Dynamic
Positioning
Committee

Marine Technology Society

DYNAMIC POSITIONING CONFERENCE

October 12-13, 1999

DESIGN SESSION

Year 2000 Contingency Planning
Hope for the Best – Plan for the Worst

Terje Sabo

Kongsberg Simrad Norway

Doug Phillips
Nautronix USA

Terje Sabo – Kongsberg Simrad, Design Year 2000 Contingency Planning

Doug Phillips – Nautronix Hope For the Best – Plan for the Worst

INTRODUCTION

The millenium is close and now it is time to change focus from system compliance to contingency planning in order to avoid problems causing interruptions in operations and thereby loss of business.

Nautronix and Kongsberg Simrad, as major suppliers of Dynamic Positioning systems, have a common interest to minimize the potential that their systems should cause problems. The Dynamic Positioning Control Systems are a critical part of the vessel. If the system is not available during critical operations the customer's revenue and reputation may suffer as well as our own image.

However diligent we have been as suppliers, and you have been as operators, in our checks and tests to ensure that there is every reason to 'Hope for the Best'. We must also consider the possibility that something has been missed and 'Plan for the Worse'

SUMMARY OF WHAT SIMRAD AND NAUTRONIX HAVE DONE

Short Summary of the Nautronix Y2K Project

Nautronix Year 2000 (Y2K) compliance review and testing has been a four fold approach to identify, review and test all the existing systems 4000 series Compliance being checked:

- Review of the software source code for time related issues
- Testing of the each system's software on ASK hardware available in - house or desk top PCs – this represented testing some systems.
- Review of suppliers' information for the component parts of the ASK 4000 system   hardware and proprietary software
- Testing on actual vessels if the above was not deemed adequate, or if the system was a special that could not be tested in house. Testing on board was also performed wherever possible to spot check the validity of the findings from the above.

In addition all ASK 5000 systems and new ASK 4000 systems from around July 1998 were to be systems tested in the factory prior to shipment.

Acceptance Criteria

Before embarking on Y2K compliance checking it was necessary to decide on an acceptable acceptance criteria – Nautronix, in line with the IMCA guidelines, adopted the British Standards Institution definition of Year 2000 conformity requirements DISC PD2000-1.

The standard is summarized as:

- No value for current date will cause any interruption in operation.
- Date based functionality must behave consistently for dates prior to, during and after year 2000.
- In all interfaces and data storage, the century in any date must be specified either explicitly or by unambiguous algorithm or interfacing rules.
- Year 2000 must be recognized as a leap year.

In addition to this general definition, the following rollover dates, identified by IMCA for Year 2000 conformity, were used to for the testing. The first seven are recommended for testing of any system as they cover the initial millennium problem, the remaining ten being used for IMCA's extended compliance checking.

Rollover	1998 to 1999	Power on / off
Rollover	31st August 1999 to 1st September 1999	Power on / off
Rollover	8th September 1999 to 9th September 1999	Power on / off
Rollover	9th September 1999 to 10 September 1999	Power on / off
Rollover	1999 to 2000	Power on / off
Rollover	28th February 2000 to 29th February 2000	Power on / off
Rollover	29th February 2000 to 1 March 2000	Power on / off
Rollover	2000 to 2001	Power on / off
Rollover	28th February 2001 to 1st March 2001	Power on / off
Rollover	2001 to 2002	Power on / off
Rollover	28th February 2002 to 1st March 2002	Power on / off
Rollover	2002 to 2003	Power on / off
Rollover	28th February 2003 to 1st March 2003	Power on / off
Rollover	2003 to 2004	Power on / off
Rollover	28th February 2004 to 29th February 2004	Power on / off
Rollover	29th February 2004 to 1st March 2004	Power on / off
Rollover	2004 to 2005	Power on / off

In addition each of the rollover dates used in the testing were checked for three possible conditions:

- With the computer running through a rollover and starting the application software afterwards.
- Run the computer with the application software running through a rollover.
- Restart the computer and application after a rollover.

Short Summary of Kongsberg Simrad's Y2K Project
Kongsberg Simrad's Y2K Project started the summer of 97 after we started to receive compliance requests from some customers in land based industry.

The previous QA Manager was assigned project manager by the Management Team, and the different product departments was requested to verify their products for Y2K compliance. No standard test procedures were prepared and no compliance criteria were defined. During spring 98 some customers started asking for test reports (Stolt Comex Seaway and Statoil). Based on this we saw that we had to start all over again. Compliance Criteria was established, test procedures were developed, and we started to test new and old products.

Compliance Criteria
The compliance criteria was copied from Stolt Comex Seaway and corresponds to those defined by BSI DISC PD 2000-1:

1. Neither the performance nor the functionality of the Hardware and Software Systems, and/or products will be affected by any date changes to the Date Format caused by the advent of the Year 2000.
2. Neither the performance nor the functionality of the Hardware and Software Systems, and/or products will be affected by the fact that Year 2000 is a leap year.
3. No value for current date will cause any interruption in the operation of the Hardware and Software Systems, and/or products.
4. All manipulations of time related data will produce the desired results for all valid date values within the Application Domain.

Terje Sabo – Kongsberg Simrad,   Design   Year 2000 Contingency Planning

Doug Phillips – Nautronix   Hope For the Best – Plan for the Worst

5. Date elements in user input fields, interfaces and data storage will permit the specification of the century to eliminate date ambiguity, without human intervention, including leap year calculations.

6. Where any date is represented without a century, the correct century is unambiguous for all manipulations involving that element.

Test procedures

The test procedures prepared cover the following rollovers:

Rollover	1998 to 1999	Power on / off
Rollover	8th September 1999 to 9th September 1999	Power on / off
Rollover	1999 to 2000	Power on / off
Rollover	28th February 2000 to 29th February 2000	Power on / off
Rollover	29th February 2000 to 1st March 2000	Power on / off
Rollover	30th December 2000 to 31st December 2000	
Rollover	31st December 2000 to 1st January 2001	
Rollover	28th February 2001 to 1st March 2001	Power on / off
Rollover	28th February 2004 to 29th February 2004	Power on / off
Rollover	31st December 2009 to 1st January 2010	Power on / off
Rollover	24 hours stability test 1999-2000	Power on / off

Findings from in-house test program

• The old DP systems, ADP 503 and ADP 311 are not compliant. They only accept year starting with "19xx". Solution is to upgrade or to set back the clock.

• On the ADP 70X systems it is not possible to enter 29th February 2000, but when the system is left running, it shows the correct dates and handle the leap year dates

• On the new SDP systems, we have identified two minor issues related to printing:

  • The alarm/event printer prints 00 MARCH for 29th February. This is due to a problem in the operating system VxWorks running on the SBC 400 computer.
    The Windows NT Operator Station, running Windows NT, shows the correct date.

  • The Print Page function prints year 1980 for all years from 2000. This is due to wrong settings in one isolated function.

• Minor problem related to older HPR software. Compliant software available and most of the systems are upgraded. The rest will be upgraded before Year 2000.

Sub-suppliers

All sub-suppliers were requested to come up with Y2K compliance information for their products and internal business systems. Very few have any problems. The most critical has been the problem with old GPS receivers used in the DARPS/DPS systems from Seatex. They were declared compliant by the manufacturer, but testing by Seatex at the Almanac rollover 18th August revealed problems. We managed to inform most of the influenced customers.

Information

• All results both from in-house program and sub-suppliers are registered in a dedicated Lotus Notes database, available to all offices in Kongsberg Simrad.

• Information sent to customers is tailored to the systems installed, and handled by one person to achieve control

• We decided early to not publish compliance status information on the Internet:

  • We want full traceability of who has received what information, so we are able to inform about new findings

  • We can not include sub-supplier information on our website.

Terje Sabo – Kongsberg Simrad,   Design   Year 2000 Contingency Planning

Doug Phillips – Nautronix   Hope For the Best – Plan for the Worst

WHY THERE IS GOOD REASON TO HOPE FOR THE BEST

The results of Nautronix's efforts are summarized by Nautronix's Compliance statement that covers the ASK 4000. The level of compliance depending on the type and BIOS version of the processor boards: -

- *ASK 4000 series* –

  Systems with Xycom processor boards with type No.s 684 or 674 (with version lower than 5.1) will roll over to the year 1900. The ASK 4000 is Year 2000 compliant, with no issues, for those systems with a different processor board to the ones indicated with the minor issue.

- *Solution*

  This will not affect the operation of the system and can be manually adjusted.

There is therefore every reason to hope for the best in that considerable effort has been made by suppliers such to ensure that their systems are compliant. In addition many DP vessel operators have performed their own compliance testing on board their vessels; and systems have been tested by Nautronix's technicians on board vessels and in the test area prior to shipping.

In addition the Nautronix ASK system has been specifically designed to not care about date and time. After all it is of no significance to a DP system what day of the week, month or time it is. It is not even concerned about whether it is day, night or even the DP Operator's birthday.

The situation for Kongsberg Simrad Systems is the same as for the Nautronix systems. The DP systems are real time systems, where date information is only used for tagging information on a printer, a display or a log file. The functionality is not dependent upon information about year, date and times such as pay roll systems.

Several customers have performed on board testing and no problems have been reported. We have also assisted customers having installed integrated systems from us (DP, Vessel Management, Safety and Process Control) in onboard Y2K testing. The results of these have not identified any problems related to the millennium change. If problems have occurred this has been caused by the test itself. We have therefore upgraded our procedures to prevent this, and also emphasized the test planning process, which is very important for integrated systems.

But a DP system has a lot of interfaces to other equipment, such as reference systems and sensors. Luckily, the Kongsberg DP system has no interfaces where year and date information is part of the protocol. As mentioned above, the DP system does not care which date or year the calendar shows in order to operate.

Plan for the worst

The best thing about the millennium problem is that we know when it will happen, compared to other incidents that just happen. The bad thing with the Y2K is that no one can exactly predict what is going to happen.
And due to the nature of DP systems we should except problems causing major problems.
But anyway measures should be taken to prevent critical situations or loss of business, if there should be a problem.
As explained above incidents can always happen to a computer based control system. And a vessel should have prepared risk analysis and established the necessary procedures to handle critical incidents.

Terje Sabo – Kongsberg Simrad,   Design   Year 2000 Contingency Planning

Doug Phillips – Nautronix   Hope For the Best – Plan for the Worst

IMCA has produced a Year 2000 Contingency Planing Process Description. This document presents a simple procedure to be followed to identify risks. All vessels should do this exercise.

For us as suppliers of DP systems there are several precautionary measures that should be taken before and during the millennium change:

- ✓ Y2K tests performed onboard vessel in operating conditions
- ✓ Backup systems (if any) should be checked and available.
- ✓ Stand by crew trained and available
- ✓ Procedures for handling critical incidents should be available
- ✓ Check that available alarm printers and/or logging devices are switched on.

And in order to identify problems as early as possible it is important to check the following after the roll over:

- ✓ Check time and date on monitors are correct
- ✓ Check that time and date on print-outs are correct
- ✓ Check that Sorting of events and alarms (If available) are correct.
- ✓ Check that Man Machine Interface operates as normal
- ✓ Check that monitoring and control of peripheral equipment is as expected
- ✓ If possible, check all modes and functions

In case of Y2K rollover problems collect as much information as possible before reporting to us:

- ✓ Type of system / equipment / peripherals
- ✓ Detailed description of incident:
  - ▪ Symptoms / Consequences
  - ▪ Print outs / error messages
  - ▪ Intermittent or permanent problem
  - ▪ Other relevant information

WHAT WILL SIMRAD AND NAUTRONIX AS SUPPLIERS DO TO ASSIST YOU IN TO THE YEAR 2000?

Kongsberg Simrad

During the roll over from December 31st 1999 to January 1st 2000 will have extra staff available at our premises to take care of requests. The Y2K support center will be open from 08:00 Dec. 31st 1999 to 16:00 Jan. 1$^{st\ 2000.}$

 In addition to personnel on duty at our Y2K service center, about 50% of total available support engineers will be available through telephone back up. These resources will be called upon as soon as there is a need for more than those already on duty. Our 24 hrs on-call service will of-course be available as normal

We recognize that our systems are used worldwide and will also take this aspect into our plans.

We will also have resources available from our Product and Project departments for technical assistance to our service engineers.

The resources and actions described above apply to our support organization here in Norway. In addition to these actions we will also involve our global support organization in our contingency efforts, as well as critical suppliers as part of our contingency measures.

Terje Sabo – Kongsberg Simrad,   Design   Year 2000 Contingency Planning

Doug Phillips – Nautronix   Hope For the Best – Plan for the Worst

To be able to give the best possible support during Y2K rollover, we would like to exchange status information with our customers. We would be pleased if you could inform us about your Y2K Organizations contact persons, phone/fax numbers and e-mail addresses.

In addition to the measures described above, we have also established a contingency team to handle our internal systems and infrastructure to assure that we are able to receive and handle any requests.

Nautronix
Nautronix will have their own contingency planning in place to ensure that they can support their customers through the millennium rollover. The key items of this that customers are interested in, other than Nautronix ensuring, that our business continues to run are

- Unknown risks – here we can hopefully rely upon our other offices and the majority of our systems going through the millennium before us in San Diego and us being aware of problems as the day develops
- For those with operational systems - Emergency coverage over the millennium – we will supplement our normal emergency coverage with back up engineers on duty trained in the Y2K
- For those requiring delivery early in the year 2000 we will be forward buying and stocking equipment to avoid supplier problems in the first part of the year 2000
- Lost or delayed shipments – we will inform customers of shipping cut off dates to avoid millennium problems with shippers
- Checks and tests on our communications equipment (faxes, telephones, cell phones) and our PCs and servers to ensure communications can be kept open with our customers

CONCLUSIONS

Hoping for the best and expecting the worst is of course basically a reiteration of the famous Murphy's Law – if it can go wrong it will go wrong or something like that. However hard we try to anticipate what will happen there is always a possibility that things can still go wrong. It is true that it is rarely the things that you have taken into account and allowed for that go wrong, it is necessarily always those things that you have not accounted for.

From an interesting book on risk and risk management – Against the Gods by Peter Bernstein – he tells of an interesting story which is has useful parallels for the Y2K problem and contingency planning.

The story goes: -

A group of hikers in the wilderness came upon a bridge that would greatly shorten their way home. Noting that the bridge was high and rickety, they fitted themselves out with ropes, harnesses and safeguards before starting across. When they reached the other side they find a hungry Mountain Lion - patiently awaiting their arrival.

You the operators are the hikers; we the suppliers have given you the ropes, the harnesses and the safe guards. Hopefully from this presentation, and the information in this paper, we have also helped you to prepare for that Mountain Lion – if you want to give the Mountain Lion's a name   we suggest Murphy.