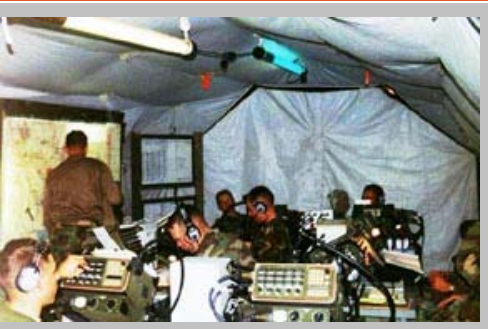

Rosetta Technology™

Mr Charlie Heidal
Joint Fires and Effects Marketing Manager
Poway Ca

Rockwell Collins

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Goals

- What was Rosetta designed to Solve
- Describe what Rosetta is
- Describe how it works
- What is Implemented?

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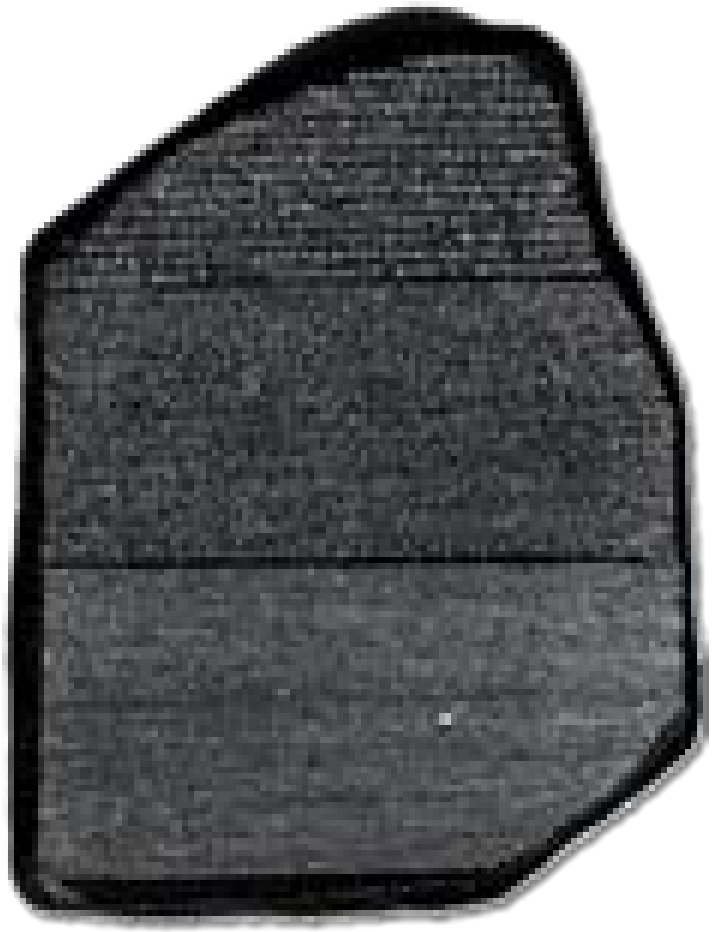
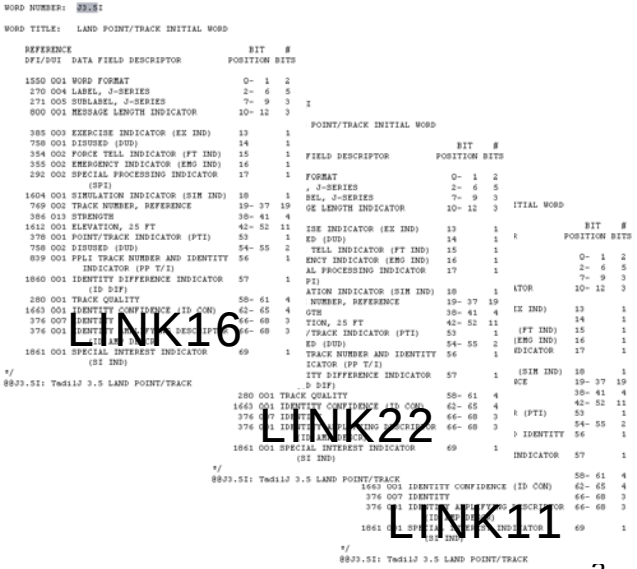
What is Rosetta?



Much like the *Rosetta Stone* in the London Museum, **Rosetta Technology** is designed to translate languages, in this case datalink messages, from one format to the other and facilitate forwarding



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Rosetta's early days

- 1996 – F-14 and E2C are fielding LINK16
  - Set up of a network is wildly complex and seems to require a PHD level brain function
  - Hardware is cumbersome, complex and mystical
- Rosetta Technology, the solution….
  - LINK message sets on a windows laptop
  - Designed to take the magic out of making LINK16 work
  - Using externalized ICDs and rules instead of source code makes the system more flexible and expandable
    - Lowers re-test or integration costs
  - "Rapid-Loader" Rosetta application made loading a terminal very easy.
- End State
  - Rosetta carried onto the E2C aircraft for cockpit crew use to see the datalink picture.
  - Rosetta laptop used to test F-14C/D aircraft prior to flight.

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What is Rosetta Technically

- Memory based track server/database running as a windows service
- Understands datalinks outside of compiled code (New or changed message to specification does not mean new c++ source code)
- Externalized Text based Rules engine.
  - Capable of Many to One and One to Many message translation and forwarding. EG, VMF K2.33 (9 line) -> LINK16 J12.0, J3.5, J3.5 and J10.2
  - Rules are on the fly editable
- Rosetta handles format translation for you
  - Feet -> Meters, Inches to CM, Degrees to MILS
  - LINK16 Latitude = 24 bits ←→ MIL-STD 6017 latitude = 25 bits
- System maintained by Systems Engineers and not software developers.
- ONE ROSETTA ENGINE, many interfaces.

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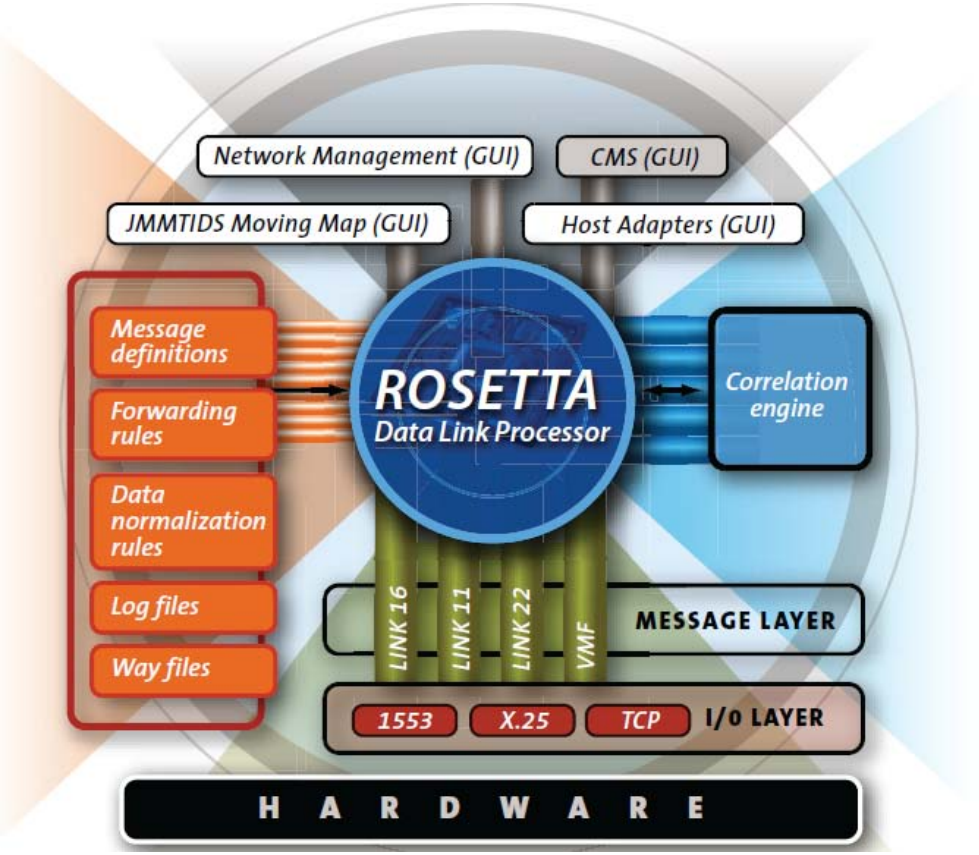
Rosetta Engine

The Rosetta Track Server enables seamless integration of disparate data sources (data links/radars/sensors).

•Rosetta's method of processing source data allows data links and sensors to be efficiently implemented and maintained, and forwarding rules remain external to core engine.



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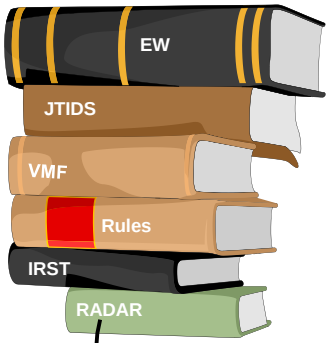
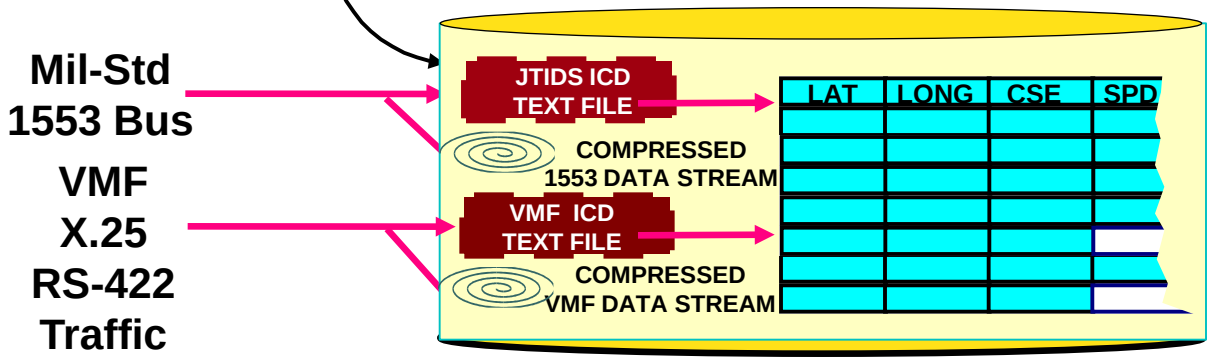
Text Parsing and why we are different

Text Parsing converts Military Standards into “C-code” (Radars, Datalinks, etc)



- Quickly Adaptable to new datalinks / sensors using Notepad
- MIL-STDS stored in ASCII format and “parsed” on startup
- Schema of generic names developed from ICDs:
  -- Latitude
  -- Course



ROSETTA RQL SERVER

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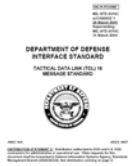
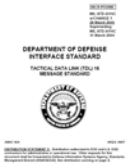
Rosetta Technology – Forwarding made Easy

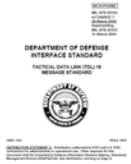


LINK-16

VMF R2

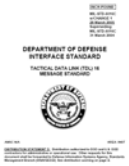


VMF R5



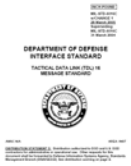
AFAPD

6017A



Country Specific Link

LINK-11



LINK-22

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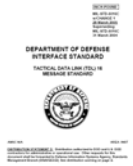
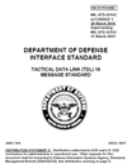
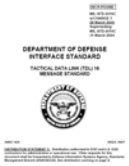
Forward from One to One…or Many



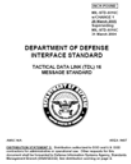
LINK-16



VMF R2



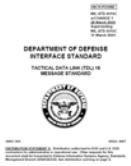
VMF R5



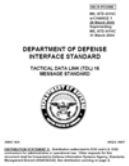
AFAPD

6017A

LINK-11



LINK-22



Country Specific Link

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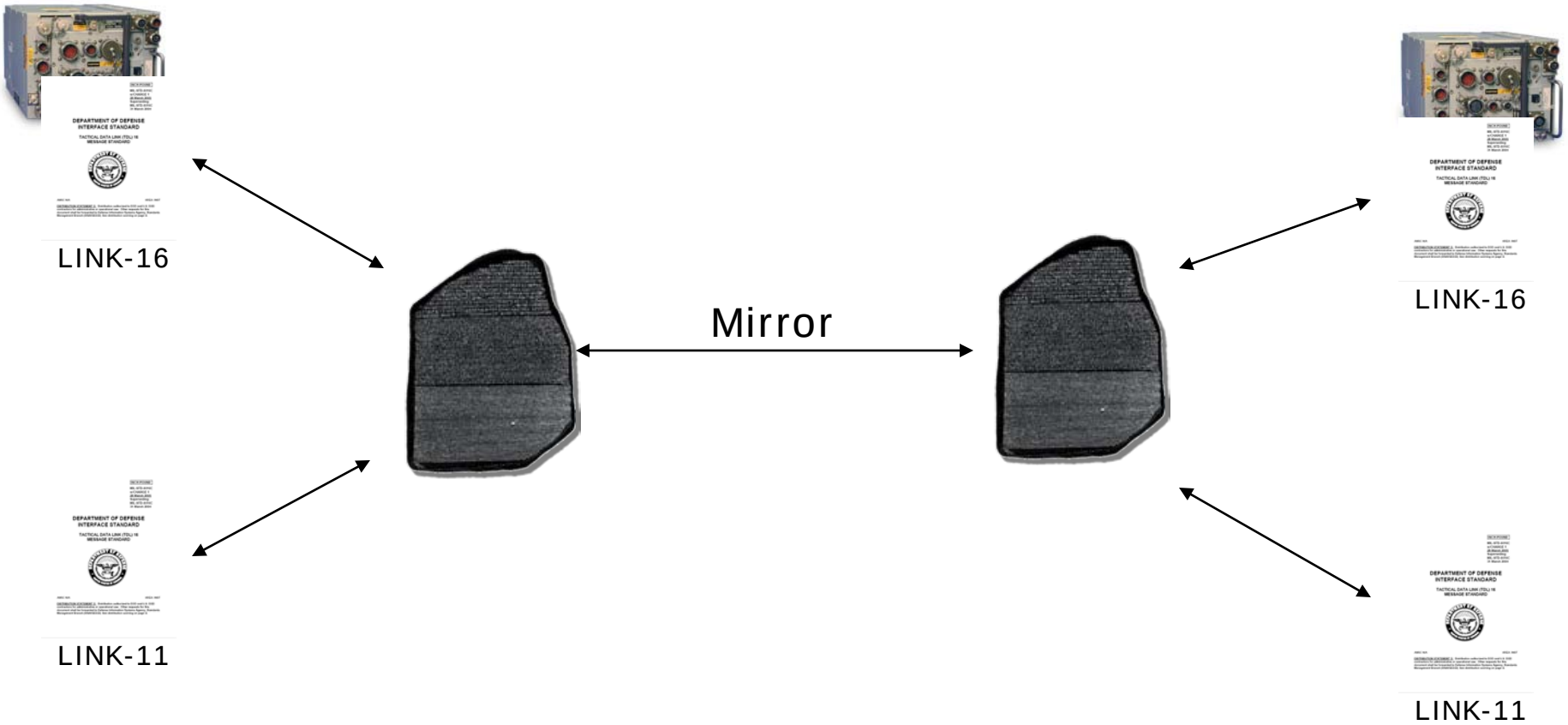
Rosetta to Rosetta via Mirror



4 datalinks + 2 Rosetta's = One Complete picture

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You can even forward to other links…

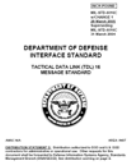
LINK-16

Mirror

LINK-16

LINK-11

Country Specific Link



LINK-11

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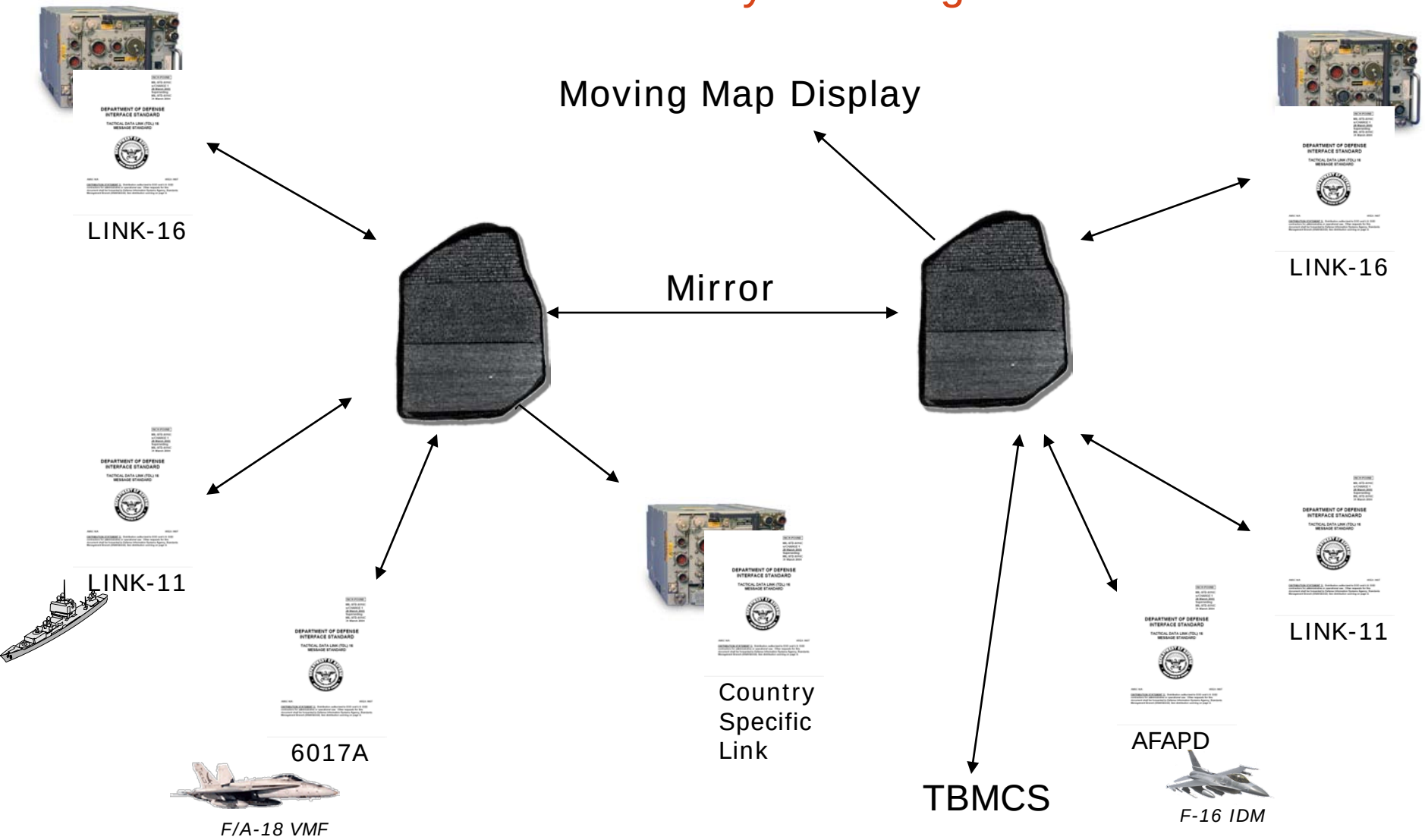
The Connection limit is your imagination



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LINK16 -> VMF5 Forwarding

LINK16

```
WORD NUMBER:  J3.5I

WORD TITLE:   LAND POINT/TRACK INITIAL WORD

   REFERENCE                                        BIT    #
   DFI/SUI  DATA FIELD DESCRIPTOR                 POSITION BITS

   1550 001 WORD FORMAT                             0-  1   2
    270 004 LABEL, J-SERIES                         2-  5   5
    271 005 SUBLABEL, J-SERIES                      7-  9   3
    800 001 MESSAGE LENGTH INDICATOR               10- 12   3

    385 003 EXERCISE INDICATOR (EX IND)            13       1
    758 001 DISUSED (DUD)                          14       1
    354 002 FORCE TELL INDICATOR (FT IND)          15       1
    355 002 EMERGENCY INDICATOR (EMG IND)          16       1
    292 002 SPECIAL PROCESSING INDICATOR           17       1
                (SPI)
   1604 001 SIMULATION INDICATOR (SIM IND)         18       1
    769 002 TRACK NUMBER, REFERENCE                19- 37  19
    386 013 STRENGTH                               38- 41   4
   1612 001 ELEVATION, 25 FT                       42- 52  11
    378 001 POINT/TRACK INDICATOR (PTI)            53       1
    758 002 DISUSED (DUD)                          54- 55   2
    839 001 PPLI TRACK NUMBER AND IDENTITY         56       1
                INDICATOR (PP T/I)
   1860 001 IDENTITY DIFFERENCE INDICATOR          57       1
                (ID DIF)
    280 001 TRACK QUALITY                          58- 61   4
   1663 001 IDENTITY CONFIDENCE (ID CON)           62- 65   4
    376 007 IDENTITY                               66- 68   3
    376 003 IDENTITY AMPLIFYING DESCRIPTOR         66- 68   3
                (ID AMP DESCR)
   1861 001 SPECIAL INTEREST INDICATOR             69       1
                (SI IND)

*/
88J3.5I: Tmdi1J 3.5 LAND POINT/TRACK
```

LINK16_J3_5.Latitude
LINK16_J3_5.Longitude
LINK16_J3_5.Elevation (feet)

```
@@RQL FORWARD J3.5 to VM5_05.19
   SET VMF5_HEADER.OriginatorUrn = tim_2.sourceTrack,
      VMF5.latitude = LINK16.latitude,
            VMF5.longitude = LINK16.longitude,
            VMF5.Altitude = LINK16.Elevation;
@@END
```

VMF5_K05_19.Latitude
VMF5_K05_19.Longitude
VMF5_K05_19.Altitude (meters)

VMF R5

```
WORD NUMBER:  J3.5I

WORD TITLE:   LAND POINT/TRACK INITIAL WORD

   REFERENCE                                        BIT    #
   DFI/SUI  DATA FIELD DESCRIPTOR                 POSITION BITS

   1550 001 WORD FORMAT                             0-  1   2
    270 004 LABEL, J-SERIES                         2-  6   5
    271 005 SUBLABEL, J-SERIES                      7-  9   3
    800 001 MESSAGE LENGTH INDICATOR               10- 12   3

    385 003 EXERCISE INDICATOR (EX IND)            13       1
    758 001 DISUSED (DUD)                          14       1
    354 002 FORCE TELL INDICATOR (FT IND)          15       1
    355 002 EMERGENCY INDICATOR (EMG IND)          16       1
    292 002 SPECIAL PROCESSING INDICATOR           17       1
                (SPI)
   1604 001 SIMULATION INDICATOR (SIM IND)         18       1
    769 002 TRACK NUMBER, REFERENCE                19- 37  19
    386 013 STRENGTH                               38- 41   4
   1612 001 ELEVATION, 25 FT                       42- 52  11
    378 001 POINT/TRACK INDICATOR (PTI)            53       1
    758 002 DISUSED (DUD)                          54- 55   2
    839 001 PPLI TRACK NUMBER AND IDENTITY         56       1
                INDICATOR (PP T/I)
   1860 001 IDENTITY DIFFERENCE INDICATOR          57       1
                (ID DIF)
    280 001 TRACK QUALITY                          58- 61   4
   1663 001 IDENTITY CONFIDENCE (ID CON)           62- 65   4
    376 007 IDENTITY                               66- 68   3
    376 003 IDENTITY AMPLIFYING DESCRIPTOR         66- 68   3
                (ID AMP DESCR)
   1861 001 SPECIAL INTEREST INDICATOR             69       1
                (SI IND)
*/
88J3.5I: Tmdi1J 3.5 LAND POINT/TRACK
```

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What does Text Parsing get me verses Hard Coding???

Task: Upgrade TACP CASS to support F/A-18 OFP 19C ACAS which uses VMF R6+ (as opposed to VMF R2) not including imagery

Auto Generated

SourceFile	IAdded	IDeleted	IChanged
Rosetta Core Totals	**0**	**0**	**0**
VMF.CPP	7	0	0
Rosetta Add-Ins Totals	**7**	**0**	**0**
VMF.icd	1	0	1
VMF_6.ICD	215	0	0
DFI_6.ICD	149	0	0
VMF_6.dtl	517	0	0
Rosetta Config/ICDs Totals	**882**	**0**	**1**

Notes:

1) For Rosetta, almost entirely ICD and configuration file: VERY LITTLE CODE

2) There were some changes to the front-end application JMMTIDS for input dialogs, etc that are not shown here but no changes were needed to jmmtids to fetch this new data from Rosetta and display on the map and in lists

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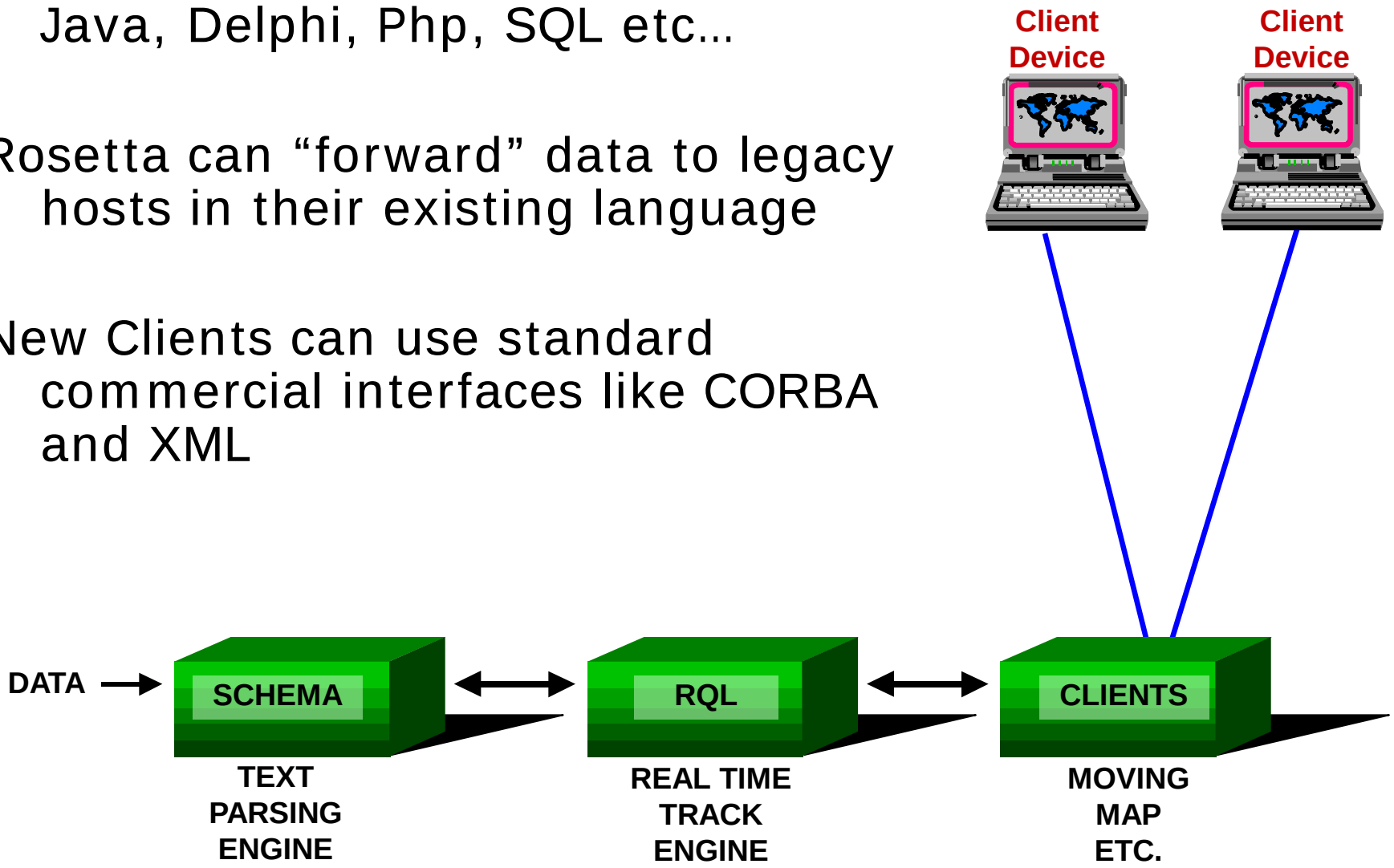
Rosetta Clients

Clients can be C, Visual Basic, Excel, Java, Delphi, Php, SQL etc…

Rosetta can “forward” data to legacy hosts in their existing language

New Clients can use standard commercial interfaces like CORBA and XML



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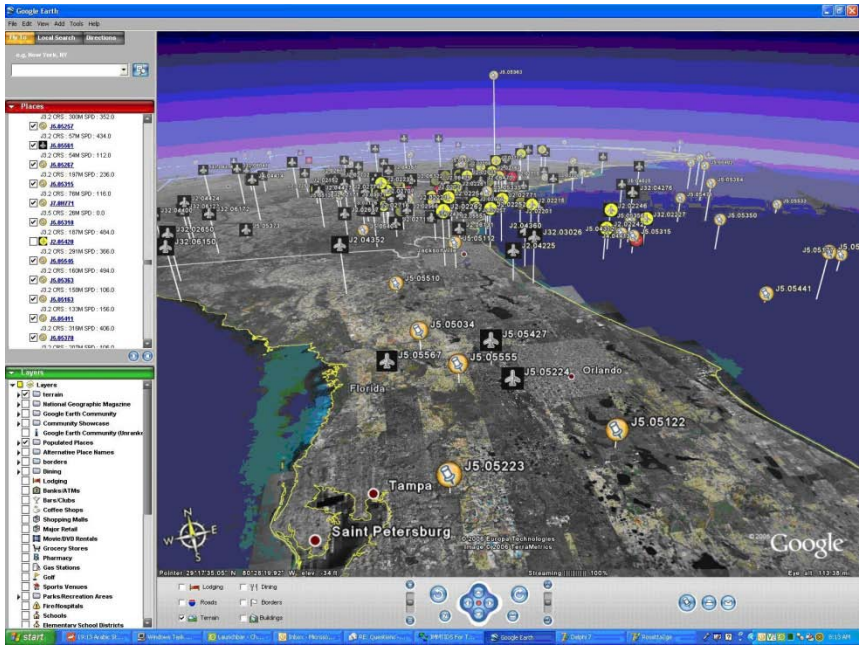
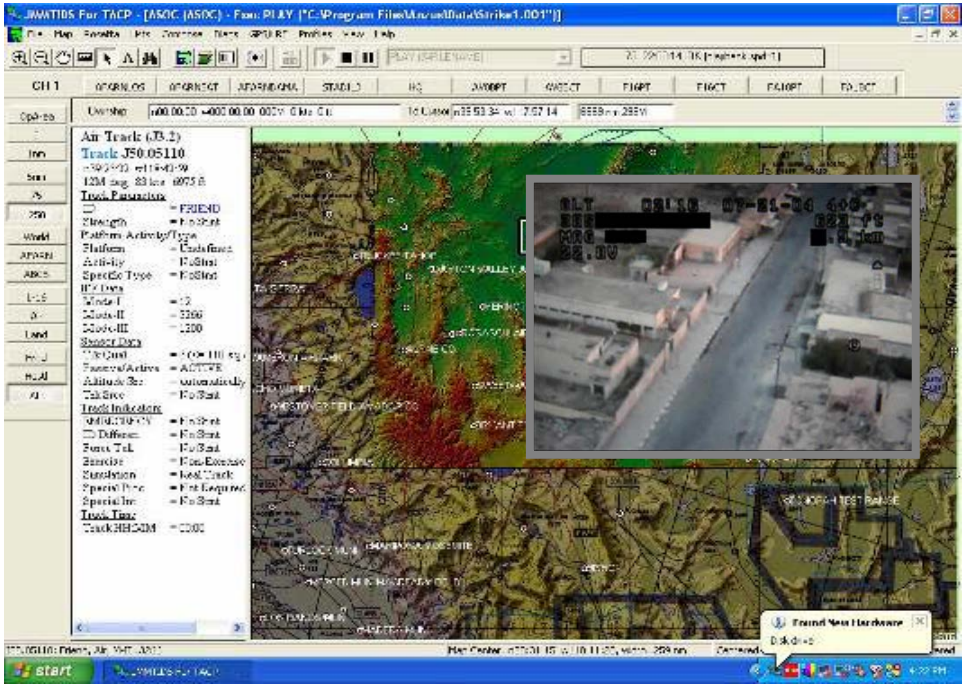
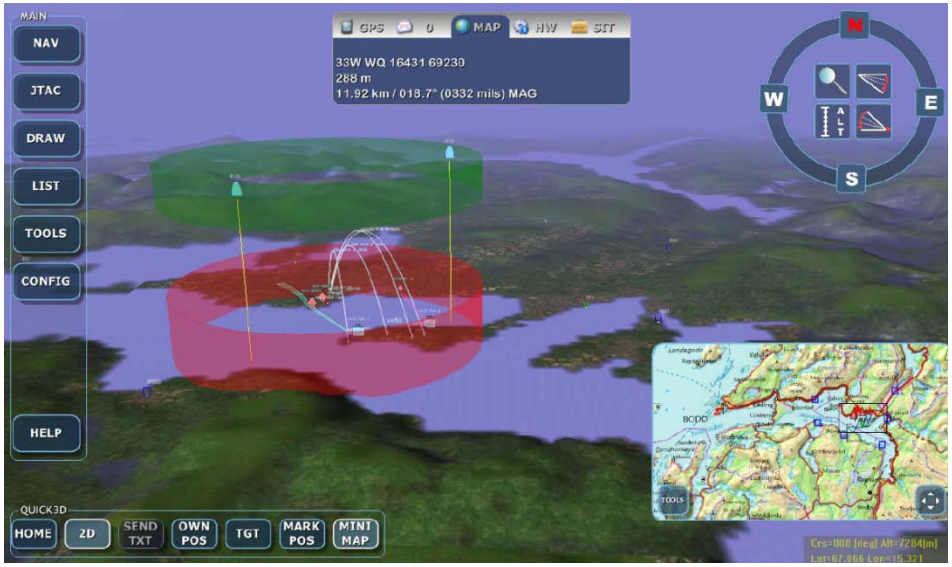
Rosetta is Map Agnostic







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So What if….

- You have a Different Map you want to use
  - Using the SDK you write a client interface to Rosetta
  - No “Re-Test” costs…Rosetta didn’t change
  - Treat Rosetta like a database to Snap Shot data

- You have a Proprietary Datalink that you don’t want anyone to know
  - Take the Rosetta SDK Course (1 week)
  - Write your own message handler (4 Hours)
  - You can now translate and forward between your datalink and any other datalink already in Rosetta*

- Or we can do it for you
  - Complete Development Staff and Systems engineers to provide onsite development, documentation, testing, training and services support.

* Host nation to LINK16 forwarding would require COCOM approval

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Rosetta Interfaces

Low Level Interfaces

- MIL-STD-1553
- ARINC-429, 561, etc.
- RS-422
- Ethernet (TCP/IP and UDP/IP) server and client interfaces
- Sync Serial
- ASync Serial
- AEGIS / CVN NTDS Parallel and Serial
- ICI PCMCIA improved Modem Card
- ICI USB Modem
- Aeronix/Symetrics UROC Modem

Protocols Supported

- ARINC-429
- MIL-STD 188-184
- MIL-STD 3011A (STADILJ)
- MIL-STD 3011C
- Slowlink (Rosetta Broadcast)

Forwarding

- MIL-STD-6020
- USAF TACP Gateway Forwarding Rules
- Finland country wide infrastructure rules
- Swedish Air to Ground rules

Equipment Interfaces

- PRC-150
- PRC-117F/G
- PRC-152
- PRC-148
- JTRS Enhanced MBITR
- MIDS-LVT 1 Plat A, B and N
- MIDS LVT 2 Platform J
- Class 2 JTIDS
- Class 2M JTIDS (E2C)
- FDL
- URC-138 (SHAR)
- SADL RT-1720

Mapping Applications

- MAP-X
- FalconView
- Maria (In progress)
- Google Earth (demo Only)
- BAE CGS Command/Control System (In progress)

Certifications

- LINK11 to LINK16
- LINK16 C2 Minimum Implementation

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Rosetta Interfaces Part II

Supported Sensors / Links

- CEC
- TIBS
- MIL-STD 6016 B
- MIL-STD 6016 C
- Link-11
- VMF Reissue 2
- VMF Version 3
- VMF Version 5
- VMF Version 6 and 6+
- MIL-STD 6017
- MIL-STD 6017A
- STANAG 5522 (Link22)
- IDM-AFAPD
- GBDL
- OTH-GOLD
- USMTF
- OMNITRAKS, SABRE
- AEGIS Interface; NSERIES
- SLQ-32 EW System
- Situational Awareness Datalink (SADL)

Command and Control Systems

- TACP Gateway
- TBMCS
- ADOCS/JADOCS
- AFATDS
- FBCB2

Aircraft Interoperable with

- A-10C SADL & VMF
- F-16 IDM
- F-16 LINK16
- F-15E LINK16
- AWACS/JSTARS LINK16
- Mirage F1 IDM
- Mirage 2000 IDM
- Tornado IDM
- B-52 VMF
- AC-130U LINK16
- AV-8 MTS
- F/A-18 C, D, E, F VMF
- F/A-18 SuperHornet LINK16
- Grippen LINK16
- EuroFighter LINK16
- CF-18 Canada VMF
- Jaguar IDM
- Grippen

Testing has occurred against, but not Live fired:

- M32 Mortar with the DAGGER munition
- AFATDS to the Excalibur munition

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A Rosetta Example : USAF TACP Gateway "Live" in Iraq and Afghanistan

- TACP personnel are reliant upon the SATCOM based AFARN to move message traffic. This network supports upwards of 150 CASS systems.
- Users send K series messages to each other and the ASOC
- The ASOC can translate and forward these messages to LINK16 and SADL in Real time. The ASOC can then send K and J series messages back to the users across the AFARN via wrappers.

- K2.33 CAS Request
  - Translated to 3 messages that are Joined in Rosetta
  - J3.5 (target), J3.5 (Closest Friendly) and J12.0 Mission Assignment
- Aircraft can provide a WILCO to J12.0 which becomes a J10.2 to the JTAC.
- K2.34 End of Mission
  - Translated to 3 messages that are Joined in Rosetta
  - J10.2 (Cease Attack), J7.0 (Drop Target), J7.0 (Drop Closest Friendly)
- K5.01 Translated at ASOC to J2.0 Indirect PPLI and "kept alive" until unit leaves the net. (MIL-STD-6020)
- K2.92 SITREP -> J13.5 SITREP

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Rosetta Message Processing

- Remember that Rosetta Interface Control Documents are flat text files!
- “Not Stored” messages pass all the way through and out of Rosetta with no action taken on them
- An ICD Entry of @@VMF5_01.02 UNIT REF QRY/RESP @NotStored@ means simply that the message is processed but not stored in the Rosetta archive. To make Rosetta do something with the message remove the @NotStored@ from the ICD, then set up your own forwarding rule..which is also a flat text file
- This is important as you look at the next two slides. Just because the message is not listed does not mean that Rosetta is not receiving and handling it.

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Messages Process and forwarded by Rosetta

- AFAPD – S100, S101, U068, X100, X101, X102, X103, X104, X200, X201, X202, X203, X204, X204_OS, X204_DP, X205, X206,
- DPSS – CoT Message
- *** See Note below on VMF
- Shar Terminal – TIMS 1 thru 30
- Reissue 5 K4.17, K1.01, K2.14, K2.15, K2.27, K2.28, K2.31, K2.32, K2.33, K2.34, K2.35, K2.37, K2.04, K2.08, K2.09, K3.06, K4.01, K4.02, K5.01, K5.11, K5.13, K5.15, K5.19, K5.02, K5.04, K5.06, K5.09, K7.01,
- Reissue 6 K2.33, K2.34, K2.35, K2.57, K2.58,
- MIL-STD-6107 – No Significant Changes from R6
- MIL-STD-6017A K101, K2.33, K2.34, K2.35, K2.57, K2.58
- TBMCS – AODBMessage 9.27, 9.31, 9.32, 9.90, 9.92, 9.01, 9.02, 9.34, 9.35, 9.15, 9.03
- TADILJ – J8.6, J16.0, J20.0, J2.0, J2.2, J2.3, J2.4, J2.5, J2.6, J3.0, J3.1, J3.2, J3.3, J3.4, J3.5, J3.6, J3.7, J5.4, J6.0, J7.0, J7.1, J7.2, J7.3, J7.4, J7.5, J7.7, J8.0, J8.1, J9.0, J9.1, J10.2, J10.3, J10.5, J10.6, J12.0, J12.1, J12.2, J12.3, J12.4, J12.5, J12.6, J12.7, J13.0, J13.2, J13.3, J13.4, J13.5, J14.0, J14.2, J15.0, J17.0, J28.0, J28.1, J28.2, J28.3, J28.4, J28.5, J28.6, J28.7, J29.1, J29.2, J29.3, J29.4, J29.5, J29.6, J29.7, J30.0, J30.1, J30.2, J30.3, J30.4, J30.5, J30.6, J31.0, J31.1, J31.7,
- Small Diameter Weapon - J11 series

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More of What is Done

- SADL – SC91, SC92, SC0, SC1, SC2, SC3, SC4, SC5, SC6, SC71, SC72, SC73, SC8, SC9, SC10, SC15, SC151, SC80, SC101, SC102, SC016, SC121, SC122, SC283, SC285, SC308, SC409
- PLGR – MSG5030, 5080, 5031, 5040, 5101, 1299, 5330, 5042
- MTS – X900, Q034, U069, U075, U130, P060, Q090, W125, U135, Q035, T001
- MIDS-LVT2 Status Messages 1 – 38, I Blocks 1-63, FIMS/FOMS and Platform J
- MIDS-LVT1 Platform Type A and B – Complete Spec
- 1553 Bus Controller/Bus Monitor – Complete Spec
- Class 2 JTIDS Complete Spec
- Class 2M JTIDS for E2C Complete Spec
- FDL (F15 Terminal)
- MRA4 (Nimrod)

- Several other message sets are handled but their ICDs are either country, company or US DOD classified/controlled.

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