

## SATELLITE & HIGH FREQUENCY BROADCAST

### ■ Summary

- The industry consensus is that Y2K problems are unlikely to affect satellites now in orbit. However, there is some concern about earth stations and the interconnection of satellite gateways with public switched telephone networks, particularly abroad. Since earth stations serve as the link to multiple private as well as public terrestrial-based networks that may include date-dependant elements, these concerns are especially significant.
- Most respondents expect full compliance in all systems by September 1999. Respondents can be split into two groups: over 70 percent have a formal process for managing the Y2K problem, while under 30 percent do not have a formal process or are addressing problems simply as they arise.
- The small number of satellite corporations that have developed contingency plans is a concern.
- The respondent companies not commencing commercial service until after January 1, 2000, on the whole, recognized the severity of the Y2K problem. Some believe they have an advantage over existing systems in the hardware and software procurement process since they are purchasing, constructing, and integrating their systems in an environment of heightened sensitivity to Y2K issues.

### INTRODUCTION

The Commission surveyed U.S. satellite operators and HF broadcasters concerning their Y2K readiness and contingency plans. The Commission has also undertaken a number of initiatives regarding the Y2K challenge. The Commission conducted three Y2K roundtables with the satellite, international, wireline and HF service providers that discussed challenges facing the industry and potential solutions as pertains to international services.

### THE SATELLITE NETWORK

A satellite in orbit can communicate with users on the ground through various earth stations. These stations can be, for example, large earth stations for transmission and reception of video signals for broadcast or cable, earth stations connecting to the public telephone network, 18-inch rooftop receiving antennas for Direct Broadcast Satellite (DBS), rooftop receiving antennas at a convenience store as a part of a private Very Small Aperture Terminal (VSAT) network, or handsets or mobile transceivers for a Mobile Satellite Service (MSS).

For purposes of the Commission's assessment, the satellite networks were broken up into network elements, support systems, and auxiliary systems. Network Elements of a satellite system are defined as those system components (hardware and/or software) that directly affect satellite transmission and/or reception. The two major elements of a satellite system are earth stations and in-orbit satellites. An earth station is comprised of antennas, computers, modulators, high-power amplifiers, electric power bays, antenna pointing and drive systems, and up-converters, among other things. The satellite (often referred to as a "space station") has components that complement those on earth stations: down-converters, de-modulators, etc.

Both earth and space stations may rely upon date- and time-sensitive systems and processes through electronic switches and clocks, most of which require precise synchronization. Earth stations act as the connection to terrestrial networks and because of this functionality, earth stations may have increased vulnerability to Y2K anomalies. Operationally, a data, voice, or video signal is up-linked from an earth station, in a specified frequency band, to a designated space station. The signals are





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then relayed through the space station to a single point, or to many points of reception around the world, including cable headends, broadcast stations, and homes.

Auxiliary systems are defined as systems or components such as payroll, human resources, backup systems, security and alarm control systems, and environmental control systems. The network control center (NCC), in satellite/earth station systems, is the key auxiliary component. A network control center is an assembly of administrative and technical devices, all interconnected through the dynamics of date and time.

### Methodology

The Commission's survey targeted satellite operators that serve both individual and business users. Surveys were sent to both current and start-up service operators including all participants of the July 1998 Commission roundtable. These included Fixed Satellite Service (FSS) operators, MSS operators in the Big and Little Low Earth Orbit (LEO) bands, as well as Geostationary Mobile Satellite Service (GMSS) providers. In addition, the Commission surveyed Broadcast Satellite Service (BSS) providers such as DBS and future satellite Digital Audio Radio Service (DARS) operators.

In the satellite industry, some operators are also corporate affiliates of satellite manufacturers. The survey also targeted this relatively small industry segment. By targeting these parent corporations, the Commission hoped that the survey would also provide information about the preparedness of satellite manufacturers.

### Assessment

The response rate from the satellite industry was mediocre. The Commission contacted 32 operators and received 28 responses, but only 12 of these responses were complete. Of the companies that responded, over 70 percent indicated that they have implemented a formal Y2K plan.

The Commission has since contacted the various companies to try to get both a better response rate and more complete data. The Commission realizes that some companies have expressed reluctance to provide data or are still working to send information as this Report went to press. Since developing a good understanding of the Y2K problem in the satellite industry is difficult without complete data, the Commission continues to seek additional response from all service providers that have not yet returned the questionnaire. However, as of the release of this Report, many of these companies are still hesitant to share individual company information that is essential to fully assess the impact of the Y2K problem. Given the relatively modest response rate, figures in this report might not accurately reflect the satellite industry's overall Y2K readiness.

Industry information suggests that U.S. satellites are at low risk of experiencing adverse disruption or failure due to the Y2K problem. However, given their reliance on earth stations and, in relevant cases, interconnection with the public switched telephone networks, satellite operators still have a responsibility to evaluate and confirm earth station and terrestrial equipment compliance. Some antenna controls and earth stations contain large computers and complex electronics that are date and time-dependent. Responses from earth station manufacturers concerning earth station compliance were inconclusive.

As Figures 1 and 2 indicate, the respondents who have formal processes for dealing with the Y2K problem have completed, on average, almost 100 percent of the inven-

tory stage and nearly 90 percent of the assessment stage for network elements. Respondents expect both stages to be finished by March 1999. With regard to support systems, the inventory and assessment stages are also expected to be finished by March 1999. The inventory and assessment stages of auxiliary systems are near completion. The assessment of all systems project a completion date of July 1999.

Approximately 55 percent of the remediation and testing of network elements has been completed, with 100 percent completion forecasted for September 1999. Operators anticipate a completion date of July 1999 for support systems.

Thirteen percent of the rollout phases have been completed. The rollout of network elements is expected to be completed by October 1999.

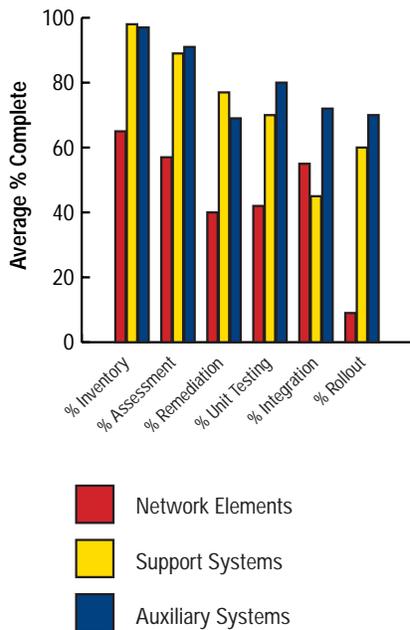


Figure 1.

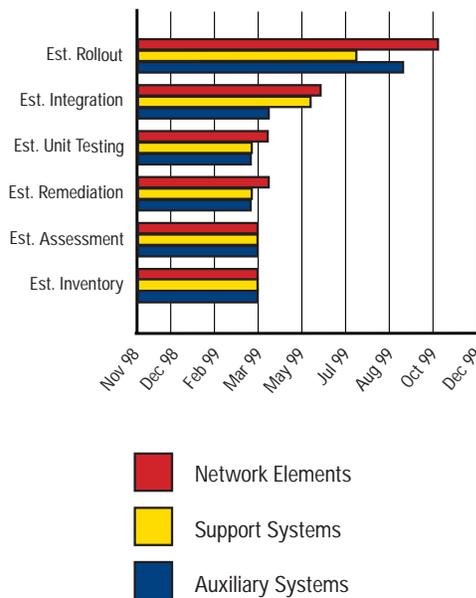


Figure 2.

The integration-testing phase had varied responses. The estimates for integration and system tests in the three areas of network elements, support systems, and auxiliary systems were either consistently good or consistently poor when viewed on a company-by-company basis. The number of companies that fell below 50 percent in each of the categories outnumbered those that estimated above 50 percent completion by almost two-to-one. Answers ranged from “not at all” to 100 percent, and some companies did not expect completion until late in the fourth quarter of 1999.

The questions regarding probability of failure and risk of failure as a result of the Y2K problem and the preparation of contingency plans in light of this event were the two categories with the poorest response rate, even among the limited number of questionnaires returned to the Commission. Approximately 25 percent of the surveys returned had data for these fields. Understandably, but disconcertingly, the companies that had the highest marks in previous fields again had the highest in these two. This is worrisome for the simple reason that with the absence of specific information to the contrary, it appears that the least prepared companies have neither addressed internal Y2K issues nor developed appropriate contingency measures.

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The areas for response in the assessment of probability of failure and risk of failure as a result of the Y2K problem include electric power and suppliers, as Figures 3 and 4 indicate. Of the approximately 25 percent of respondents that conveyed information on these critical areas, the estimates ranged from a mere 20 percent to total completion of assessment and preparation of contingency plans.

**ADDITIONAL ASSESSMENT DATA AND INFORMATION**

The assessment survey asked several more questions concerning whether each company had adopted a standard definition for Y2K compliance, whether satellite operators were working with any other commercial entities on the Y2K issue, the status of commercial interactions with their vendors and customers, and the availability of resources for their Y2K efforts.

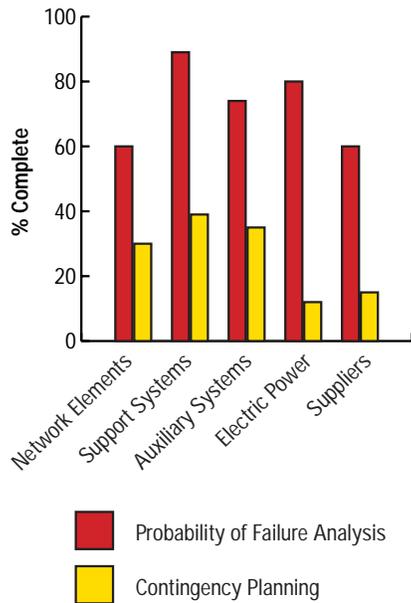


Figure 3.

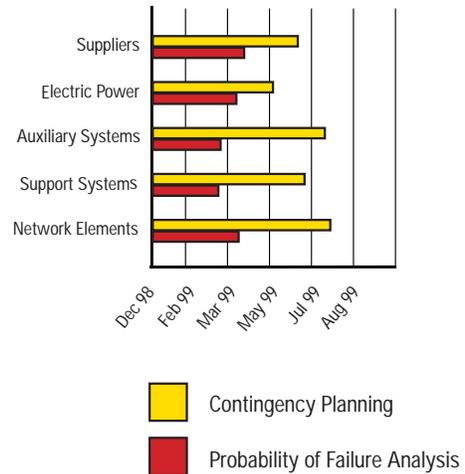


Figure 4.

Survey results show an even split between operators who have and have not adopted an industry-developed definition. Of the 50 percent of operators that selected a standard, most chose the British Standard. The second most selected standard was IEEE 2000.1. Still other operators chose to modify or employ portions of the IEEE 2000.1, GSA, Bellcore, and the British Standard.

In addition, many corporations in the satellite industry that work with other carriers, vendors, foreign carriers, or foreign governments are still uncertain about whether or not the other carriers have adequately addressed the Y2K problem.

Overall, the responses indicate moderate satisfaction with vendor interactions. Respondents indicated they have sent letters requesting compliance status for suppliers' software and equipment items. Most suppliers have responded.

While most of the respondents indicated a shortage of either information or resources, less than 50 percent indicated that they were lacking both. Satellite operators not currently providing service note the negative cash flow environment in which they are operating and that the Y2K problem is diverting already limited resources.

Some respondents indicated that since commercial service for their own system would not begin until after January 1, 2000, that the Y2K problem would be addressed prior to commencing service. The respondent companies not commencing commercial service until after January 1, 2000, on the whole, recognized the severity of the Y2K problem. Some believe they have an advantage over existing systems in the hardware and software procurement process since they are purchasing, constructing, and integrating their systems in an environment of heightened sensitivity to Y2K issues. Still others mentioned the performance of formal testing procedures for Y2K compliance prior to acceptance of any equipment to be delivered to it under procurement contracts.

### CONCLUSIONS AND REMAINING CONCERNS

The general assessment of industry is that in-orbit satellites, or so-called space stations, are generally free of Year 2000 problems because they are relatively devoid of time- and date-dependent processes and systems. However, to the extent that satellites interconnect with earth stations to access various public networks, there is some concern. In that regard, inasmuch as the dates and percentages conveyed, this report may not accurately reflect the totality of the satellite industry's Year 2000 readiness, the FCC must assign some component of risk to the industry due to the mediocre response of the industry to the FCC's survey.

#### *Consumer Tips*

- Confirm with your set-top box provider and your Direct Broadcast Satellite receiver manufacturer that all date-sensitive hardware and software in your home is Y2K compliant.
- If you rely on DBS for news and weather information, make sure you have battery-powered radio or TV available so that you can receive over-the-air broadcasts.

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## INTERNATIONAL HIGH FREQUENCY (HF) BROADCASTS

### Summary

- HF broadcasting stations indicate that they should be ready for Y2K.

### INTRODUCTION

High Frequency (HF) broadcasting, also known as Shortwave Broadcasting, is a radio service licensed by the Commission to operate between 5,950 kHz and 26,100 kHz. This is an international broadcast service where transmissions are intended to be received by the general public in foreign countries.

### METHODOLOGY

The survey targeted all of the 21 FCC-licensed, international HF broadcasters.

### ASSESSMENT

The Commission received 15 submissions for a response rate of 72 percent. The 15 submissions represent a cross-section of the Commission's HF licensees, ranging from smaller stations with only one transmitter and one antenna, to stations with more than one transmitter and more than one antenna.

As Figures 5 and 6 illustrate, the respondents who have devised a formal process for managing Y2K remediation efforts have completed, on average, almost 100 percent of the inventory for network elements, support systems and auxiliary systems. Respondents will have completed over 95 percent of the assessment for network elements, support systems and auxiliary systems by the end of the second quarter of 1999.

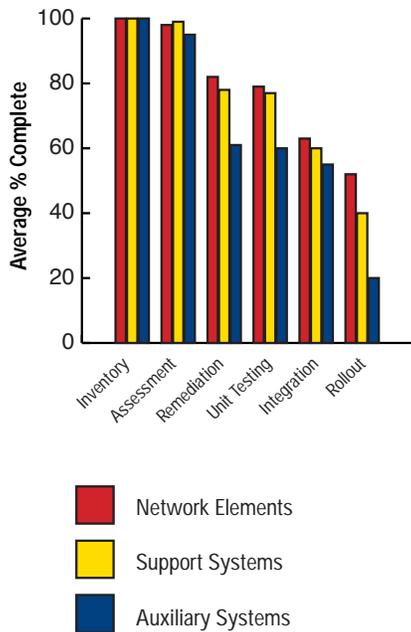


Figure 5.

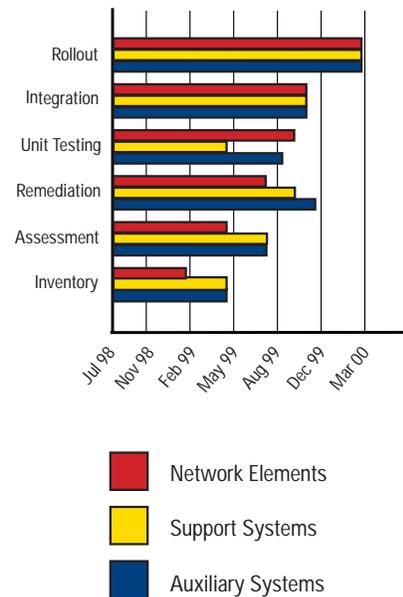
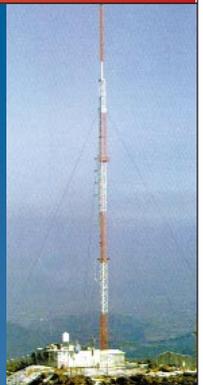


Figure 6.

With regard to network elements, respondents estimate that the remediation phase is 85 percent accomplished with completion by August 1999. The testing phase is 79 percent accomplished with completion by October 1999. The integration phase for network elements is 66 percent complete with total completion by November 1999.



Finally, the rollout phase is 53 percent complete with completion in advance of the millennial rollover.

With regard to support systems, as represented by Figure 6, the remediation, testing, and rollout phases are anticipated to be completed by August, May and December 1999, respectively.

As for auxiliary systems, remediation, testing, and rollout phases are moving towards completion. The remediation phase is 62 percent accomplished with completion by December 1999. The testing phase is 61 percent accomplished with completion by September 1999. The integration phase for network elements is 53 percent complete with total completion by November 1999. Finally, based on the respondents' current projection of rollout completion, auxiliary systems are expected to be Y2K compliant by December 1999.

In September 1998, the Commission held a conference call on Y2K issues with 11 of the 21 HF broadcasters. The information gathered during this conference call was consistent with the conclusions of the Commissions' subsequent assessment. While there is the possibility that problems could arise with transmitters, antennas and other related equipment, HF broadcasters represented that their systems should be ready prior to January 1, 2000. However, broadcasters noted they had experienced some difficulty in obtaining information from equipment manufacturers about Y2K compliance.

Figures 7 and 8 illustrate that the respondents who have devised a formal contingency plan, have completed, on average, over 80 percent on network elements, almost 100 percent on support systems and auxiliary systems, and about 50 percent on suppliers. Estimated completion dates are early May 1999, except for suppliers, which are early August 1999.

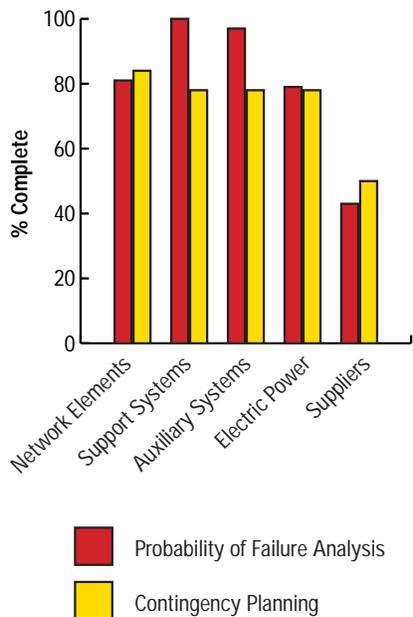


Figure 7.

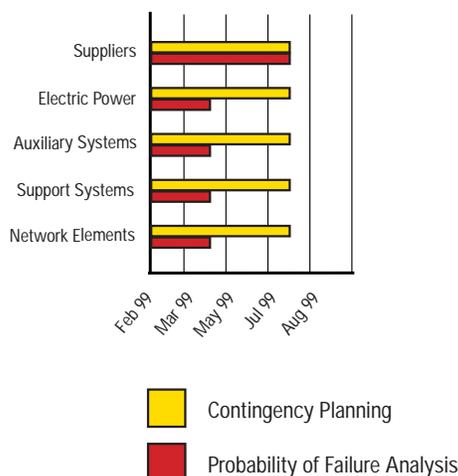


Figure 8.



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### **ADDITIONAL ASSESSMENT DATA AND INFORMATION**

The assessment survey queried whether the industry had adopted a standard definition for Year 2000 compliancy, those organizations with whom HF licensees were involved with on Y2K issues, the status of the commercial interactions with their vendors, and the availability of resources during their Y2K remediation efforts. Twenty percent of the licensees indicated that they used one of the industry standards. Twenty percent of the licensees also indicated that they have worked with the National Association of Short Wave Broadcasters. Fifty percent of the licensees rated their vendors "very satisfactory" with only two indicating "moderately satisfactory." There were only three responses concerning whether respondents were lacking resources: one checked "information" but didn't comment on what information was lacking, one entered "no," and one entered "N/A."

### **CONCLUSIONS AND REMAINING CONCERNS**

The FCC has no information at this juncture to indicate that HF broadcasting stations are not generally prepared for the Year 2000 problems. While there was the possibility that problems could potentially arise with transmitters, antennas, and other related equipment, it was the general consensus of the industry, as evidenced by the survey, that these devices will attain Year 2000 compliancy before the millennial transition.

#### ***Consumer Tips***

- Although HF stations do not expect to encounter Y2K problems, HF listeners should be aware of possible Y2K-related interruptions of service.
- HF broadcasting station audiences should be aware that from December 31, 1999, to January 1, 2000, stations may switch from line fed programming to taped programming in the event of interruptions in service.