

ANSI/NIST 2000 Fingerprint Standard

April 28, 2005 Update Review

New Type 1 Field: GPS

Bonny G. Scheier, SABER Imaging

- GPS : Global Positioning System Data Field
 - Request to add Type 1 field to support GPS data sets for geospatial Geographical Information Systems (GIS) mapping of arrestees at or near point of arrest.
 - Another valuable humanitarian application of capturing fingerprints with associated GPS location could be used in the event of a large scale disasters such as the recent Tsunami, to record the initial and final resting places of deceased.

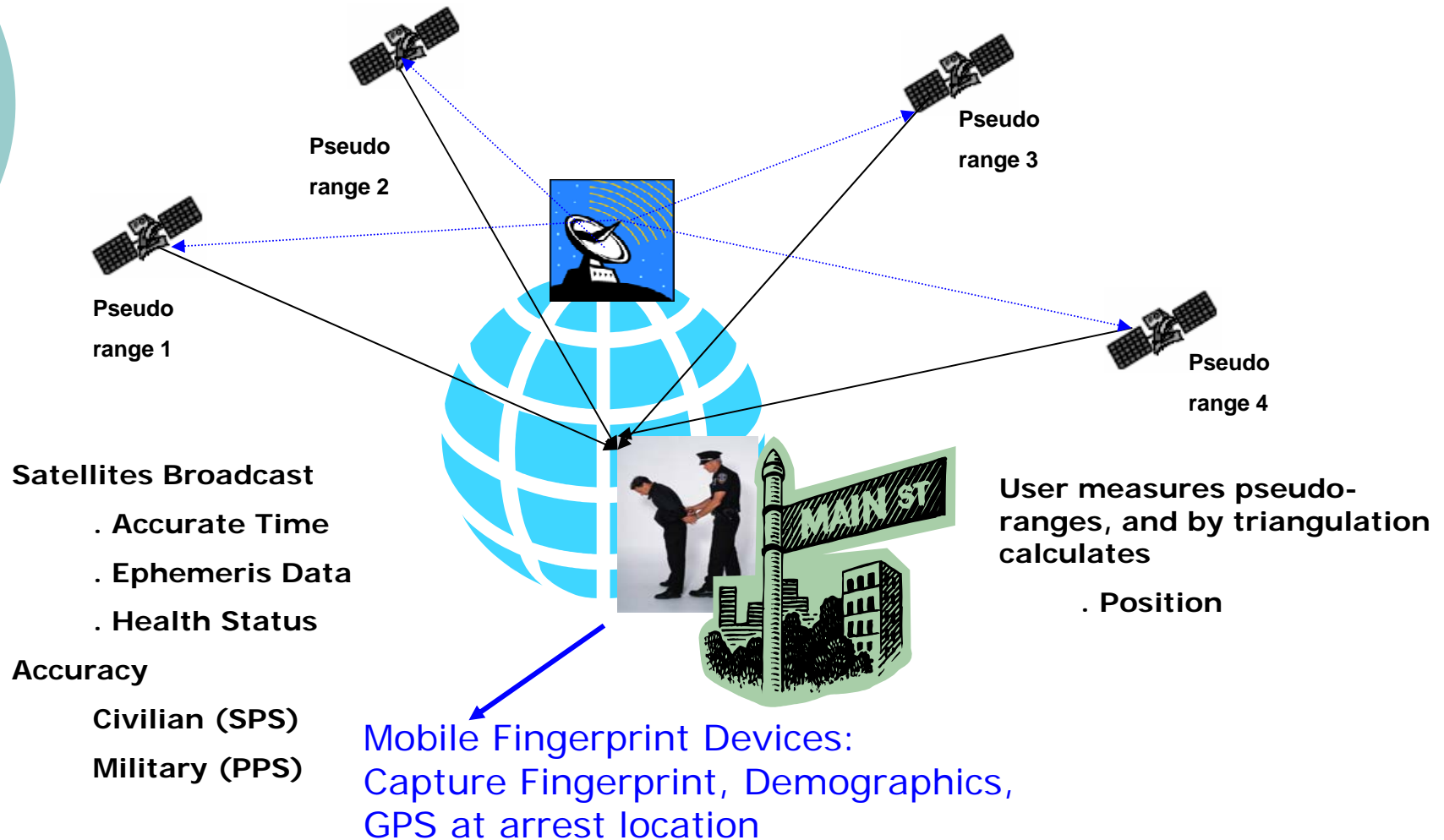
GPS: New Type 1 Field

- GPS Definition
- Utility of GPS in Fingerprint Record
- Federal GPS Policy Dec 2004
- ANSI/NIST GPS Field/Subfield
GPS Suggested record description
(US Naval Observatory
GPS Data Categories Description)

GPS Definition

- **GPS:** Global Positioning System. A network of radio-emitting satellites (SPACE segment) deployed by the US Department of Defense. Ground-based GPS receivers (Control segment) automatically derive accurate surface coordinates for GIS, mapping, and surveying data collection.
 - The SPACE segment, consists of 28 operational satellites in six orbital planes. The US Naval Observatory has 32 Satellite vehicle numbers (PRN) currently assigned. The first Block II satellite was launched in February 1989.
 - The CONTROL segment consists of five Monitor Stations (Hawaii, Kwajalein, Ascension Island, Diego Garcia, Colorado Springs), referenced as 33-38 PRN. Three Ground Antennas, (Ascension Island, Diego Garcia, Kwajalein), and a Master Control Station (MCS) located at Schriever (formerly Falcon) AFB in Colorado.
 - GPS is at the present time the most competent system for the distribution of Precise Time and Time Interval (PTTI). The system uses time of arrival (TOA) measurements for the determination of user position. A precisely timed clock is not essential for the user because time is obtained in addition to position by the measurement of TOA of FOUR satellites simultaneously in view. If altitude is known (e.g. for a surface user), then THREE satellites are sufficient.

Type 1 Field: GPS (Global Positioning System)

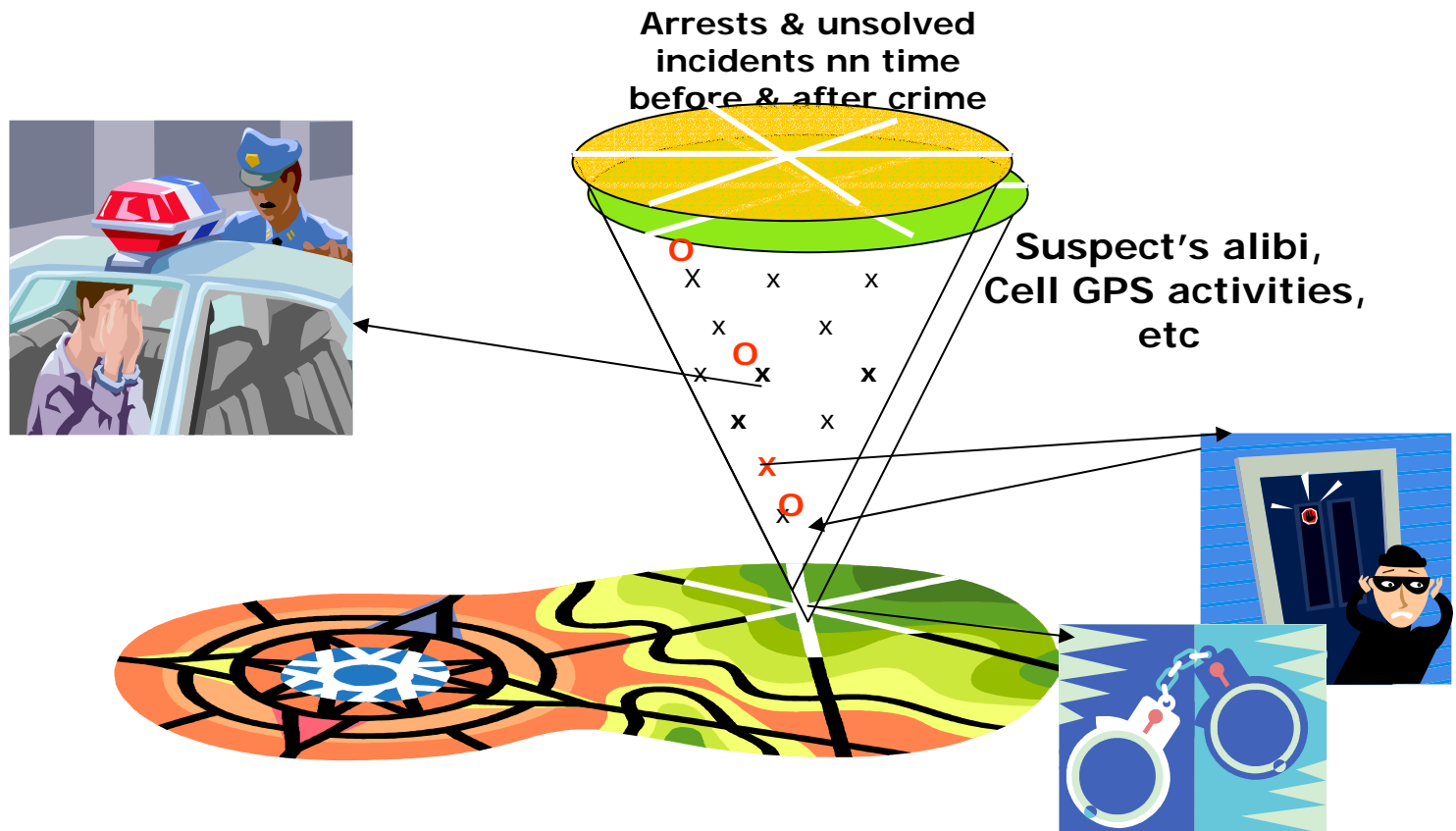


GPS: Utility of GPS in Fingerprint Standard

- **Mobile Fingerprint Capture devices,**
 - Cite and Releases (Mostly minor offenses, 40-50%) and Pre-Booking Identification upload with RMS arrest data, record GPS
 - Id subject by fingerprints linked to GPS of arrest location
 - Auto Generation of Uniform Crime Reporting (UCR)/ National Incident-Based Reporting System (NIBRS) geo-data referenced by GPS
 - Retrieve photos, etc of recently arrested subjects in geospatial area for suspect identification based on local arrests, like incidents and/or arrestees/parolees residence GPS links
 - Capturing fingerprints, demographics and GPS of large scale disaster victim location
- **Creating links via GPS for Crime Mapping Applications** Geographic Information Systems (GIS)
 - Record arrest/incident event GPS
 - Geospatial mapping of serial crimes against arrest, incident locations and/or suspects alibi, residence.

GIS (Geographical Information System)

- GIS is any integrated system of information that includes a geographic component





Federal GPS Policy Dec 2004

U.S. SPACE-BASED POSITIONING, NAVIGATION, AND TIMING POLICY

December 15, 2004

FACT SHEET

The President authorized a new national policy on December 8, 2004 that establishes guidance and implementation actions for space-based positioning, navigation, and timing programs, augmentations, and activities for U.S. national and homeland security, civil, scientific, and commercial purposes. This policy supersedes Presidential Decision Directive/National Science and Technology Council-6, U.S. Global Positioning System Policy, dated March 28, 1996.

Federal GPS Policy Dec 2004

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III. Goals and Objectives

The fundamental goal of this policy is to ensure that the United States maintains space-based positioning, navigation, and timing services, augmentation, back-up, and service denial capabilities that: (1) provide uninterrupted availability of positioning, navigation, and timing services; (2) meet growing national, homeland, economic security, and civil requirements, and scientific and commercial demands; (3) remain the pre-eminent military space-based positioning, navigation, and timing service; (4) continue to provide civil services that exceed or are competitive with foreign civil space-based positioning, navigation, and timing services and augmentation systems; (5) remain essential components of internationally accepted positioning, navigation, and timing services; and (6) promote U.S. technological leadership in applications involving space-based positioning, navigation, and timing services. To achieve this goal, the United States Government shall:

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- Promote the use of U.S. space-based positioning, navigation, and timing services and capabilities for applications at the Federal, State, and local level, to the maximum practical extent.

ANSI/NIST Type 1 Field/Subfields GPS Proposed Record Description:

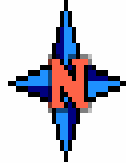
http://tycho.usno.navy.mil/usno_head.html



US Naval Observatory Home Page



What Time Is It? USNO Time Service Home Page



GPS Home Page at USNO

Time Service Dept., U.S. Naval Observatory, Washington, DC

ANSI/NIST Type 1 Field/Subfields

GPS Proposed Record Description:

http://tycho.usno.navy.mil/usno_head.html

GPS Data Categories Explanation

PRN	MID	PASS	BGTK	TRK	MC-GPS	SLOPE	RMS	SAMP	EL	AZM	ION	MC-SATCL	SLOPE	TROP
	MJD	HHMM	SEC	NS	PS/S	NS	N	DG	DEG	NS	NS	PS/S	NS	
8	51999.64757	1526	780	2.2	-3.0	7.4	52	49.8	203.0	33.6	-61365.1	-49.3	10.7	
20	51999.69201	1630	780	23.6	-14.5	11.7	52	29.8	103.5	52.1	62655.0	-12.6	16.3	
4	51999.70312	1646	780	14.5	-2.3	9.1	52	35.6	216.8	49.1	-701056.9	-4.7	14.0	
7	51999.80312	1910	780	35.0	0.0	10.5	52	49.6	103.0	38.7	-583495.2	-2.2	10.7	
30	51999.85868	2030	780	-24.2	-1.4	12.0	52	25.9	301.7	53.7	13797.5	0.1	18.6	

ANSI/NIST Type 1 Field/Subfields

GPS Proposed Record Description:

Column	Data Category	Explanation
1	PRN	the satellite vehicle PRN number
2	MJD	the five digit Modified Julian Date and the fraction of day at the midpoint of the track
3	BGTK HHMM	hour and minute (in UTC) of the start of the track tracks begin at 1 second after the minute
4	TRK SEC	the track length in seconds (a full track is 780 seconds)
5	MC-GPS NS	the time difference (measured in nanoseconds) between UTC(USNO MC) and GPS time, referred to the midpoint of the pass via a linear fit
6	SLOPE PS/S	the slope determined via the linear fit to produce MC-GPS (measured in picoseconds per second)
7	RMS NS	the root mean square of the residuals of the linear fit used to produce MC-GPS
8	SAMP N	the number of data points used in the fit to produce MC-GPS
9	EL DG	the elevation (in degrees) of the satellite at the midpoint of the track (<i>data prior to MJD 50846 gives elevation at beginning of track</i>)
10	AZM DEG	the azimuth (in degrees) of the satellite at the midpoint of the track (<i>data prior to MJD 50846 gives azimuth at beginning of track</i>)
11	ION NS	the modeled ionospheric delay (measured in nanoseconds) referred to the midpoint of the pass via a linear fit
12	MC-SATCL NS	the time difference (measured in nanoseconds) between UTC(USNO MC) and satellite time, referred to the midpoint of the pass via a linear fit
13	SLOPE PS/S	the slope determined via the linear fit to produce MC-SATCL (measured in picoseconds per second)
14	TROP NS	the modeled tropospheric delay (measured in nanoseconds) referred to the midpoint of the pass via a linear fit

ANSI/NIST Type 1 Field/Subfields

GPS Proposed Record Description

Tag #: 1.016 **FIELD NAME:** GPS- GLOBAL POSITIONING SYSTEM

Identifier: GPS **FIELD SIZE MIN:** **MAX OCCURRENCES:** 32

FIELD SIZE MAX: **TYPE:** SET

DESCRIPTION: This is an optional, repeating field, consisting of fourteen subfields, up to nnn??? Number of occurrences (TBD by NIST 4/2005) that defines the Global Positioning System data elements.

C: This field is contains the following subfields:

Subfields	O/M	Char	Fld	Cond	Type	Min	Max	Description
#1-PRN	M	N	1	3				This is a mandatory subfield. The field contains the satellite vehicle PRN number
#2-MJD	M	N	11	11				This is a mandatory subfield. This field contains the five digit Modified Julian Date and the fraction of day at the midpoint of the track
#3-BGTK HHMM	M	N	4	4				This is a mandatory subfield. The subfield contains the hour and minute (in UTC) of the start of the track tracks begin at 1 second after the minute
#4-TRK SEC	M	N	1	3				This is a mandatory subfield. This field contains the the track length in seconds (a full track is 780 seconds)
#5-MC-GPS NS	M	N	3	5				This is a mandatory subfield. This subfield contains the time difference (measured in nanoseconds) between UTC(USNO MC) and GPS time, referred to the midpoint of the pass via a linear fit
#6-SLOPE PS/S GPS	M	N	3	5				This is a mandatory subfield. This subfield contains the slope determined via the linear fit to produce MC-GPS (measured in picoseconds per second)
#7-RMS NS	M	N	3	4				This is a mandatory subfield. This subfield contains the root mean square of the residuals of the linear fit used to produce MC-GPS
#8-SAMP N	M	NS	1	2				This is a mandatory subfield. This subfield contains the number of data points used in the fit to produce MC-GPS
#9-EL DEG	M	N	3	3				This is a mandatory subfield. This subfield contains the elevation (in degrees) of the satellite at the midpoint of the track (data prior to MJD 50846 gives elevation at beginning of track)
#10-AZM DEG	M	N	5	5				This is a mandatory subfield. This subfield contains the azimuth (in degrees) of the satellite at the midpoint of the track (data prior to MJD 50846 gives azimuth at beginning of track)
#11-ION NS	M	N	5	5				This is a mandatory subfield. This subfield contains the modeled ionospheric delay (measured in nanoseconds) referred to the midpoint of the pass via a linear fit
#12-MC-SATCL NS	M	N	2	8				This is a mandatory subfield. This subfield contains the time difference (measured in nanoseconds) between UTC(USNO MC) and satellite time, referred to the midpoint of the pass via a linear fit
#13-SLOPE PS/S MC-SATCL	M	N	3	5				This is a mandatory subfield. This subfield contains the slope determined via the linear fit to produce MC-SATCL (measured in picoseconds per second)
#14-TROP NS	M	N	3	5				This is a mandatory subfield. This subfield contains the modeled tropospheric delay (measured in nanoseconds) referred to the midpoint of the pass via a linear fit

SPECIAL CHARS:

EXAMPLE DATA: 1.016:30□53481.03368□0042□780□-6.4□-52.5□4.6□52□47.3□88.2□6.8□-141376.6□-28.8□11.1<gs>

Update ANSI/NIST 2000 Fingerprint Standard

New Type 1 Field: STF

Bonny G. Scheier, SABER Imaging

- STF : Submission Tracking Field
 - Request to add Type 1 field that will support tracking submissions header information and timestamps while traversing multiple vendors and jurisdictions NIST compliant systems.
 - This information would be used for Auditing submission activity and assisting in error resolution between multiple vendors interfacing using NIST compliant constructs.



STF: New Type 1 Field

- STF Definition
- Utility of STF in Fingerprint Record
- ANSI/NIST STF Field/Subfield
Suggested record description

STF: Type 1 Field Definition

- **STF:** This optional, multiple occurring field will be used to chronologically capture key elements from the type 1 header information.
 - The field will support 7 subfields including TCN, TCR, TOT, DAI, ORI, SYS and GMT upon receipt and dissemination to another system.
 - An Additional agency results (RSF) field could be added to indicate hit or no hit and resulting agency subject code.

Utility of STK in Fingerprint Standard

- **Resolving multi vendor and multi level agency exchange issues,**
 - **Submission Tracking Field will capture start to end processing times and header information for each system**
 - Currently each traversed system records activities independently, normally in vendor specific logs. Some agencies assign completely new TCNs for submission to the next system, creating a disconnect to the originating TCN submission,
 - Acquiring and mapping these unique logs for response time reports and error resolution have been historically problematic
 - STF Provides each independent NIST system a structure for recording receipt and transmission information.

STF Sample Contents

System	Action	Interface	STF Contents
RMS	Send	Livescan	TCN12345678,CAR,ID0211950,ID0423951,20050423061753z,RMS,Send,Livescan
Livescan	Receive	RMS	TCN12345678,CAR,ID0211950,ID0423951,20050423061754z,Livescan,rcv,RMS
Livescan	Send	AFIS	TCN12345678,CAR,ID0211950,ID0423951,20050423061829z,Livescan,send,AFIS
AFIS	Receive	Livescan	TCN12345678,CAR,ID0211BCI,ID0211950,20050423061830z,AFIS,Rcv,Livescan
AFIS	Send	CCH	TCN12345678,CAR,ID0211BCI,ID04211950,20050423062301z,AFIS,Send,CCH
CCH	Receive	AFIS	TCN12345678,CAR,ID0211BCI,ID04211950,200504230623432z,CCH,rcv,AFIS
CCH	Send	AFIS	TCN12345678-01,TCN12345678,SRE,ID0211BCI,ID04211950,200504230623450z,CCH,rcv,AFIS
AFIS	Receive	CCH	TCN12345678-01,TCN12345678,SRE,ID0211BCI,ID04211950,200504230623455z,AFIS,RCV,CCH
AFIS	Send	CCH	TCN12345678,CAR,ID0211BCI,ID0411950,20050423063955z,AFIS,Send,CCH(ID?)
CCH	Receive	AFIS	TCN12345678,CAR,ID0211BCI,ID0411950,20050423064445z,CCH,rcv,AFIS
CCH	Send	AFIS	TCN12345678-02,TCN12345678,SRE,ID0211BCI,ID0411950,20050423064540z,CCH,rcv,AFIS
AFIS/ CCH	Send	RMS/ Livescan	TCN12345678-02,TCN12345678,SRE,ID02119BCI,ID0411950,20050423065223,AFIS/CCH,RCV,RMS(ID?)
AFIS	Send	FBI	TCN12345678,CAR,WVIAFIS,ID02119BCI,20050423070433z,AFIS,send,FBI
AFIS	Receive	FBI	TCN44332211,TCN12345678,SRE,WVIAFIS,ID02119BCI,20050423072332z,AFIS,send,FBI
AFIS	Send	CCH	TCN44332211,TCN12345678,SRE,WVIAFIS,ID02119BCI,20050423073054z,AIS,send,CCH

ANSI/NIST Type 1 Field/Subfields STF Proposed Record Description

NIST 2005 NEW TYPE 1 FIELDS

Identifier/Tag# :			STF	1.017
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Tag #:	1.017	FIELD NAME:	STF-Submission Traking Filed
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Identifier:	STF	FIELD SIZE MIN:		MAX OCCURRENCES:	99
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FIELD SIZE MAX:		TYPE:	SET
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DESCRIPTION: This is an optional, repeating field, consisting of (up to) 9 subfields, up to nnn??? Number of occurrences. These values TBD by NIST 4/2005.

C: This field is contains the following subfields:

Subfields	O/M	Char	Fid	Cond	Type	Min	Max	Description
#1-STF-TCN	M	ANS	10	40				This is a mandatory subfield. The field contains the TCN of the submission of the submission received or sent.
#2-STF-TCR	O	ANS	10	40				This is an option subfield. This field contains the TCR (1.10) of the submissin when appropriate of the submission received or to be sent.
#3-STF-TOT	M	ANS	4	4				This is a mandatory subfield. The subfield contains the TOT of the submission received or to be sent.
#4-STF-DAI	M	ANS	9	19				This is a mandatory subfield. This field contains DAI (1.07) of the submission received or to be sent.
#5-STF-ORI	M	ANS	9	19				This is a mandatory subfield. This field contains ORI (1.08) of the submission received or to be sent.
#6-STF-GMT	M	ANS	10	30				This is a mandatory subfield. This field contains the GMT/UTR of the submission received or to be sent.
#7-STF-SYS1	M	ANS	10	30				This is an mandatory field used to record the originator of the submission received or to be sent.
#8-STF-SRF	O	ANS	1	2				This is an optional field used to record the result of the search results.
#9-STF-ID	O	ANS	3	10				This is an optional field used to record the Agency Identification number result of the search results.

SPECIAL CHARS:

EXAMPLE DATA:

```
1.017:ORPB00123456  OR0420000  CAR  OR0SBI100  OR0SBI102  20050423181653
z  LIVSCAN  <RS>ORPB00123456  OR0420000  CAR  OR0SBI100  OR0SBI102  2
0050423181754z  WIN ORTC01  <RS>ORPB00123456  ORPB00123456-
2  OR0420000  SRE  CA0340001Y  20050423181854z  OSP CCH TSCorp
  ID0001234567<qs>
```