NAVA STP MESSAGING SPECIFICATION

EDOCUMENT BARCODING

VERSION 2008-1

Target publication date is on or before October 31st, 2008

Document Status: **Working Draft**
Document Status Date: **2008-09-03**

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NAVA MESSAGING SPECIFICATION DOCUMENT CONVENTIONS

Specification States/Status:

Draft – An unofficial working copy of the next specification version, typically under deliberation by a NAVA WG.
Proposed – A completed draft ready for final review and consideration by NAVA Members.
Published (Initial) – This is the first official spec version; labeled "Version YYYY-1"
Published (Amended) – This is an updated official spec version; labeled sequentially from 1 "Version YYYY-#"

The next version of the Specification is indicated with the words 'DRAFT' after the version; 'Version 2007-2 DRAFT'.
In any DRAFT version the following document contribution, reviewing, and decision conventions are used (all should be removed from a published version.
Any text in normal (clear) font is to be considered the current definitive normative 'standard' specification.
Text in Green is new since the last draft version and is open for review, discussion and ultimately decision.
Text in Yellow is work-in-progress and under discussion, or in question within the appropriate the NAVA WG.
Text in Red has been marked for removal/deletion.
Text mark with a ~~strikethrough~~ means it is deprecated, but left for reference.

DOCUMENT HISTORY

Document Version	Date	Comment
Initial Template	2008-09-03	Pulled BarCode Specs from EDocument Specification into this separate Spec

CONDITIONS AND TERMS OF USE

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CHAPTER ONE - INTRODUCTION

This specification provides detailed information about the NAVA STP Messaging Specification for eDocument Barcoding (here in after referred to as the eDoc Bar Coding or simply Bar Coding.)

The main intended purpose of these bar code standards is to provide a means of identifying any document or form that needs to be rendered to paper or image with a barcode so that the document can later be electronically, automatically re-associated with the business process (e.g. Order Entry) that rendered the document.

This specification represents a point-in-time best effort encapsulation of what a compliant, adequate, and well-formed barcode shall look like including the expected data elements, expected/allowable values, and anticipated implementations at the time of publication. Given the dynamic nature of product development, regulation, sales and business practices, and other dynamic forces it is recognized that this standard will inevitably evolve over time. As soon as a version is published most likely a subsequent version will be immediately started to further refine, clarify, and expand the usage.

This document enables users – trading partners – to have a mutually agreed upon neutral reference point from which to develop systems, testing methods, and information processing practices internally, between trading partners directly and via various service providers.

It is expected that the data elements and tables are accurate and complete, however it is understood that all conceivable standard usages have not, nor most likely cannot, be completely defined though it is our intent to continually clarify and expand their usefulness. Please submit any and all suggestions to the NAVA Data Conformity and Messaging Standards Working Group.

Role in Straight-Through Processing (STP)

NAVA has developed a straight-through processing (STP) initiative to help the Retirement Insurance Industry improve the efficiency and effectiveness of retirement product sales and service. The initiative focuses on the three critical components necessary to achieve real STP:

- The legal and regulatory environment,
- Operational standards and insurance product information,
- Data / business messaging, standards.

This specification is focused on the how to handle ‘Hybrid’ processing where documents need to be rendered to paper (or image) and able to be identified back to the originating transaction or process that spawned the document.

Certification

There are currently no certification requirements for bar coding.

History

This standard was developed in the fall of 2008 as part of NAVA’s STP Initiative. It continues to be updated and enhanced for additional use cases as they are discovered.

CHAPTER TWO - OBJECTIVES AND SCOPE

This document defines how a bar code image may be applied to any electronic document that needs to be rendered to paper or image. It defines the bar code technology to supported, the location of the bar code and the contents of the bar code. This then should allow any system or entity in the insurance value chain to read and understand this bar code and know then who generated it, what process it was spawned form and how to re-associate it with the originating process/transaction – should they need or want to do so.

Intended Audience

This message is expected to be used by any or all trading partners and supporting entities in the annuity industry including carriers, distributors, solution providers, service providers and any other entity wishing to have a standard way of moving a electronic document from between two or more systems.

Usage Scenario: Render Unto Paper: NAVA Bar Code Specifications

While the principle objective of the NAVA STP effort is an all electronic process, there are scenarios where rendering information to paper is necessary and/or required. The intent of the Standards is to support this sub-process and to re-integrate the produced paper back into the electronic process as seamlessly as possible in an automated fashion.

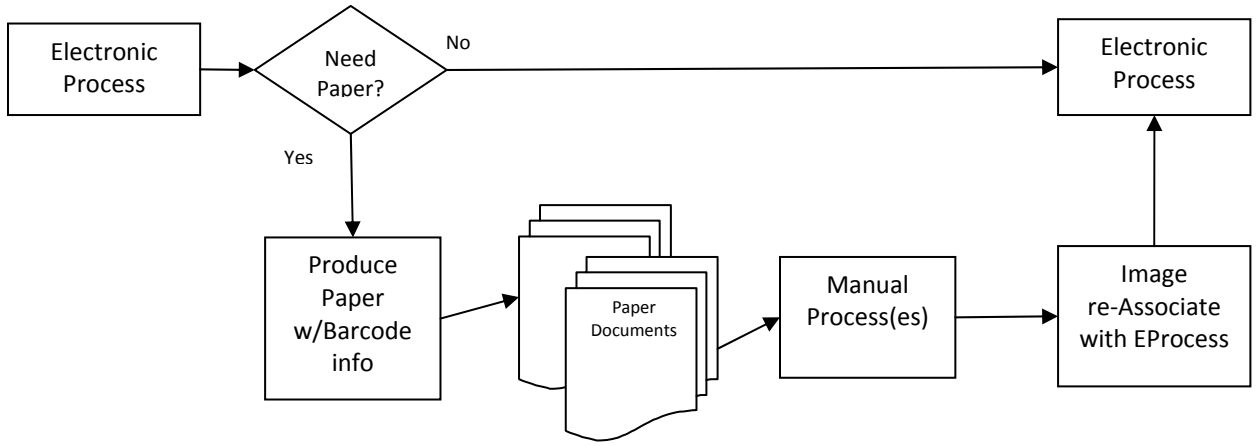
Identified physical 'Paper' Scenarios

- Client ops out of electronic process
- Need a required signature collected as a 'wet' signature

In these instances the objective is to first produce the paper documents with an attached bar code so that subsequently the re-imaged paper can be electronically processed, bar code recognized, and the imaged documents re-associated with the original process that generated them (e.g. with an annuity order).

A core assumption herein is that NO NEW DATA, NO EDITS occur on the paper. The paper must remain as rendered by the creating application. As such the paper document is intended purely for disclosure and or wet signature purposes. If a change must be made then the standards call for regenerating all affected paperwork, then reviewing and/or signing. This is to insure that the electronic record maintains its status as the primary informational record, not the paper form. It also then enables receivers of the documents (carriers) to image and store without manual human review since its assured there are no manual changes to the documents.

Basic workflow – Hybrid Process; Gather Data Electronically, generate form(s), re-integrate Forms into EProcess



PRINCIPLE OBJECTIVES:

- To be able to automatically identify imaged documents that are produced so they may be re-associated with the business process generating the paper in the first place.

- To provide identification of a document, including its type/category, source, as well as specifics of an individual transaction – sufficient to uniquely identify the documents.

- Not for order only, expected to be a standard for any insurance process needing forms. Note that future process may require some additional data elements (to be defined).

- Maximize flexibility - Find a bar code standard technology that meets needs while imposing the least technology/hardware (e.g. scanners, etc.) on implementation.

- Maximize utility - The barcode should be readable by others. It is not only for the creating system (aka Carrier).

- There should be only one bar code. A single bar code should be able to contain the information needed for everyone's use (if not then submit additional requirements to NAVA to include into the specs). The objective is to have sufficient information in a defined encoding symbology so any appropriate entity or system can read, identify and process electronically imaged/scanned documents previously generated by earlier, upstream systems.

- There is no implied or literal prohibition to a carrier or other entity publishing other bar codes on the form, the only constraint is they do not use or overlay the area described here as reserved for the industry standard barcode information.

IDENTIFIED DATA ELEMENTS

There are three basic parts to the data; unchanging static data identifying a document, dynamic data to associate a document with its source and optional variable user provided data for usage specific scenarios. The later is not part of the standard except noting it may exist.

Element	Definition	Format	Len	Example
Static Form Data – Classification of the Form or Document. Allows identification of the document type. All are Required.				
Form Type	The industry standard classification of the form (e.g. Application), NAVA Form Type Specifically identifies the type or classification of the form (e.g. Application, Replacement form, etc.). See NAVA Standard Form Types	Num	7	2250001
Form Number	The provider of the form unique identifier for this form.	AlphaNum	12	A1212bc-987z If < 12, add spaces after
Form Version	The provider of the form version number.	AlphaNum	12	vTX2008.1234 If < 12, add spaces after
Form Provider	Unique identifier of the producing organization (e.g. Carrier Code). For Carriers it is their NAIC Code.	AlphaNum	5	12345 If < 5, add spaces after
Page Count of Total Pages	Page Number of Total Pages count for this form or document.	Num	4	0105
		Static Bar Code Size	**40**	
Dynamic Instance Data – Specific 'identification' of this document, in respect to the process that spawned the paper documents. Provides info sufficient to re-associate the document back to the process creating it. All are Required.				
Transaction or Order Number	Unique identifier which associates the paper document back to the process (e.g. order) that created it.	AlphaNum	18	123456789-1234567 If < 18, add spaces after
Form Sequence Number	When there is more than one copy of the same form (same static data) this counter uniquely identifies each	Num	2	01

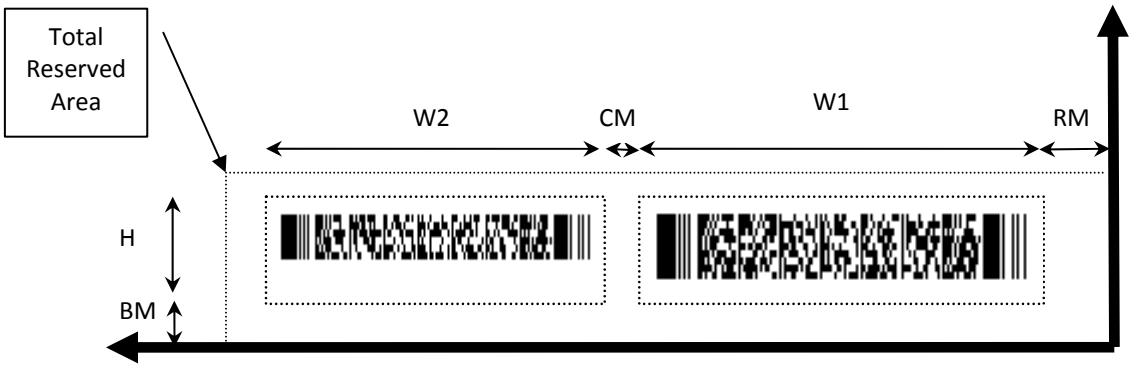
	iteration of the form. For example, multiple replacement forms.			
		Dynamic Bar Code Size	**20**	
Variable Private Data – Optional information				
	Ability to do extensions, for marketing or other business purpose.	AlphaNum	Var	any

Working assumed size based on estimates above [in brackets], is 57 characters, ignoring any extension, 128 digits with 72 digits of padding. Picked 128 simply because it's a binary number (2^7) which is programmatically natural limit to work with.
Example (used in samples below):

Data: 123456789-123456701 225001A1212bc-987zTX2008.123123450105

DEFINED REQUIRED SPACE ON FORMS

On every form or document produced to paper the following space should be reserved for a barcode, and if a barcode is applied it should be produced into this space.



Paper Edge Bottom Right Corner

Static BarCode (Far Right)

Width (W1)	**25 cm (≅ 3/4")**
Height (H)	**20 cm (≅ 1/2")**
Right Margin (RM)	**10 cm (≅ 3/8")**
Bottom Margin (BM)	**10 cm (≅ 3/8")**
White 'quiet' space above	**5 cm (≅ 1/8")**
Reserved area from bottom of paper	**25 cm (≅ 3/4")**
Reserved area from right edge of paper	**35 cm (≅ 1 1/4")**

Dynamic BarCode (Middle)

Width (W2)	**25 cm (≅ 3/4")**
Height (H)	**15 cm (≅ 1/2")**
Right Margin (RM)	**10 cm (≅ 3/8")**
Bottom Margin (BM)	**10 cm (≅ 3/8")**
Center Margin (CM)	**10 cm (≅ 3/8")**
White 'quiet' space above and to left	**5 cm (≅ 1/8")**
Reserved area from bottom of paper	**30 cm (≅ 1 1/4")**
Right edge of bar code from right edge paper	**45 cm (≅ 1 1/2")**
Reserved area form right edge of paper	**55 cm (≅ 2 1/4")**

Total Reserved Area	
Outside Width	**65 cm (≅ 1 ½")**
Outside Height	**35 cm (≅ 1 ¼")**

This includes 'Gripper' space framing the space around a document, which needs to be a minimum of 3/8" of white space, or unprinted space, on the perimeter of the document.

Open issues/questions of how to implement the barcode into a forms 'tag' on a form. Need to research any issues relating to the barcode being compressed or altered when put into a tag or image space on the form (research adobe as an example). While not specifying 'how' the bar code is applied, need to se if in the common ways they are applied any issues may surface (may need an implementation guideline for barcodes???)

The bottom left hand corner should not be used for any barcodes, and reserved for form number, page numbering and other authoring formatting information.

Paper size is not specifically defined within the NAVA Standards and up to the provider's requirements. Standard convention in the United States is 8 ½ x 11 inch paper.

RECOMMENDED BAR CODE ENCODING SYMBOLOGY SUPPORTED

The recommended bar code symbology for use is **ISO/IEC 15438:2006 PDF417 [STILL BEING REVIEWED}.**
Details of this open barcode standard can be found in many places including;

Recommend standard parameters for encoding PDF417, these are typically the common defaults, are:

Number of columns:	2
Error Correction Level:	2
X to Y Ratio:	3
X Dimension:	.03 cm
Process Tilde:	True / Yes
Compaction mode:	Text

THESE DEFAULTS NEED TECHNICAL REVIEW AND APPROVAL

Analysis and review of various Barcode Symbologies

- Assuming we will encode ## characters
- Must use an existing open barcode symbology
- Prefer Font based.
- Support alphanumeric, upper and lowercase basic symbols (!@#$%*&-)

During the analysis several basic barcode principles have become apparent. We repeat them here for reference.

When considering a 1D or 2D symbology its notable that typically 1D presumes a model where what you are encoding is a unique identifier. The purpose is to simply allow a database key or lookup to be encoded which is then used for more info about the form. It requires a database and the sharing of this key to everyone who may need it. This is fine for closed systems. 2D on the other hand generally allows encoding more data, sufficient to not require a database to lookup the key and find out about the doc – the data you need is directly in the barcode on the doc. The late approach is a more applicable approach for annuity document needs and a more open process whereby any system or entity in a complex workflow can leverage the data in the barcode.

Bar Code Standard	Description / Source Sample (not to scale)	Pros	Cons
Codabar 64 – n/a 128 – n/a 256 – n/a	The Codabar bar code symbology is used for various numerics bar coding applications including libraries, blood banks and parcels. The symbology of the Codabar character set consists of bar code symbols representing characters 0-9, Letters A to D and the following symbols: - $ / +. Additional data may be encoded in the actual choice of start and stop codes. The letters A, B C and D are used for start and stop codes. For example, to print the data 2727 in the Codabar barcode font, print **A2727B** with the Codabar font selected.  3 1117 01320 6375	Most dense 1D Only supports #	Limit of 30 char. Thus, not appropriate for NAVA.
Code 39 64 – n/a 128 – n/a 256 – n/a	Code 39 (also known as "USS Code 39", "Code 3/9", "Code 3 of 9", "USD-3", "Alpha39", "Type 39") is a barcode symbology that can encode uppercase letters (A through Z), digits (0 through 9) and a handful of special characters like the $ sign. The barcode itself does not contain a check digit (in contrast to—for instance—Code 128), but it can be considered self-checking by some, on the grounds that a single erroneously interpreted bar cannot generate another valid character. Possibly the most serious drawback of Code 39 is its low data density: It requires more space to encode data in Code 39 than, for example, in Code 128. This means that very small goods cannot be labeled with a Code 39 based barcode. However, Code 39 is still widely used and can be decoded with virtually any barcode reader. It was later standardised as ANSI MH 10.8 M-1983 and MIL-STD-1189. The width ratio between narrow and wide can be chosen between 1:2 and 1:3. **LOGMARS** (Logistics Applications of Automated Marking and Reading Symbols) is an application of Code 39 used by the United States Department of Defense that recommends a check character. LOGMARS is defined by Military Standard MIL-STD-1189B and others such as MIL-STD-129, MIL-STD-129N and MIL-STD-2073-1C.	Support letters and numbers, though dual case support double size.	Effective Limit of 20 char. Thus, not appropriate for NAVA.

	HIBC (Health Industry Barcode) is a Code 39 barcode format that all health care products should be labeled with. IDAutomation's 3 to 1 bar ratio in the Code 39 fonts.  		
Code 128 64 – n/a 128 – n/a 256 – n/a	**Code 128** is a very high-density barcode symbology, used extensively world wide in shipping and packaging industries. GS1-128 (formerly known as UCC/EAN-128) is one of its variants. It is used for alphanumeric or numeric-only barcodes. It can encode all 128 characters of ASCII and is also capable of encoding two numbers into one character width, called double density. This feature is evidence of it being designed to reduce the amount of space the bar code occupies, to address the ever-increasing needs of item catalogs. Each printed character can have one of three different meanings, depending on which of three different character sets are employed. Code 128 is the major component of the labeling standard for GS1-128 (formerly known as UCC/EAN-128), used as product identification for container and pallet levels of retail markets.  	Any characters. Improvement to Code 39	Limit of 40 char. Thus, not appropriate for NAVA.
2D Barcodes Note the point at which 2D makes sense (space wise) over 1D is over approximately 20 characters. Thus for NAVA needs nearing 60+ we most likely need either multiple 1D Barcodes, or a single 2D BarCode.			
PDF417 **ISO/IEC 15438:2006** Char – mm* 64 – 35x10 **128 – 35x15** 256 – 55x10 **Can specify desired width & height width, and vary the margins NAVA may set. Thus make wide and short or narrow and tall.*	**PDF417** is a stacked linear bar code symbol used in a variety of applications, primarily transport, identification cards, and inventory management. PDF stands for Portable Data File. The PDF417 format was developed by Symbol Technologies, and has spawned an Open Source decoder project[1] together with an Open Source encoder. Used by FedEx, USPS and other package services. Around the world, **PDF417** is setting the standard for identification. From driver licenses to social services and national ID cards, **PDF417** has become the preferred means of encoding ID information. **PDF417** answers the need to store and transfer large amounts of data securely and inexpensively. A single **PDF417** symbol carries up to 1.1 kilobytes of machine-readable data and it can contain biometric data files such as photographs, fingerprints, and signatures, as well as text, numbers and graphics. Can be used to generate postage accepted by the United States Postal Service. In addition to features typical of two dimensional bar codes, PDF417's capabilities include: - Linking. PDF417 symbols can link to other symbols which are scanned in sequence allowing even more data to be stored. - User-specified dimensions. The user can decide how wide the narrowest vertical bar (X dimension) is, and how tall the rows are (Y	Most common 2D Barcode. Looks to be most likely current candidate.	Need to validate there is no cost to use. Appears to be a fee for getting the spec, but NOT for use.

	dimension). - Public domain format. Anyone can implement systems using this format without any license. Example: 123456789012345|01|225001|A1212bc-987z|TX2008.123|12345|0105  Generate examples: http://en.wikipedia.org/wiki/PDF417 http://www.idautomation.com/java/pdf417servlet.html		
Data Matrix Char – mm* 64 – 10x10 128 – 18x18 256 – 20x20	A **Data Matrix** code is a two-dimensional matrix barcode consisting of black and white square modules arranged in either a square or rectangular pattern. The information to be encoded can be text or raw data. Usual data size is from a few bytes up to 2 kilobytes. The length of the encoded data depends on the symbol dimension used. Error correction codes are added to increase symbol strength: even if they are partially damaged, they can still be read. A Data Matrix symbol can store up to 2,335 alphanumeric characters. Data Matrix symbols are square and made of cells, that is little squares that represent bits. Symbol sizes vary from 8×8 to 144×144 Examples of other standards using: • AS9132 - Society of Automotive Engineers (SAE) parts marking • Air Transportation Association's (ATA) Spec 2000 • Automotive Industry Action Group (AIAG): AIAG B-4 - parts identification AIAG B-8 - shipping labels AIAG B-11 - tire and wheel identification AIAG B-13 - symbology white paper AIAG B-17 - direct parts making • DOD UI - Department of Defense Guide to Uniquely Identifying items • EIA 706 - Electronics Industry Marking Standard • EIA 802 - Electronics Industry Marking Standard • GS1 DataMatrix - standard for encoding GTIN numbers on small items with camera-based readers • ISO/IEC 15418:1999 – symbol data format semantics • ISO/IEC 15434:1999 – symbol data format syntax • ISO/IEC 15415 – 2-D print quality standard • MIL-STD-130L - US DOD Department of Defense standard • NASA-STD-6002 - aerospace parts marking • NASA-HDBK-6003 - aerospace direct part marking methods and techniques • SAE AS9132 – Society of Automotive Engineers (SAE) aerospace industry marking standard • Semiconductor Equipment and Materials International (SEMI): T2-0298E – silicon wafers marking T3-0302 – wafer box labels T7-0302 – double sided wafers T8-0698E – flat panel display substrates T9-0200E – lead-frame strips marking T10-0701 – direct mark quality test method • X6721 - Korean standard	Generally most reliable in fax environment.	

	Example: 123456789012345|01|225001|A1212bc-987z|TX2008.123|12345|0105  Generate Examples: http://www.idautomation.com/java/dmservlet.html		
DataGlyphs	PARC DataGlyphs® are a robust and unobtrusive method of embedding computer-readable data on paper surfaces. Unlike most barcodes, DataGlyphs are flexible in shape and size. Their structure and robust error correction also make them suitable for curved surfaces and other situations where barcodes fail. PARC invented DataGlyphs in 1993, and has licensed the basic software patents to Microglyph Technology GmbH to form the foundation of their microglyph® code. While PARC developed DataGlyphs for document management systems, Microglyph Technology has developed additional, proprietary code structures and algorithms to enable parts-marking for the manufacturing industry, to enable the embedding of computer-readable data on surfaces such as plastic, glass, or metal. Features: • Flexibility -- adjustable size, shape, color • High data density • Robustness • Adjustable error correction • Compatible with cryptography At 600dpi, DataGlyphs offer up to 1KB per square inch of data. At this density, the Gettysburg Address fits in a block the size of a small United States postage stamp. Applications: • document management • fraud prevention • inventory tracking • ID cards • parts marking • product tagging DataGlyphs have been used in several Xerox products, licensed to a major manufacturer of airplane parts, licensed to Progressive Casualty Insurance for use in turnaround documents, and more. Other markets include financial services, software, government, health care, and pharmaceuticals.  http://www.parc.com/research/projects/dataglyphs/	Extremely Versatile. Could 'hide' the data in log or part of even a 'NAVA Symbol' unknown to observer.	Probably too advanced for our needs, would introduce unnecessary hardward/software implementation restrictions.

Resources:

- http://ww.wikipedia.com/
- http://www.idautomation.com/
- http://www.tec-it.com