What's Going to Happen? Assessing Y2K for Missions

Y2k is a serious problem, especially in the developing world. You need to seriously deal with it both personally and in your mission organization. However, the most serious Y2k risk is not technical, but societal. If public panic arises, the doomsayers will have won. Just as with fears of a run on the banks, if society panics about Y2k, it really could become a disaster.

by Pete Holzmann

You're a worker in Zimbabwe, and urgently need some medical advice from a colleague in Sweden. But it's January 10, 2000, and the entire Zimbabwe telephone network has been cut off from the rest of the world because it hasn't been upgraded to take care of Y2k. What a nightmare. Some people must prepare for just such a possibility.

At midnight on December 31, an elderly man with a computer-controlled pacemaker begins to cross a busy street with computer-controlled street lights. Suddenly, the man's pacemaker, the lights, and even all the cars on the street don't know what year it is! Imagine the horror.

Horror? Nope. Pacemakers, street lights and cars don't care what year it is![1] Y2k, The Millennium Bug, the Year 2000 Problem could it be the day the computers die, and we'll all finally live at normal speed again? Or will anyone even notice? Just about everyone has heard about this worldwide problem. But few of us know the facts.

Have you been ignoring Y2k, perhaps, because you've never used a computer? Please read this article and find out what you need to do. None of us can afford to ignore Y2k, even missionaries working in remote African villages.

Have you become so alarmed by what you've heard and read that you are making some significant lifestyle changes? Perhaps, you've come to believe those who say there's a strong possibility December 31, 1999 will be "The End Of The World As We Know It." Please read on; you may discover facts allowing you to take simpler, less costly precautions. In any case, my prayer is that you'll learn enough to carry an important message to those around you:

Y2k is a vital and expensive problem. We all need to deal with it. If we do our part, we need not worry about long-term consequences.

Three Major Questions

In what follows, you will find answers to the three major Y2k questions: (1) How serious is the Y2k problem? (2) What do we need to do about Y2k? (3) How do we respond to people who say . . . ?

Throughout this report I've tried to supply you with verifiable facts rather than biased opinions. My personal Y2k slogan is: "No Hype, No Hysteria!"

Do you ever travel other than on foot? Do you ever communicate other than face to face? Do you use money? If so, then the Y2k problem can affect you. You need to learn about Y2k, and deal with its impact on your life.

Yes, it is serious. Are you ready to do business in the year 2000? If you think you are, have you properly tested all your systems to make sure you won't have problems? Have you talked to your business suppliers and other business partners to be sure they are ready?

Y2k is a foreseeable problem. If you ignore it, your organization could go under. Your officers and directors could be held personally liable in donor lawsuits.

Y2k is a business problem. Business decisions are required to allocate appropriate money, time, and human resources. Decisions about legal and operational risks to your organization need to be made at the highest executive levels.

Ignoring the problem is not a solution, but a way to increase your chances to get hurt. Even if you have no computers,[2] you still need to discover whether your bank and other vendors are taking care of the problem. You don't want to be a customer of a bank that wont be ready!

What's the issue? Some computer software sees "99" as "1999", but does not see "00" as "2000".[3] If this bug is not fixed, various things will stop working correctly. For example, financial calculations may be wrong ("your credit card expired in 1900!"); bank vaults may unlock at the wrong time

("It's Monday 1/1/1900, not Saturday, 1/1/2000").

Understanding the Problem

First, make sure you understand a few important details left out by almost everyone who talks about Y2k. Attention to these details will give a balanced view of the situation.

Critical vs. non-critical errors. Some claim a computer-controlled systems can't survive unless they are 100 percent Y2k compatible. In reality, only critical defects need to be repaired for service to continue. For example, true critical Y2k defects in electric power delivery systems are extremely rare, i.e., that would cause a serious interruption in power delivery; on the other hand, there are many non-critical Y2k power problems involving accounting reports.

Contingency vs. real-world planning. When faced with a difficult, complicated situation, many people panic about the complexity itself, believing Murphy's law: "If anything can go wrong, it will go wrong." Fortunately, Murphy's law is only valid as a design idea, not as something to apply in day to day living!

Contingency planning when designing systems. When designing a safe airplane, it is best to assume almost any part can fail. We then build the plane so it will continue to fly even if some parts fail.

Real world planning applies when preparing to actually use a product. When we prepare for our next trip, it would be foolish to assume every element of the airplane will fail. If that were actually true, nobody could ever fly! In fact, loose talk about bombs and such is illegal in airports for exactly this reason. It falsely incites panic.

It's important to remember that in the real world complex systems, whether aircraft or power grids, usu-ally function correctly even when several of their parts are broken. That's how they are designed, and that's how they operate!

Legal Realities. Compliance Statements. We live in a selfish, greedy, lawsuit-happy society. People who suspect they could earn a lot of money through a lawsuit are likely to make the attempt. As a result, corporations are reluctant to say clearly

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what is or is not ready for Y2k, not because they don't know, but because their lawyers warn them to be careful. Thus, when asking your business partners about Y2k, use a friendly, practical approach that asks whether they have discovered any critical or non-critical Y2k issues, and when they expect to have all of the critical issues resolved.

How Serious is the Problem?

Let's look at it from three perspectives: (1) How much it will cost to fix, (2) What may go wrong at the beginning of 2000 even with the efforts in place to solve the problem, and (3) How well (or poorly) the world is doing about solving the problem.

How much will it cost? The most up to date, unbiased assess-ments[4] predict as much as $200 to $300 billion dollars will be spent globally to solve the problem over a five year period. This does not include any litigation costs. So it really is serious. To place these huge numbers in perspective, $300 billion is less than 0.2 percent of worldwide GDP of over $150,000 billion[5] over the same period. Most economists see a small overall economic effect of Y2k. Other global economic crises are far more worrisome![6]

What may go wrong? Can anyone accurately predict what will happen on 1/1/2000? I believe investigating the facts and applying some wisdom allows us to develop a clear understanding of the situation. Many of the problems listed here are already visible today.[7]

If your bank does not upgrade its software, it may be unable to continue automated banking transactions with the rest of the financial community. Worse, its own accounting system may revert to manual entry of interest payments and so forth. Make sure you are using a Y2k-compliant bank! (If they've recently replaced their software, updated monthly statements, offered new web banking features, you're probably OK. But check anyway!)

Millions of PC's around the world will need to have the correct date entered, and possibly rebooted. I can visualize agents walking down a row of reservation terminals in a big airport, typing in the necessary DOS command "date 1-1-2000" or clicking on the Windows time button.

Many nations around the world are far behind in their Y2k work. Mission organizations are well advised to develop contingency plans for getting at least a month of funds into the hands of their field people. Some medical devices that schedule advanced treatments (such as dialysis or chemotherapy) will need to be manually set

if their software is not upgraded.[8] Many marginally profitable businesses are shutting down rather than investing in expensive Y2k repairs. This is an ongoing process that began several years ago.

Most of us will suffer minor inconveniences. For example, many VCR's will no longer remember the correct date. Airport operations may be slow for a time due to manual operation of uncorrected baggage or ticketing systems.[9] Some features on older telephone systems may not work correctly.[10] Traffic signals may switch from weekend to weekday timing patterns.

A few of us will encounter a major problem. Yes, in a few localized places, especially internationally, there will be a significant breakdown in services. This is mostly because there are still too many people completely ignoring the problem. Phone networks in some developing nations may not be upgraded in time, isolating them from the rest of the world (to avoid billing problems).[11] Older accounting software will not work. Custom scheduling systems for ministry radio station broadcast control will break down, and so forth.

What's being done about it?

On the one hand, many people are clearly over-reacting to the problem. For example, many fear widespread blackouts, even though there is little chance that power delivery, anywhere in the world, will be seriously affected by Y2k (see How Do I Respond To Other People below).

Sadly, many are ignoring the issue, even though we know that significant sums must be spent to repair the Y2k problem, and there are many serious ways this affects us personally and in our communities. Many companies and governments (especially local governments) haven't taken the first step. They are not even aware of the problem.

For example, in June 1998, the Russian Atomic Energy agency said "We don't have any problems yet. We'll deal with the problem in the year 2000."[12] Fortunately, this attitude is not widespread.

The Business Arena

We need to take a look at how a few business arenas that are dealing with Y2k, and also examine the situation from an international perspective.[13]

Power: Experts fully expect power delivery in the USA to continue on 1/1/2000, with possible short-term interruptions in localized rural areas.[14] Even the skeptical Sen. Bennett has reduced his "blackout predic-

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tion" from 40% to 4%.[15] An industry-wide Y2k test was run on April 9, 1999, with another one coming in September, just to be sure.[16] Why such confidence? Because critical power delivery systems (worldwide!) generally do not depend on dates.[17] Non-critical billing and administration functions are still at risk. There's much work yet to be done, but no reason to panic.

Banks: As noted above, the financial community is working hard to take care of Y2k. The good news—

initial financial transaction tests have been completely successful. However, the remaining problems are still large. In the US, the FDIC recently reported that of all federally insured banks, three percent are currently behind in their repair work[18]. The situation is worse in many international arenas.

Credit Card Transactions: Credit cards will work. As of 12/98, 45% of all credit cards had expiration dates after 2000.[19] About one in a thousand terminals can't handle such a card, requiring a manual call for approval.

Telecommunications: Ensuring reliable phone service on 1/1/2000 is both an imperative and daunting task; phone billing is highly date dependent.[20] The ITU is carefully tracking the issues in every nation, and encouraging massive testing of repaired systems. So far, the results have been very encouraging; there's no reason to expect failure of telephone service in any major nation.[21] The primary current concern is Sub-Sahara Africa, which has insufficient funding to accomplish the needed upgrades; they are asking the World Bank for funding.

Air Transport: Aircraft have been tested extensively;[22] and they will continue to fly. The big problem is scheduling, ticketing, baggage control and other non-flight systems; massive work is underway to ensure every international airport will continue to function properly.[23] Repairs to the air traffic control system are now complete and are being tested.[24] While some slowdowns can be expected, especially in remote international areas, commercial flights will continue throughout the night on 12/31/99.

Government: Government responses to Y2k have mostly been "too little, too late." There's very little political gain to be found in spending money on a problem few can see!

That's the bad news. For example, the US Government Y2k report card[25] currently shows a "C+" grade, with 20 of 24 departments expected to have all critical systems repaired on time. The good news? Governments are able to take action as a whole—once they put their minds to it. A lot of energy is being put into the Y2k problem now. Even with additional resources, however, it is too late to fix everything in time. There will be visible slowdowns and government service failures over the next year.

Globally, western nations such as the USA, Australia, Ireland, Israel, South Africa, UK, etc., are expected to get through with few problems. About half the nations are working hard on the problem. Almost all at least have an awareness of the issues. However, some developing nations have done little or nothing about Y2k, and may suffer severely for their lack of preparation.[26] The UN is taking an active overall role; its members have agreed on a set of guidelines for dealing with the Y2k issue.[27]

The major issues in developing nations are lack of awareness, lack of funding, distractions from financial crises, and lack of qualified experts. [28] Some nations have an advantage in dealing with Y2k: they still do a lot of their administrative work manually rather than by computer. Pens and paper are, of course, Y2k compatible!

What Must we Do?

Whether you are a concerned individual or represent an organization, the primary steps in responsibly dealing with the Y2k problem are:

—AWARENESS: Acknowledge that there's a problem.

—SURVEY: Check your organization and outside connections to identify critical systems. Strongly encourage your ministry partners to do the same.

—EVALUATE: Create and imple-ment a plan to evaluate which systems and connections actually have a problem.

—FIX: Develop and implement a plan to resolve critical issues and cope with non-critical issues.

—TEST: the results, well before 12/31/99! This is important not only for your own confidence in moving forward, but also for ensuring that your workers and constituents can have confidence that your organization will thrive after 1999.

—PLAN FOR CONTINGENCIES:

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Test the results. This is important not only for your own confidence in moving forward, but also for ensuring that your workers and constituents can have confidence that your organization will thrive after 1999.

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For any operational areas that give you low confidence of successful operation in 2000, develop an alternative plan that will keep you in business. This is especially important in areas where a few hours of downtime could cause a critical problem; i.e., medical services, broadcast systems, etc.

Survey. This is something you need to plan based on your own organizational situation, and on the partners you work with. If you work in a developing nation, be aware that banking and telephone services may be reduced or even unavailable for a time beginning on 1/1/2000. We should verify our bank's Y2k status. You may be able to do this check online.[29]

Individuals in many areas of the world need to check on the Y2k readiness of their health care and medical insurance providers. Medical administration is a nightmare even without Y2k date problems confusing the issue.

PC Hardware & Software. If you need to deal with Y2k on one or more personal computers, see Appendix 1 below for help on the basic technical issues. If you need to deal with large computers or software systems, or if you run a large organization, you need to get some technical help![30]

Other Equipment. There's a lot of computerized machinery. Some people claim that televisions, VCR's, microwave ovens, breadmakers, cars, even hair dryers will shut down on 1/1/2000.

Reality. There is no evidence for any of these scenarios. Beware of such "urban legends." It is true that dates may be wrong in appliances that track the date (such as VCR's), but no expert suggests the equipment will fail to work![31]

Does this mean we can ignore Y2k when it comes to appliances of various kinds? Possibly as most of us do not have any equipment where the date is critical to its operation.

If you do have such equipment (perhaps some hospital patient monitoring equipment? Broadcast antenna control systems?), you need to test that equipment and decide what to do if it is not Y2k compliant. (Example: our VCR will no longer hold the correct date. All of our other equipment doesn't care about the year.)

Contingency Planning. In "Western" nations, there's little need to hoard cash, as purchases using credit cards and checks will still work

fine. Debit card cash advances may be the best way to obtain cash internationally if there's trouble in 2000, as approval uses the credit card transaction system rather than bank transfers. Consider how do you prepare (or how should you prepare) for other emergencies? Do you have first aid supplies, flashlights, candles, backup power, some extra food in the pantry, extra water? All of these are good preparations in earthquake or tornado areas. They are quite reasonable suggestions for those who work in developing nations. In the Western world, I leave the decision to you.[32]

Example, my family keeps our pantry full of food in winter, as we are sometimes snow-bound. If serious problems cause stores to close for hours or even a few days, we'll be fine. My bank is ready for Y2k, so I'm not worried about cash supplies.)

Information Contingencies If you aren't confident your administrative systems are Y2k compliant, you need to prepare contingency plans for potential breakdowns. How will you print year-end statements for 1999 (or perhaps print them before the year ends)? How will you handle payroll in the first 2000 pay period? These questions and many more need to be answered.

What about records? Do we need backup copies of every conceivable bit of information? Hardly. Remember, the Y2k problem does not cause computers to crash, nor does it cause data to be permanently lost. On the other hand, as always it is helpful to have your own set of records in case your bank or insurance company gets confused.

What about Doomsayers

Some doomsayers suggest we need to "head for the hills," buy weeks or months worth of food, obtain backup power generators, and generally prepare for the reduction of our social services to the level of developing nations.

Sadly, much of this hysteria comes from within the Christian community. Motivations of such people must be questioned. Some of the best-known spokesmen have a hidden theological agenda, believing the world as

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Do you have first aid supplies, flashlights, candles, backup power, some extra food in the pantry, extra water? These are reasonable suggestions for those who work in developing nations.

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we know it must end in the next few years. Also, many doomsayers make a tidy profit from sales of their books and seminars.

To briefly introduce this topic, here are behind-the-scenes quotes from one well-known Christian doomsayer, Dr. Gary North, whose web site communicates a grain of truth along with a bias (or "spin") that results in hysteria and hype. Check the endnotes and references for further information.

> Of course I want to see y2k bring down the system, all over the world. I have hoped for this all of my adult life.
>
> Doom and gloom will sell, as it has never sold before. I have positioned my name in the center of this fear. All I have to do now is to report bad news.[33]
>
> The kind of world we really want to see can come only if the dead hand

of big government is pulled from off our necks. That monster has to be killed. The Millennium Bug is more likely to kill big government than anything we can imagine. As the Bible says, our redemption draweth nigh.[34]

A More Balanced View

First, are you taking care of the Y2k problem in your own organization? No matter what part of the world you live in, thinking "It doesn't apply to us" is a sign of foolish ignorance.

Second, as Christians we are called to be prepared in season and out of season. Y2k will have an effect on people around the world. On 1/1/2000, every breakdown in the whole world will be blamed on Y2k, right or wrong. As Christians, we are called to be a light to the world. Are you prepared, spiritually, emotionally, and physically to help others who may be among those who are harmed by Y2k? Does your organization have a contingency plan to deal with potential problems?

Third, deal calmly with the hysteria, panic and doomsday scenarios. A spirit of fear is not from the Lord. Stay close to the Lord in prayer. Share His spirit of hope and love with those around you. Refer people to balanced, unbiased experts. I've prepared a web site of annotated references to unbiased information. After Feb. 1, 1999, visit <www.icta.net/y2k>.

Fourth, remember that people hear what they want to hear. People who have come to a conclusion on Y2k are rarely willing to adjust their views. This is especially true if they have already taken action! We all want to justify our actions.

Y2k Myths

With that context, here are brief responses to some of the more blatant myths relating to Y2k. (Earlier portions of this report have already provided you with all the facts needed to counter many doomsday scenarios.)

Myth #1: All Critical Systems Will Fail (power, communications, transportation, finance).

Doomsayers talk about the scary "embedded systems" problem, where an unknown quantity (50 million?) of tiny, hidden computers worldwide will fail on 1/1/2000 causing critical facilities to shut down. They say society's infrastructure is doomed unless these systems are all 100% repaired.

Reality: These embedded systems are real, but the problem isn't nearly as bad as described. I'll just mention three key points the doomsayers ignore:

Critical systems are designed to work even with some parts broken. They operate all the time in such a condition!

Embedded systems that deliver services normally don't care about the date! For example, power plants deliver appropriate amounts of power, no matter what day it is.

Embedded systems problems that do crop up don't require months or years of repair work; normally they can be reset in seconds, or replaced in minutes or hours. Critical services normally can be placed under manual control. Also, the vast majority of "embedded system" critical failures I've seen can be readily solved through a manual reset/reboot. These solutions take seconds, minutes or hours, not weeks.

Is there still a concern? Certainly! But not about delivery of critical services in Western nations. The big problems requiring a lot of repairs involve planning, forecasting, and recording usage of services. Y2k failures in these areas would certainly be a serious problem, but the power will not fail for weeks, planes will not fall out of the sky, banks will not suddenly close on 1/1/2000.

Remember: there are serious problems in this area, especially in developing nations. Banking and communication systems are the most vulnerable. Also remember: society copes with blackouts, crashes and other disasters every day.

There's no need to take what I'm saying on blind faith. Look at some of the doomsday Y2k predictions from the past and watch as we enter 1999:

—People originally screamed that the global credit card system was doomed: "Credit and ATM cards will no longer work. Has it ever struck you as odd that nearly every credit card expires in the year 1999?"[35] Today, the problem has been solved; 45% of

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As Christians we are called to be a light to the world. Are you prepared spiritually, emotionally, and physically to help others who may get harmed by Y2k?

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all credit cards now have expiration date after 2000.[36]

—There have been widespread predictions the airline reservation systems would fail in early 1999 when year-in-advance reservations would fall in 2000. Such predictions have proven false.

Myth #2: Everyone's Pacemaker will stop!

All kinds of modern medical devices contain computer chips, from insulin delivery systems to pacemakers. Will the medical establishment come to a screeching halt?

Reality: Health care providers have been working on these issues for several years. Certainly, some medical scheduling devices are at risk,[8] but not therapy equipment such as pacemakers.[37] The main medical Y2k risk is in administration, record keeping and scheduling, not delivery of services.

Myth #3: The total cost of repairs will be more than $1 Trillion.

Major consulting firms advertising for Y2k work, such as The Gartner Group, have estimated global Y2k costs as high as $600 billion[38], a trillion, or even more. Doomsayers such as Gary North put it at $3 trillion.[39] They encourage clients to sign up quickly for their services, claiming there will be a drastic shortage of available technical staff as we approach 2000, with associated increases in the cost per hour of technical assistance.

Reality: Actual costs have turned out to be much lower than estimated by these firms. Gartner estimated $30 billion for repairs of US Federal government systems. The latest report from the US is less than $7 billion.[4] We're also seeing that there is no shortage of available Y2k technical staff; in fact, many Y2k texhnicians are out of work, now that the vast majority of repairs are complete.

Conclusion

Y2k is a serious problem, especially in the developing world. You need to seriously deal with it both personally and in your organization. However, there's no reason to panic. Most personal computers and software will not be affected. The larger affected systems are mostly being worked on as you read this.

Yes, computer errors will cause serious problems in some local areas . Many faxes will have the wrong date; some databases and spreadsheets will have wrong calculations until they are fixed. Some medical systems will have to rely on manual rather than automated measurements for a time.

But the power grids will not shut down for days, the financial markets will not crash, airplanes will continue to fly. God is still in command; the tides will rise and fall, the sun and moon will maintain their course. And God's gift to mankind of intelligence and creativity will once again allow us to cooperatively solve issues that surface in the early hours of January 1, 2000.

The most serious Y2k risk is not technical, but societal. If public panic arises, the doomsayers will have won. Just as with fears of a run on the banks, if society panics about Y2k, it really could become a disaster.

The only thing we have to fear is fear itself. Roosevelt

God has not given us a spirit of fear and timidity, but of power, love, and self-discipline." II Tim. 1:7 "You will keep in perfect peace all who trust in you, whose thoughts are fixed on you! Trust in the Lord always, for the Lord God is the eternal Rock. Isaiah 26:3-4

Appendix 1: Technical Basics
—PC Hardware Issues

Do all PC's need to be replaced? Not even close! All Macintosh computer hardware is Y2k compatible Over 90% of PC's will "roll over" to 1/1/2000 without being fixed. A small number of PC's need to have the correct date manually entered (once!) after 12/31/99. A very small number of PC's require a hardware fix BIOS chip update.[40]

Some folks claim a few older (especially 8086 and 286) PC's have an improperly programmed BIOS that sometimes reads the wrong date from the battery powered clock. A commercial software fix is available. (Note: The reality of this issue is disputed: I have been unable to confirm that it is real.)[41]

Yes, you do need to test your PC's. Free testing software is available.[42] There are two important tests. The first test checks for automatic date roll over; it decides if your PC will automatically change to 1/1/2000. If this test fails, try the manual date-set-and-reboot test. In the rare case of a PC that fails this second test, you will need to spend some money fixing your computer (a BIOS upgrade is required). (Example, several of our 9 PC's will need the date entered on 1/1/2000. None of them need a BIOS repair.)

—Software Issues

Most software works just fine no matter what the date. But you still need to test and verify! While many software packages, whether for Mac or PC, are ready for Y2k, many are not. Some examples of software that is not ready:

Peachtree for DOS before ver. 10;
Quicken for DOS before ver. 5.0;
Simply Accounting versions 1-3;
Lotus: 123 (DOS v1), cc:Mail before v8, and Symphony. Check the footnote "43" for links to lists of compliant/non-compliant software.

—Custom Software & Data

The most difficult software issue involves custom programs, and custom databases and spreadsheets. Your employees need to verify that the custom data they work with will properly handle the century transition.

Available software can help with this daunting task. For example, Symantec's Norton 2000 will check all popular spreadsheet and database file formats, tell you where there's a data or formula problem, and offer to fix it for you as well! (Expert readers will recognize this is not always a complete solution, but it's good enough in most situations.) (Example: My critical software is Quicken 98 (accounting) ECCO 4 (contact manager), Pegasus Mail (e-mail), and Cheyenne (backup software). These are all Y2k compliant.)

Appendix 2: Y2k Web Sites

Note: I find very little published information that is factual and unbiased (i.e., free of hype and hysteria). The annotations below give some cautions as you explore these Web resources for yourself.

After reviewing over a hundred web sites recommended by many "experts" and by popular Christian commentators, I've concluded that it is almost impossible to find really good, unbiased Y2k information on the Internet. As a result, this list is far shorter than I would like.

If you don't see a site listed, it is almost certainly because I cannot recommend it without reservation. I do recommend these sites (as well as a number of additional sites referenced in the End Notes that follow). Even so, please remember: reader beware! <www.gospelcom.net/ccmag/y2k> A positive "spin" on Y2k from a North American Christian perspective. <www.jps.net/bygrace/general/ Y2K.html> Well-researched, balanced article. Recommendations assume panic will happen, which I consider unlikely as more good news emerges. www.sangersreview.com A useful concise daily summary of Y2k news reports from around the world. <www.y2knews.com> References without comment to Y2k reports in print media. <www.zdy2k.com> Ziff-Davis provides extensive Y2k resources. <www.sba.gov/y2k> US Small Business Administration Y2k info, including how to test your PC. <www.y2k.gov> US main Y2k site, with links to every state Y2k site. <www.fda.gov/cdrh/yr2000/ year2000.html> US Food & Drug Administration database of medical device manufacturer Y2k reports. A good starting place for research if you have or use medical devices. <y2k.policyworks.gov> Master reference database of product Y2k compliance information, with links to other major databases as well. Information in the main database is sparse. Telecommunications product database is very good. <www.rx2000.org> Medical industry non-profit awareness and information sharing consortium. Some valuable information is found here, along with the usual doomsday quotes about how bad the situation could theoretically get.[44] <www.vendor2000.com> Compliance information for tens of thousands of computer hardware and software products.

What else is out there?

Financial experts, economic experts, historians and more are "waking people up" to an issue that they themselves do not deeply understand. There are doomsday sites for churches, for women, for the health-conscious, for those seeking financial wisdom, for survivalists, and more.

Most Y2k web resources simply refer to each other, and to a small number of "experts" who generally accept only the worst-case interpretations of

events. There are vanishingly few true experts out there.

End Notes

1 With apologies to Dave Barry, who can tell a joke better than anyone else on the planet. Dave's take on Y2k is at <www.mercurycenter.com/columnists/barry/docs/db010299.htm>.

2 Do you just want basic Y2k information, as a non-technical person? Here's another resource: the US government toll-free Y2k information line. From 9-8 (Eastern Time) call 1-888-USA-4-Y2K.

3 Why did this happen? Because even today, people prefer to write "98" rather than "1998." It's quicker and easier. Unfortunately, it's also harder to write software that correctly deals with 2 digit years. (It has nothing to do with saving space in computers.)

4 See the comprehensive economic review The Economist, 19 Sept. 1998. <www.economist.com/editorial/freeforall/19-9-98survey/index_bug9.html>. The US government expects to spend $6.4 billion; this estimate is expected to grow a bit more during 1999. See US government OMB report, 12/98, at <http://cio.gov/decdraft6.htm>.

5 Derived from data available online at <www.polisci.com/economy.htm>.

6 US economic estimates are in the range of a 0.1 to 0.2 percent GDP slowdown due to Y2k (<www.fcw.com/pubs/fcw/1998/0427/web-fry-4-28-1998.html>). Other areas of the world receive estimates as high as 0.5 percent over the short run. Analysis of major disasters in the past has shown that while they can be very expensive on a local cost basis, they do not show up visibly in the global economy in the long run. The economic benefit to those making repairs balances out much of the economic devastation.

7 Most of these examples have been personally tested or verified by the author. Additional references are provided in certain cases.

8 <www.baxter.com> A great example of medical systems Y2k impact analysis. Of their 339 products, 23 involve various kinds of patient or medical services reporting 12 of these (52%) have a Y2k problem of some sort. The other 317 products are involved in direct delivery of medical services (blood therapy, heart disease, kidney dialy-

sis, medication delivery). Of these, 6 related kidney dialysis products (2%) must have their schedules set manually if not upgraded. <www.ge.com/medical/year2000> describes General Electric's medical system Y2k issues. Again, the problems generally involve dates on reports, not failure of equipment and certainly not failure to deliver medical services.

9 IATA summary, <www.iata.org/y2k/articles.htm>

10 Here's a good example of what can go wrong with a telephone system: "What happens if I don't upgrade my system? Your telephone system will still continue to function and process calls correctly. What will happen, however, is that day of week and date will not be displayed properly on display telephones. Also, dates will not print correctly on reports, and sequencing in reports will be incorrect since 00 will come before instead of after 99 your [call accounting] output will continue to accumulate correctly, [but] you will need to turn off any features you have activated that automatically direct calls based on day of week." (<www.executone.com/yr2000.htm>) See <www.fcc.gov/year2000/links-manufact.html> for a complete reference list.

11 A good overview of telecommunication issues is at <www.fcc.gov/year2000/faq.html>. One quote: "U.S. consumers may lose international service options as a result of Y2k. Some larger carriers are considering the option of not connecting to systems that are not Y2k compliant. Countries in South America, Russia, Eastern Europe, Central Africa, the Middle East, and others are still in the initial stages of awareness and assessment. It is possible that telecommunications services currently available in the U.S. that use systems in these regions will not be available (temporarily or permanently) to U.S. consumers as of January 1, 2000."

12 Spokesman Vladislav Petrov, widely quoted on 6/19/98, <abcnews.go.com/sections/tech/DailyNews/y2k_russia980619.html>

13 Links to national Y2k web sites can be found at <www.itpolicy.gsa.gov/mks/yr2000/g7yr2000.htm>.

14 An expert analysis of power delivery issues is at <www.albany.net/~dmills/fallback/chapt5.htm>; see also the latest senate summary, as reported at <http://

www.sjmercury.com/business/top/030603.htm>.

15 Recent interview, at <www.worldnetdaily.com/bluesky_exnews/19981221_xex_un_plans_glo.shtml>.

16 See <www.fdic.gov/about/y2k/newsletter/1298-energy.html>. An additional quote: "Forty-five percent of all (critical and non-critical) Y2k power issues have been dealt with," said Gerry Cauley, Y2k Project Manager for the North American Electrical Reliability Council. "We don't feel there are any types of failures that will directly jeopardize the ability to provide electricity to all customers."

17 I have yet to discover a critical Y2k problem in a power delivery "embedded system," other than simple issues of PC-based date change (which requires typing in the correct date on a keyboard).

18 FDIC statement, <www.fdic.gov/about/y2k>.

19 News report quoting VISA spokesman, <www.techweb.com/se/directlink.cgi?IWK19980112S0065>.

20 See the FCC Commissioner's statement on this, at <www.fcc.gov/Speeches/Powell/spmkp818.html>.

21 See the "what's new" section at <www.itu.int/y2k>. Tests have been conducted (all successfully) between Hong Kong, Australia, Denmark, Germany, USA, and more.

22 A Boeing statement, following disclosure of some cockpit indicators that do not show the correct year: "Boeing considers these Y2k issues significant because they generate flight deck effects that are inconsistent with the company's 'quiet, dark' flight deck philosophy. However, no flight critical effects exist, and safety of flight is not compromised. In addition full and normal functionality of the FMS [Flight Management System] is available." <www.boeing.com/commercial/aeromagazine/aero_03/textonly/sy01txt.html>

23 See IATA summary at <www.iata.org/pr/pr98decd.htm>.

24 Interview with Ray Long, FAA Y2k coordinator, December '98: <www.gcn.com/gcn/1998/december14/52a.htm>.

25 The latest government Y2k report card is always found at <www.house.gov/reform/gmit/y2k/index.htm>, while an easy to read summary is at <www.freedom.gov/

y2k/grades/grades.asp>.

26 The OECD has put together a comprehensive overview at <www.oecd.org/puma/gvrnance/it/y2k.htm>.

27 UN guidelines, <www.un.org/members/yr2000/e98l40.htm>

28 There's some information on Y2k and developing nations at <www.undp.org/info21/new/n-y-dc.html>. Be wary when reading. I discovered many wrong conclusions drawn based on factual errors involving misinterpretation of data.

29 <www.amisafe.com> has official statements from banks and other industry sectors. Note these can be hard to understand clearly! It may be easier to just ask your bank.

30 There are many organizations providing Y2k technical help. <www.icta.net/y2k> has a section referring to some that specialize in assisting Christian ministries.

31 See <www.nao.otis.com/y2k_letter.html> for a statement from Otis Elevator, the largest elevator vendor. They have tested all systems and are confident elevators will function.

32 The Gartner group has some suggestions for personal planning. Note they offer a generally pessimistic view of the overall situation (in line with their push to pull in more corporate clients). <gartner5.gartnerweb.com/public/static/home/00073955.html>

33 See <www.serve.com/thibodep/cr/y2k.htm> for a comprehensive analysis of Dr. North's background.

34 Summer 1998 publicity brochure "RGNP98", page 22.

35 From a 2/97 report at <www.rit.edu/~jse9787/papers/infoterm.htm>.

36 <www.techweb.com/se/directlink.cgi?IWK19980112S0065>

37 <www.y2k.gov/java/whatsnew1.html> provides details debunking several common doomsday rumors.

38 An LA Times report, 11/3/97 p. A1, A16, quotes Matt Hotle of Gartner as saying, "all of this stuff is thumbnail [guesses]; it includes costs of equipment that would have been replaced anyway; and does not account for any recent improvements in Y2k repair techniques."

39 North summer 1998 publicity brochure "RGNP98", page 4. 500 billion lines of code x $6/line = $3 trillion.

40 See <www.award.com/tech/y2k.htm> for information on PC's with Award BIOS dated 26 April 1994 to 31 May 1995. These are the only PC's I've ever found that require an upgrade.

41 This problem is known as Time Dilation or the Crouch Echlin Effect, so named after its discoverers. See <www.dell.com/year2000/tech/notes.htm> for more information. Crouch and Echlin sell a software fix for $40 per computer; <www.nethawk.com/~jcrouch/dilation.htm> has more information. Intel claims the problem does not exist; I'm not so sure. (See <http://www.intel.com/support/year2000/c-efaq.htm>.)

42 Ignore the highly advertised panic-inducing tests that check up to 14 different items, most of which have nothing to do with the correct functioning of your system! Visit <www.unicore.com/mpcdownload.html> to get a free test program. If your PC fails this automatic rollover test, use the DOS date command (or the Windows Date/Time control panel) to set the date manually to 1/1/2000, and reboot. (Remember to return to the correct date when you're done, and don't use scheduling software during this test next month's appointments might be deleted!) Almost every PC can be "fixed" through this simple procedure. For an automated test of both the rollover and reboot scenarios, visit <www.rightime.com>. Note their recommendation that you buy some software from them if the rollover test fails. Most people don't need the software; it is only useful if your computer really must automatically rollover the date from 12/31/99 to 1/1/2000 (e.g., a date-dependent life support system) and you can't afford to manually type in the correct date, once, after 2000 begins.

43 Links to some lists of compliant/non-compliant software: Overall chart: <www.cnet.com/Content/Reports/Special/Y2k/chart.html>. Microsoft products: <www.microsoft.com/technet/topics/year2k/product/product.htm>. Intuit/quicken: <www.intuit.com/support/year2000.html>. Lotus products: <www.lotus.com/home.nsf/tabs/y2k>. Borland/Inprise products: <www.borland.com/devsupport/y2000/products.html>. Claris/Filemaker: <www.claris.com/about/year2000.html>. Corel/Wordperfect products: <https://livewire.corel.com/cfscripts/y2k/index.cfm>. Dbase-related databases: <http://www.iag.net/~philb/clipy2k.htm>. (Only Dbxl is truly broken.)

44 Rx2000 concerns focus on Y2k's impact on medical administration and clinical record-keeping (lab results, etc.) See <www.rx2000.org/data/presentations/presents.html>.

45 Y2k analysis requires an understanding of people's expertise in the areas they comment on. I have 29 years of computer system design and development experience, ranging from mainframes (COBOL, etc.) to "embedded system" microchips ("assembly language" for many CPU's). My education is in computer hardware (electrical engineering, specializing in semiconductor electronics and digital communications); my experience is primarily in software and "firmware" (software in embedded systems). In 1993, I moved to Colorado Springs after many years as a technical and management consultant in Silicon Valley. While there, I contributed to the development of many products commonly used today, including early microcomputers, digital telephones and laser printers. Hosted By: Gospel Communications Network. Report problems to: <WebServant@icta.net> Copyright C1999 ICTA.

Photo here of Pete Holzmann

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