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**PROGRAM INFORMATION SYSTEMS MISSION SERVICES**

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**Sustaining Engineering Support  
for Agencywide Administrative  
Systems (SESAAS)**

**Year 2000 Compliance Plan**

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National Aeronautics and  
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SESAAS  
Year 2000 Compliance Plan  
Consolidation Center Signature Page

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## **1. INTRODUCTION**

This document is the Year 2000 (Y2K) Compliance Plan for the NASA Agencywide systems supported by Sustaining Engineering Support for Agencywide Administrative Systems (SESAAS). Six out of the eight systems require some degree of modifications to make them Year 2000 compliant. The systems requiring modifications are:

- NASA Personnel/Payroll System (NPPS)
- NASA Training and Development System (NTDS)
- NASA Equipment Management System (NEMS)
- NASA Property Disposal Management System (NPDMS)
- Acquisition Management System (AMS)
- NASA Supply Management System (NSMS) - Electronic Data Interchange /Just-in-Time Ordering (EDI/JIT) subsystem.

The mainframe NASA Supply Management System (NSMS), and the Consolidated Personnel/Payroll System (CAPPS) are Year 2000 compliant.

### **1.1 Purpose**

The primary purpose of the Year 2000 Compliance Plan is to define the overall project approach and objectives. It provides details of the compliance approach, compliance schedules, testing approach, and external interface coordination.

## 2. PROJECT OVERVIEW

SESAAS provides sustaining engineering support to maintain the Agencywide application software and documentation in a current and operational state. Software maintenance is performed in response to regulatory, policy, and environment changes. Year 2000 compliance modifications are being implemented as regulatory changes. Configuration Change Requests (NASA Form 1620) have been written and approved to bring each system into Year 2000 Compliance.

### 2.1 Background

The NASA Information Resource Management (IRM) office requested a Rough Order of Magnitude (ROM) assessment of the Year 2000 impact on all SESAAS systems. Figure 1 shows the NASA Agencywide systems supported by SESAAS, and the Centers that currently use them. Figure 2 shows the results of a preliminary Year 2000 impact assessment performed on each system. The results of the impact assessment were the primary source of information used to plan and schedule the actual Year 2000 compliance work for each system.

A Year 2000 Compliance review was conducted with each of the seven system's Program Functional Managers (PFM) to establish the need and an appropriate time to bring the respective systems into compliance with minimal impact to the user community. A decision was made to treat the Year 2000 compliance requirement as a regulatory change to be processed as a normal regulatory release within the sustaining engineering process.

<b>Applications</b>	<b>HQ</b>	<b>ARC</b>	<b>DFR C</b>	<b>GSF C</b>	<b>JSC</b>	<b>KSC</b>	<b>LaR C</b>	<b>LeR C</b>	<b>MSF C</b>	<b>SSC</b>
<b>NPPS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>CAPPS</b>	<b>X</b>								<b>X</b>	
<b>NSMS</b>	<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>NSMS EDI/JIT</b>					<b>X</b>			<b>X</b>	<b>X</b>	
<b>NTDS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>NEMS CENTRAL</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>NEMS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>NPDMS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>AMS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

**Figure 1 - Application Usage by Installation**

Functional Area/ Application	Mainframe Application SLOC	Estimate to Convert (Man-hours)	Estimate to Test (Man-hours)	Total (Man-hours)
<b>Human Resources</b>				
NPPS	474k	2,000	960	2,960
NTDS	248k	60	160	220
CAPPS	90k	80	160	240
<b>Procurement</b>				
AMS	123k	210	320	530
<b>Property Mgmt.</b>				
NEMS	162k	5,850	480	6,330
NPDMS	119k	290	480	770
NSMS	287k	0	0	0
NSMS EDI/JIT	42k	20	20	40
Totals	1,545k			11,090

**Figure 2 - Application Impact Assessment**

## 2.2 Compliance Approach

All NASA Centers have site specific programs that make use of data elements in the Agencywide core system files. The Consolidation Center is aware that any change to Agencywide core files will have a ripple affect in these site specific programs. The Consolidation Center adopted a Year 2000 compliance approach that makes every effort to minimize the amount of impact on the Center's programming resources. The approach is based on the following premise:

1. Stay flexible and open-minded on all compliance decisions
2. Publish Detailed Conversion Documents for each system
3. Investigate Y2K compliance tools that could speed up the analysis process

### 2.2.1 Conversion Decisions

To minimize the impact on both Agencywide core code and Center site unique code, the Consolidation Center adopted a general approach that only dates used in date comparisons, date computations, and sequencing will be converted to carry the century. Date fields used only for display purposes (screens or reports) will not be converted.

Of the "date" fields that are to be converted, the Consolidation Center has adopted the approach that each "date" field will be evaluated individually. The conversion method (date expansion, Natural Date format, logic change, etc.,) that causes the least amount of impact will be employed.

The Consolidation Center will provide the appropriate file conversion programs for any file affected by “date” field changes.

### 2.2.2 Detailed Conversion Documents

A Detailed Conversion Document (DCD) will be generated for each Agencywide system requiring Year 2000 Compliance modifications. This DCD will provide the results of the detailed impact analysis performed on the system. Each Center will use this information to perform their own impact analysis on Center site unique code. The most critical piece of information presented in the DCD will be the proposed data element changes for date fields. Figure 3 is an example of how this information might be presented in the DCD.

The DCD will present all “date” type data elements found in the database. The DCD will show the data element name, current length, and current format. The DCD will also indicate all database files where that data element is found. If the date field is to be changed (i.e. Expanded to allow century), the new format and length will be indicated. The NC notation indicates that no changes have been made. The DCD will also indicate the files in which the date field will be changed.

Data Element	Current Length	New Length	Current Date Format	New Date Format	File #1	chg file y/n	File #2	chg file y/n	File #3	chg file y/n
element #1	N6.0	N8.0	yyymmdd	yyyymmdd					x	y
element #2	A8	NC	yy/mm/dd	NC	x		x			
element #3	D	NC	yyyymmdd	NC	x		x		x	
element #4	N4.0	NC	yyyy	NC					x	
element #5	A4	NC	yyyy	NC						

**Figure 3 - Data Element Changes Sample Report**

In cases where Year 2000 dates will be handled with program logic, examples of the logic will be included in the Detailed Conversion Document for centers to duplicate in site unique processes, if desired.

### 2.2.3 Year 2000 Compliance Tools

The Consolidation Center evaluated several Year 2000 tools designed to aid in the detailed analysis of ADABAS/Natural code. The selected tool, called Y2K Tool, parses Natural code, tracks “date” data elements and their alias’, and provides detailed reporting of its findings. The Y2K Tool, along with user documentation and installation instructions, has been made available to all NASA Centers free of charge. Centers can obtain assistance of the operation of the tool, or report problems found with the tool, by calling the NACC Technical Services Center and specifying SESAAS Y2K Tool..

### 2.3 Release Schedule

On January 6, 1997, commitment dates for beginning Year 2000 compliance work were obtained from the PFM’s for all Agencywide systems. This allowed a Year 2000 Release Schedule to be generated (see Figure 5).

System	5/97	6	7	8	9	10	11	12	1/98	2	3	4	5	6	7
NPPS								D			R		P		
NTDS								D		R		P			
NEMS		D								R		P			
NPDMS						D				R		P			
AMS								D			R		P		

D - Detailed Conversion Doc    R - System Rel. Beta Testing    P-System Rel. Production

Figure 5 - Agencywide Year 2000 Release Schedule

The release schedule shows three separate milestones for each system. The first milestone (D) is for the delivery of the DCD which provides detailed information to the Centers on the exact database file changes that will occur in a system. The second (R) indicates the date when the system will be released for the 60 day Beta testing period. The third milestone (P) indicates the date when the system will be released for production use.

### 2.4 External Interfaces

All Agencywide systems, except NEMS, interface with one or more external systems. The Consolidation Center has contacted the agencies that control these systems to obtain information on planned Year 2000 compliance modifications. Some have a clear understanding of Year 2000 compliance modification. Others do not feel Year 2000 changes will be necessary. Figure 6 shows the external interfaces by system, and the results of the initial contact.

SYSTEM	INTERFACE	CONTACTED	CHANGE REQUIRED	RELEASE WITH Y2K COMPIANT VERSION
NPPS	OPM Macon	YES	YES	AFTER
	Treasury	YES	NO	
	SSA	YES	YES	AFTER
	NFC	YES	NO	
	NEBA	YES	NO	
	California	YES	YES	AFTER
CAPPS	OPM	YES	NO	
NTDS	CTDS	YES	NO	
NSMS	DLSC	YES	NO	
	DAMES	YES	NO	
	EC Group	YES	UNKNOWN	
NPDMS	GSA	YES	NO	
AMS	FACS	YES	YES	YES

Figure 6 - External Interfaces

## 2.5 Testing Approach

Agencywide system software release standards require a series of tests including unit testing, system, alpha, and beta tests as required. The Year 2000 compliant versions will be tested using these standards. Specifically, testing criteria will be exercised to ensure that the core software functions properly in both the current century and in the next. Testing scenarios will be developed and approved by the SESAAS Quality Assurance (QA) team to fully test all relevant Year 2000 related situations. Listed below are some of the Year 2000 scenarios to be performed and validated.

- Processing data in the current century
- Processing data spanning the turn of the century (e.g. December 31, 1999 to January 1, 2000)
- Processing data spanning year 2000 and 2001
- Processing data that encompasses the leap year (February 29, 2000)

The ADABAS/Natural Date Differential (DD) parameter will be used to simulate the Year 2000 time frame. This parameter instructs Natural to intercept data coming back from calls to the system clock, and allows the system date to be modified, forwards or backwards, by as much as 32,767 days. This will allow testers to simulate running applications in the year 2000 and beyond. Instructions for using the DD parameter will be shared with all NASA Centers.

When established, the NACC Year 2000 environment will be dedicated for Year 2000 compliance testing activities. The system clock in this environment will be manipulated to simulate various Year 2000 date scenarios. Year 2000 compliant versions of vendor products (IBM operating system (OS/390), Software AG products, etc..) will be installed as they become available. This environment will be used to perform systems testing and is not required to perform functional testing. Functional testing will be conducted using the ADABAS/Natural Date Differential (DD) parameter.

While the Agencywide systems contain no Super Natural programs, many of the Agencywide users at the NASA Centers use Super Natural for special reporting. The Consolidation Center will contact Super Natural users at one or more Centers and coordinate testing Super Natural with the Year 2000 compliant versions of the Agencywide systems.

## 2.6 Implementation Approach

The Consolidated Center has been closely monitoring the Software AG (SAG) Year 2000 compliant product upgrade schedule in an effort to coordinate the release and implementation of the Year 2000 compliant systems with these products. Delays in the release of the SAG Year 2000 compliant products has made it impossible to upgrade the SAG products prior to the Beta Test version release of the Agency-wide Year 2000 compliant systems. The Consolidated Center is now considering a plan to upgrade to the SAG Year 2000 compliant products at the same time as the Production version release of the Agency-wide Year 2000 compliant systems.

The Detailed Conversion Documents will be released to the centers at least 90 days before the Beta version software release to allow the center time to complete their center specific compliance plans and modifications in preparation for Beta testing.

Beta software versions will be released to the center for 60 days of testing with their center specific software. The centers will be allowed to write discrepancy reports on any anomalies encountered during Beta testing for incorporating into the final Year 2000 compliant release. Recommendations on any other modifications will be accepted on NASA form 1620 for agency implementation considerations. Recommendations will be evaluated against agency requirements, Year 2000 compliance, cost benefit, and schedule/resource commitments.

Discrepancies reported by the Centers during Beta testing will be incorporated into the Year 2000 compliance software release prior to the formal production readiness release to the agency.

Software releases will be made under standard Consolidation Center release standards.

## **2.7 Contingency Planning**

All Agency-wide software will be system tested using the 20<sup>th</sup> and 21<sup>st</sup> century system dates, all external interfaces will be monitored for Year 2000 related changes, and all systems will be delivered to NASA for 60 days of Beta testing prior to delivery of the production version. The SESAAS group is aware that, even with the most thorough planning, there remains a potential for problems when the millennium boundary is crossed. Some risk areas include:

1. A problem area could be missed in the Agency-wide code
2. An external interface might make a change that was never made public
3. A center may not make all the necessary changes to their site specific code

### **Risk Mitigation:**

1. All Agency-wide systems will be released to the Agency for production processing 18 months prior to the millennium roll-over. This allows time to conduct testing for unknown systems environment changes (vendor product upgrades, operating systems, etc.) that occur in preparation for Year 2000. The SESAAS group will have a support team in place to handle any Agency-wide software problems that might occur during the millennium changeover.
2. By releasing the Agency-wide code in advance of the millennium boundary the risk of problems occurring in the Agency-wide software will be minimized. During the 18 month period, the software will be exercised several times and should uncover any latent defects in the software. All external interfaces to Agency-wide systems will continue to be monitored after the production releases have been delivered to minimize the risk of "surprise" changes in external interface code.

3. Every Center will have ample time to test their center specific programs that interface with Agency-wide systems during the 18 month period. This should greatly minimize the risk of any center specific program having problems during the millennium changeover. The same SESAAS support team will be on-hand during the millennium changeover to provide centers with consultation for any center specific problem that might occur.
4. A Special Y2K Action Team will be mobilized to stand ready to address problems which may surface during the millennium changeover period. The team will be made up of analysts and programmers who participated during the system Y2K compliance upgrade and will have thorough knowledge of the systems and Y2K potential problems.