship" stay afloat I urge you to be aware of, plan for, and avoid the following five Year 2000 icebergs. (Note the "iceberg pitfalls" are all stated in the negative and show practices to be avoided, i.e., new/classic Y2k errors). Conversely, avoiding or practicing the opposite of these errors/areas should not only help you in reaching your Year 2000 remediation goals, but help substantially in a court of law to establish that your company and/or its executives were diligent in remediating the problem, mitigating negative impact, and exercising reasonable care and good business judgement.

<u>Iceberg 1</u> (Methodology)

- ✓ Unreliable Certifications – "Certification by Survey" with no on-site follow-up is useless and gives false confidence to potential and current users.

- ✓ Indefinitely Waiting For Vendor Fixes – If your vendor has been habitually late in delivering fixes and upgrades in the past, he/she will be in the future too.

- ✓ Poor Triage – Even if some systems fixes are deferred, they cannot be deferred indefinitely. They still must be addressed one way or another, before Year 2000

- ✓ Wasted Time – Don't agonize over whether and how best to do a fix, Get Started Now!

- ✓ No/Poor Contingency Planning -- Surprises will happen and you are dependent on other parties and partners that you may not have much control over. You need alternatives/contingency plans to buy time when your primary plans fail or are delayed

- ✓ No Single Remediation Plan And Standards – Your problems are enterprise wide – your solutions should be as well. (i.e., one integrated plan for remediation and NOT different non-integrated solutions for different parts of your company)

- ✓ Underestimation – be realistic NOT optimistic (the bane of the information processing industry is over-optimism and fantasy); perform a rigorous estimate and identify assumptions; have it challenged by company executives and the Board; add a contingency factor.

- ✓ Not Managing Risks – Identify the "Top Ten" associated with the project and the fix; track and report them each week; update as necessary.

- ✓ Starting Too Late – If you start late – you will end late! That's OK as long as you implement interim contingency procedures to get you by (i.e., muddle through) until your other systems are remedied.

- ✓ "Rosier Than Actual" Status Reports -- Don't lie to yourself and others on your progress; if you've fallen behind you are not likely to make it up. Implement

alternative interim solutions to buy time.

- ✓ Under-Verifying And Under-Validating Period Ending Dates – Most errors happen at period ending dates (i.e., week-ends, month-ends, quarter-ends, and year-ends) which, to make matters worse, typically involve more dollars (running total amounts) that have a greater impact on the company. Test "the daylights" out of these.

- ✓ Under-Verifying And Under-Validating Special Y2K dates – Such dates include:
  - 12/31/1998 (normal year end); 6/30/1999, 7/1/1999 (Fiscal year cutover); 12/31/1999, 1/1/2000 (century cutover)
  - 1/1/1999, 9/9/1999 ("trigger logic" default dates)
  - 2/29/1999, 2/30/1999, 2/31/1999, 3/1/1999, 2/28/2000, 2/29/2000, 2/30/2000, 3/1/2000 (Leap year tests); 2/29/2004 (Leap Year); 1/1/2100, 2/29/2001, 1/1/3000 (Not Leap Years)
  - 4/1/99 (probable first fiscal year start that goes into next century)
  - 7/1/1999 – 6/30/2000 (Fiscal year end over "time warp")
  - 10/10/2000 (1st true 10 character date)
  - 12/31/2000 (366th day of the year)
  - 1/1/2001 (21st Century); 1/1/2002 (ensure no backwards processing errors)

- ✓ Unrealistic Expectations – Define a controllable scope. Only plan for what can be reasonably accomplished in the time remaining based upon resources available and quality of work required. The rest must be accomplished with alternatives.

- ✓ "Code And Blow" Approach -- Avoid making the fix and cutting the testing short. Your fixes will introduce new errors and may not fix all of the date problems. AT&T's long-distance service collapsed a few years back when only 3 lines of code were changed, The QA group said the changes were so insignificant that no re-testing was required.

- ✓ Shortcut Testing – You must perform tests to assure that the fixes work as expected, AND that you have not inadvertently created new errors. Functions that worked before could be accidentally affected and must be re-tested with "regression tests."

- ✓ No Independent Quality Assurance Function/Review – The people that fix the systems cannot be the only ones that test it. If the fixers missed something during remediation, then are likely to miss it as well in testing. An independent group (inside or outside of the company) should perform the final tests before moving into production.

- ✓ Poor Contingency Execution – Often for contingency plans to be effective, they must be executed when critical dates the in primary plans begin to look like they will be missed. Don't wait until its too late to execute your contingency plans.

- ✓ Insufficient Management Understanding/Commitment – Executive management refuses to freeze other business opportunities and displaces/reroutes Y2K resources to other activities.

Iceberg 2 –People (Staffing)

- ✓ "Five week wonders" -- Don't hire kids straight out of 3-5 week COBOL training unless you plan to give them more intensive training and to manage them very closely.

- ✓ Ineffective Training – Legacy systems are riddled with missing source code and very clever logic intended to fool the computer to process complex systems in the very small memory spaces available 20-30 years ago. This is not work for novice programmers.

- ✓ "Cocky" Staff Holding The Company Hostage – have an on-going process to replenish staff – otherwise you may have to pay a king's ransom to avoid being raided.

- ✓ High Turnover – Turnover can be particularly harmful because of the onrushing Year 2000 deadline. Create an environment that keeps turnover to a minimum.

- ✓ Uncontrolled Loss Of Desirable Staff -- There are many ways to keep your critical staff without busting your salary structures and budgets including: Completion/Stay bonuses and sign-on bonuses; sabbaticals when project is successfully finished; promised training in the newest most exciting technologies after 2000; a work-at- home policy a few days a month with company paid ISDN lines to staffs' homes, etc.

- ✓ Inability To House New Or Needed Staff – When you find new staff, where will you house them. You may need additional bathrooms, water coolers, photocopy machines, facilities, parking, etc.

- ✓ Salary Structure Disruptions – Simply tripling the salaries of key systems staff and programmers can throw the whole salary structure of the company out of alignment. Make sure you consider any ripple effects of salary revisions else it may cost you much more than you originally considered.

- ✓ No Post-2000 "SWARM" Team (SoftWare Analysis and ReMediation team) -- The problems will not end on January 1, 2000. Missed errors, missed understandings and missed programs will all surface to create new or deeper problems. Keep your teams intact to isolate, identify, and fix these problems as they arise. This team likely will be needed through mid-2001, at the least.

- ✓ Outsourcing To Software Factories – The history of the last year or so shows that they can be quite expensive to manage (plus they must be managed quite closely) , and that they are NOT the silver bullet that was promised.

- ✓ Know Thy Y2K Fixers -- Especially if you go outside and/or offshore, you may be opening yourself and/or your systems up for possible espionage and terrorism (i.e., with someone putting a virus, back door or time bomb into your applications.)

- ✓ Overlooked Vendor Problems (Including Year 2000 Problems) – Vendors and suppliers have their own Y2k problems; they may not get paid by their own customers with Y2k problems, or may fix their systems in ways not compatible with your own fixes.

Communicate and determine your risk and alternatives.

- ✓ Succumbing To Schedule Pressure – "The due date's here so we must be done!" If only that were true!

- ✓ No Project Office Or Minimal Cross-Team Communication – You have failed to set up a single, central, entity-wide resource that will: set up standards for remediation; determine tools to be used (including scanners and parsers); maintain common source code libraries; develop common testing environments and test cases; provide Quality Assurance services: implement Quality Control procedures; sign off on modules ready for production; etc.

- ✓ Inability to Motivate Staff – The staff is tired of the never-ending project and you haven't yet figured out how to motivate and invigorate them.

Iceberg 3 Product

- ✓ PCs, Midrange, Client/Server, networks, and telecommunications systems ignored -- Hey, It's not only legacy systems that have Year 2000 problems and must be fixed.

- ✓ Suppliers Not Ready – If your supplier can't get you your products and raw materials, who will?

- ✓ Failing to reduce/remove risks of processing corrupt data received from external trading partners – Your systems are perfect, your trading partners' systems are not. You are in big trouble unless you can detect errors in data and dates coming from their systems, and process them as exceptions.

- ✓ Relying On Third-Party Certification – Most don't have the time or money to really certify other's systems. Review their work carefully to determine the risks to your company, augment the certification, manage the risks

- ✓ Embedded Systems Overlooked – The chips and micro-processors used to manage elevators, energy grids, power, traffic signals, automated guided vehicles, medical and lab equipment, smart buildings, heating and air cooling, security systems, telephone PBX systems etc. are all potential candidates for failure. Although most will work just fine because they don't care about the date or they have manual overrides, you must determine what will not be ready/fixed in time and plan for it.

- ✓ Shortcuts in Testing – Shortcuts are not allowed unless you have first determined what the risks and impact of failure will be. If your company is willing to accept certain risks (and it should be because it is too expensive to test everything and prevent all Y2K errors), then you may make shortcuts in those identified areas. Knowing which applications to focus on is the key.

- ✓ Contractor Failure – What if your contractor, vendor or consultant says, "it's fixed"? Is that it? What must you do to ascertain true readiness?

- ✓ Leap-Year Miscalculation – There is no such thing as a "super leap-year" (Do you believe that some companies thought there were 30 days in February, 2000?). The rule is: If the year is divisible by 4 it is a leap year UNLESS it is divisible by 100 then its not, UNLESS its divisible by 400, then it is a leap year. Thus 2000 is a leap year and 1900 and 2100 are not.

- ✓ Missed "Pre-2000" Critical Dates – some industries and companies will fail before year 2000 such as: (a) insurance companies who will hit the wall on 10/10/98 -- when they first write new policies for the period 1/1/99 to 1/1/00; (b) subscription companies – many of which are already facing problems; (c) companies with fiscal year is 7/1/99 – 6/30/99; etc.) The critical time frame(s) are shorter for these companies.

- ✓ Non-Synchronized With Customers/Suppliers – You can have the perfect solution BUT it must complement those of your trading partners (i.e., you all must use four digit date expansion, or the same windowing approach, or the same encapsulation procedures, etc., else each system will be Y2k compliant separately BUT still will not work together unless you create bridges). Also even if you are all using the same solutions, you must all synchronize the date and time you put the new systems into production.

- ✓ Customers Not Ready – How can you help? Will you loose that business? How can that lost business be replenished?

- ✓ Poorly Integrated – You had no standards or no Project Office, so you systems have multiple solutions that are not integrated. Gotcha!

- ✓ Awaiting the "Silver Bullet" Solution – Stop it already – the silver bullets died with the Lone Ranger! If you wait until one exists, you will fail! You will be late! You may be sued! And successfully too!

- ✓ Changing Operating Environments – Don't attempt to change your operating environment(s) during the Y2K fix and test. This is no time to drastically upgrade your operating systems, compilers, utilities, and communications software, unless you must for some other good business reason.

- ✓ Not Freezing Requirements – Don't attempt to fix, enhance or upgrade applications unless you have to. That will only make it more difficult to isolate errors as to whether the Y2k fixes or the other maintenance caused them.

<u>Iceberg 4</u> Technology

- ✓ Using New Tools -- New Tools have their own coding and logic problems. Also users can be expected to make mistakes before they learn how to best and appropriately use the tools. New Tools can turn a development project into a research and development project. Beware!

- ✓ Using Wrong Tools – Using good tools for the wrong purpose will give you the wrong answers, and make you think your work in done prematurely.

- ✓ Using Tools Incorrectly -- Understand the limitations of each tool and tool category. Remember too that a "Scanning Tool" will only find certain errors BUT not all of them. What must you do to complete the job?

- ✓ Using New Vendors – Many new vendors have popped up to take advantage of the Year 2000 panic and shortage of staff. Check background, references and financial stability.

- ✓ Forgetting That 01/01/99 And 09/09/99 Are "Mini Melt-Down" Dates – Old procedures caused programmers to code unknown dates as 01/01/99 and 09/09/99. This then would trigger exception logic not associated with the REAL dates. When the real dates 01/01/99 and 09/09/99 hit, these programs will treat those dates as exceptions and not as the current dates.

- ✓ Using No Tools at all – While all tools have limitations, most will definitely help to accelerate your identification, assessment, and remediation tasks. Failure to use these tools is really criminal.

- ✓ Changing Configurations – Remediation services are most effective when performed in a stable environment. Changing/upgrading hardware, networks, and systems infrastructure during remediation with only delay and increase testing, and risk of failure.

- ✓ "Analysis Paralysis" – Failing to act prudently and quickly while searching for the best practice or solution.

- ✓ Encapsulation, Windows, Bit-Fiddling, Four-Digit Century Date, etc. – "There are many ways to get to Manhattan"… but you must be consistent. Each solution has plusses and minuses: some take longer to implement, some work for shorter periods of time, some are less expensive, some take up more computer resources, etc.

- ✓ "Not Invented Here" Syndrome – Read, attend conferences, get on the Internet, go to Industry Y2k Special Interest Group meetings. Don't reinvent the wheel. It doesn't matter when it occurred or who invented it. If it will work, then use the technique, product, rules, systems, methodology, etc.

- ✓ Testing On Similar But Different Configurations – If you must use outside hardware to test your systems (because you are already running near capacity). then take into account the difference in the configurations (i.e., the channels, disk drives, version of the O/S, and utilities, etc.).

- ✓ Forgetting The Telecommunication And Network Parts of The System -- When the "pagers" went out in Los Angeles a few months ago, many businesses almost came to a halt. Just think what will happen if telephones, networks (including the internet) fax machines, etc. all ceased to work for you in 2000. What are your options, and backup plans?

- ✓ Trying To Implement Year 2000 Compliance Systems-Without Allowing Appropriate Training For Use Of New Technologies – New technologies, tricks, methods, software and tools are all tricky, and require a leaning curve and a debugging curve. Try as you might, failing to plan for these curves will only put you further behind!

Iceberg 5 Legal

- ✓ Improper Disclosure – Proper disclosure is not required by law. Under- or misleading disclosure in financial statements, insurance applications, merger and acquisition representations, 10-Ks and 10-Qs , etc. can all come back to haunt you. Over-disclosure can hurt as well.

- ✓ Merger And Acquisition Nightmares – How are you going to assure yourselves that the company you are merging with or acquiring is, in fact, Year 2000 compliant? To what extent can you rely upon their warranties and representations? To what extent will you perform your own due diligence?

- ✓ Tolling Statute of Limitation Agreements -- When will warranties, insurance, and statutes of limitation begin to run – at the time of purchase? The time of implementation? The time the 1st defect was encountered? Or some other time? How can you protect your rights as time continues to run out!?!

- ✓ Express And Implied Contractual Warranties – How are you protected within your older existing contracts? Where are you most liable? What can be done to minimize risk now and in the future?

- ✓ Compliance Commitments -- What is the level of readiness of your trading partners? What is their level of commitment? Investment? What dates and guarantees are they willing and/or able to give you? What are their contingency plans? How do the answers to the above impact /change your own position and plans?

- ✓ Poor Paper Trail – Document your efforts to identify and remediate the problem. At least consider keeping the items listed in "The Year 2000 Paper Trail" by Warren S. Reid originally published in the Enterprise Systems Journal, July, 1998, www.esj.com.

- ✓ Numerous Plaintiffs—Anyone and everyone can sue: users, suppliers, customers, shareholders, regulators, and injured parties.

- ✓ New Board Liabilities – Boards will be held responsible for Year 2000 caused business failure. In the past computer glitches only meant that the CIO or CFO would be reprimanded.

- ✓ Improper Use Of Experts – Using experts too little or too late will not help to show due diligence and informed decision-making, leaving not-especially-computer-savvy Board

members exposed to lawsuits.

- ✓ "Killer" Minutes – Sparse Board Minutes regarding Year 2000 discussions and decisions may not be enough to show due diligence and informed business judgement.

- ✓ "Deadly" e-mails – Some say, "It is impossible to erase an e-mail (for certain), once it has been sent." Make sure you have an enforced data retention and creation policy. Stop disgruntled employees from spreading untruths.

- ✓ Not Managing Risks – All large projects have risks. What are the risks in your organization: Not enough staff? time? budget? Changing regulations? Outsourcer problems? Vendor going out of business? No source code? Use of obscure languages? Abnormal reliance on a few key customers, suppliers or contracts? High staff turnover? The Euro conversion? Changing from legacy to client/server architecture? AND how will you monitor, manage, and mitigate each of these?

- ✓ Arbitrarily Low Budgets -- Compare your budgets to similar companies in your industry and to industry studies. If you are way under, find out why?

- ✓ Poor Contracts On New Systems And Remedies -- There is no acceptable reason for failing to include proper Year 2000 provisions in all of your new or updated contracts. Don't make the same mistakes all over again.

- ✓ No Established Documentation/ Retention Policy – Define and implement smart and consistent rules for keeping, filing and destroying documents relating to the Year 2000 efforts.

- ✓ Poor Risk Management – in such cases you have identified the risks but have not budgeted, documented, staffed, and recognized alternatives for when the risks manifest themselves into reality.

One final admonition is in order. I realize that each organization and course plotted needs to be different, depending upon current position, resources, and destination/goals. Some of you will move like warships; others like cruise ships; and yet others like tall ships. But these icebergs are real, and have been there for some time. Be alert, chart your course, commission a captain and trained crew, gather necessary resources, manage risks, have a backup route, and steer clear.

Bon Voyage!

For full article with beautiful graphics see article originally published in August 17, 1998 and September 7, 1998 issues of MidRange Systems Magazine