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#58

M7200 & M7300 SYSTEM OVERVIEW

[redacted] Orientation Course

28 April 1998

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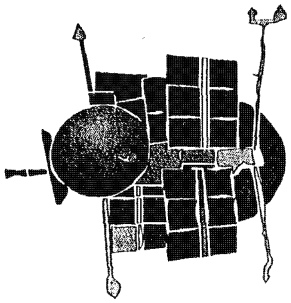
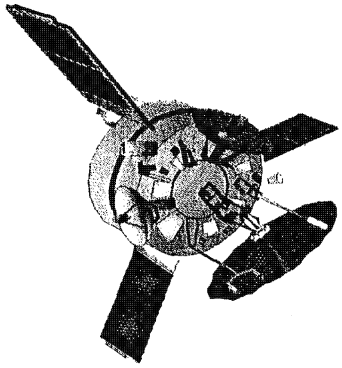
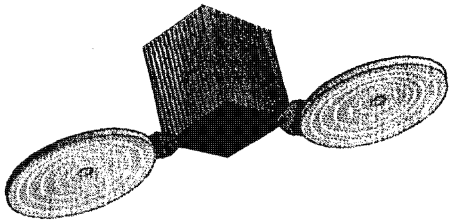
[redacted]







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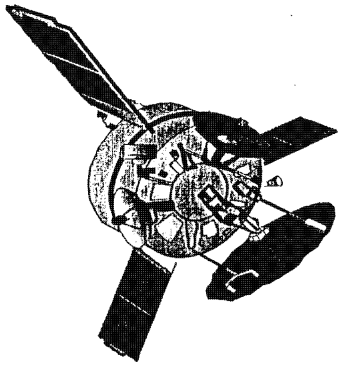
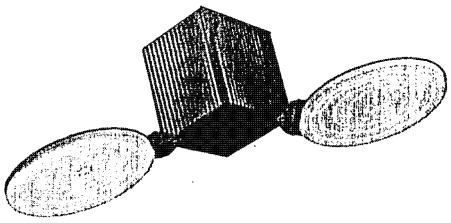
M7200 & M7300 SYSTEM OVERVIEW

The [redacted] Program





- ROSTER - Unclassified
- M7300 - TALENT-KEYHOLE
- Farrah - BYEMAN
- DARPASAT - Unclassified
- M7245 - TALENT-KEYHOLE
- Carrie - BYEMAN

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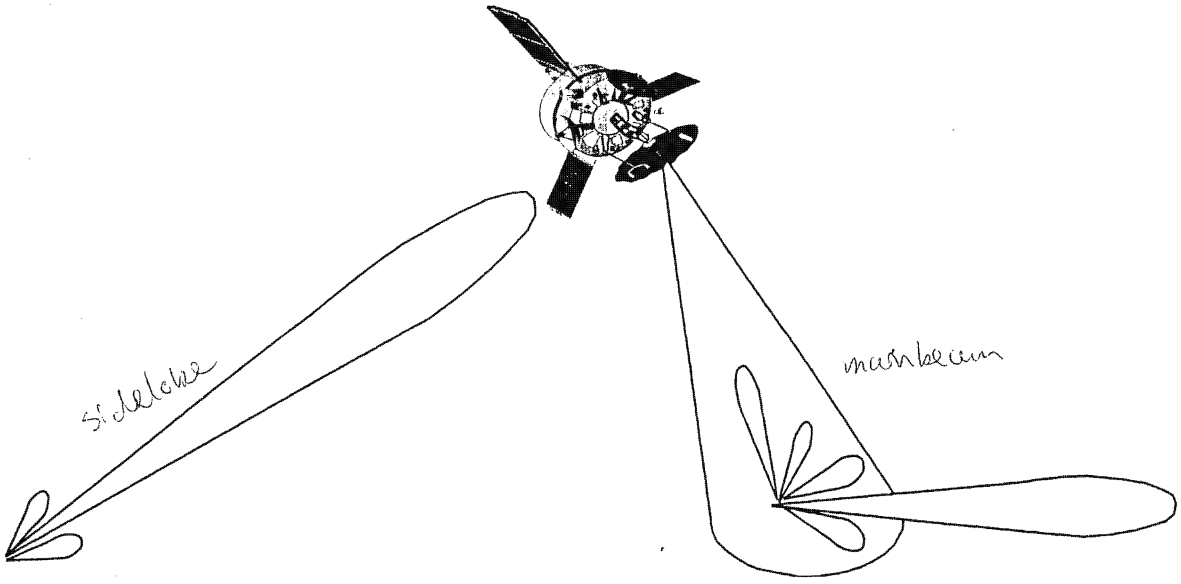
M7300 Features

Mainbeam & Sidelobe Collection



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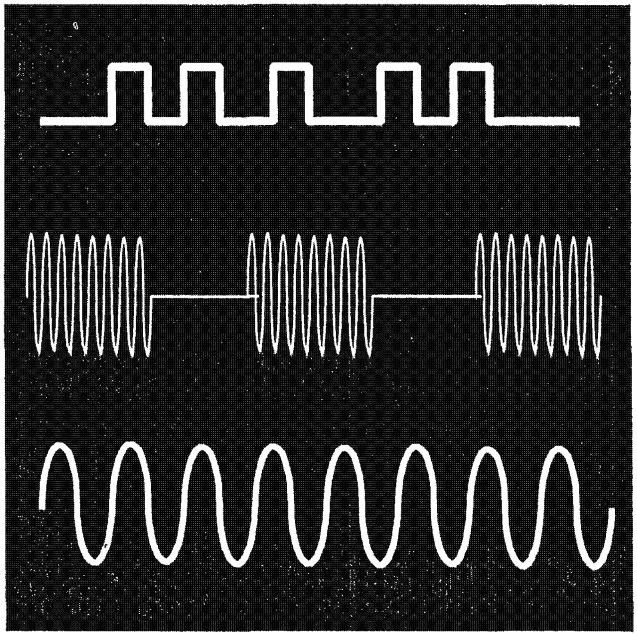
M7300 Features

Emitter Types

- Pulsed
- Pulsed Doppler
  (almost a cross between pulsed & cw)
- Continuous Wave



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M7300 Features

Other Features

- Worldwide Coverage
- Instantaneous Geolocation w/ single s/c receiver
- Record Capability & transband
- Extensive TECHELINT Capabilities
- Wide Bandwidth Capability
- Multiple Missions

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M7300 Missions

- Operational ELINT
- Technical ELINT
- ELINT Search
- COMINT Mapping
- FISINT

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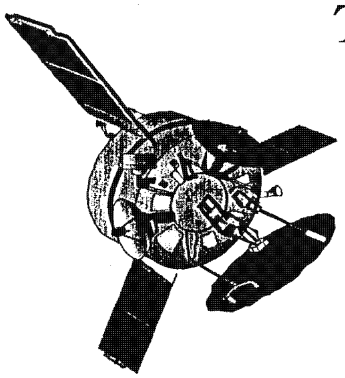
M7200 & M7300 SYSTEM OVERVIEW

TECHELINT & ELINT Search



1993 - 55 New signals discovered
1994 - 52 New signals discovered
1995 - 49 New signals discovered
1996 - 33 New signals discovered
As of September 1997 - 18 New signals discovered

80 - 90 TECH reports annually

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M7200 & M7300 SYSTEM OVERVIEW

Why Technical Intelligence ?

Parameter		Threat Assessment
ERP	→	Detection Range
PW	→	Range Resolution
PRI	→	Unambiguous Range – how far away the target is
Scan	→	Search Volume
PRI Stagger	→	Blind Speeds
Internals	→	Missile Engagement
Beamshape	→	Target Tracking Ability
Polarization	→	ECM Vulnerability

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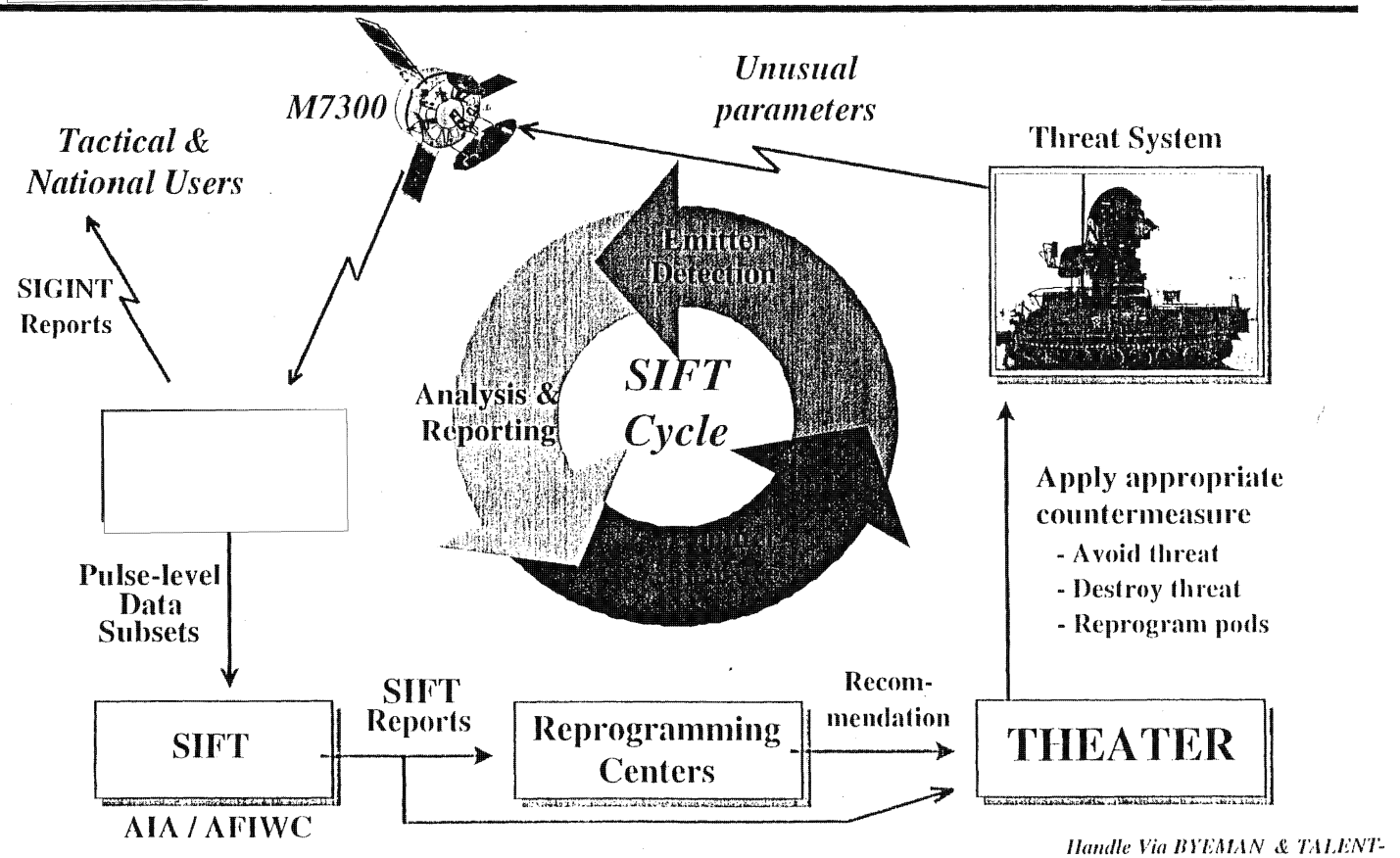
M7200 & M7300 SYSTEM OVERVIEW



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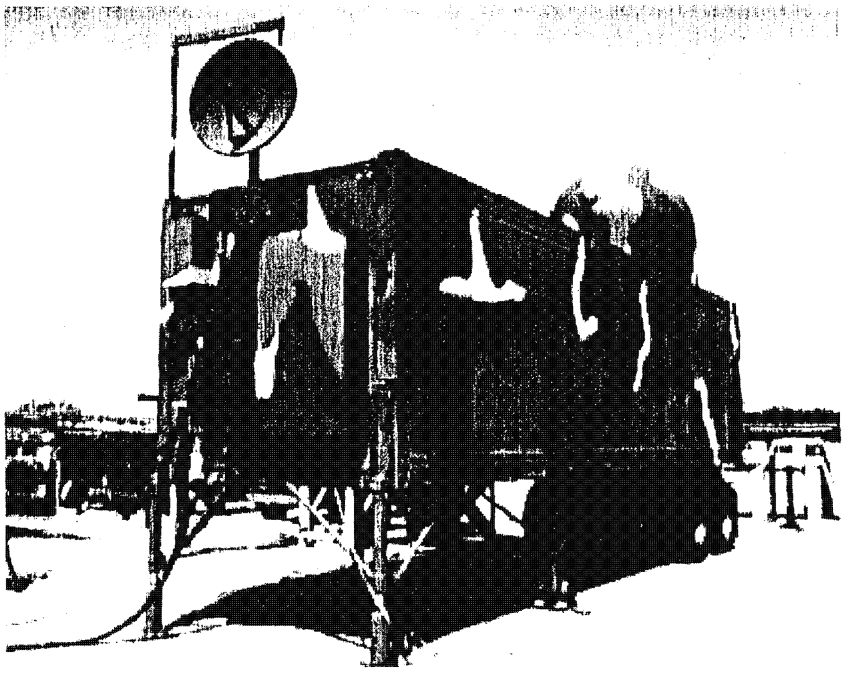
M7200 & M7300
SYSTEM OVERVIEW

EPDS/TEP Vans



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M7200 & M7300 SYSTEM OVERVIEW

M7300 Payloads

- Direction Finding ("DF") Receiver
- Omni-Directional Receiver
- Technical Intelligence Receiver (TI)
  - Pre-Detection ("Pre-D") Analog info to users from S/C
- Polarization Analysis Receiver (PAR) = circular, linear or horizontal / need to get accurate ~~EHF~~ data as well
- FARRAH V Only

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M7200 & M7300 SYSTEM OVERVIEW

The Spacecraft

TK Mission	M7346	M7347		M7245
	Farrah-I	Farrah-II		Carrie
Current Status	**Residual Operations**	**Residual Operations**		**Fully Operational**
Launch Date	11 May 82	25 Jun 84		13 Mar 94
Booster	Titan 34-D			Taurus
Altitude	383 nm			300 nm
Inclination	96 deg			105 deg
Receivers & Payloads	Direction Finding (Pulse & CW) Omni Directional (Pulse & CW) Technical Intelligence (TI)			CW, GPS
Frequency Range	2 - 18 GHz			100 - 850 MHz
Daily Tasking	80 Minutes	175 Minutes		300 Minutes

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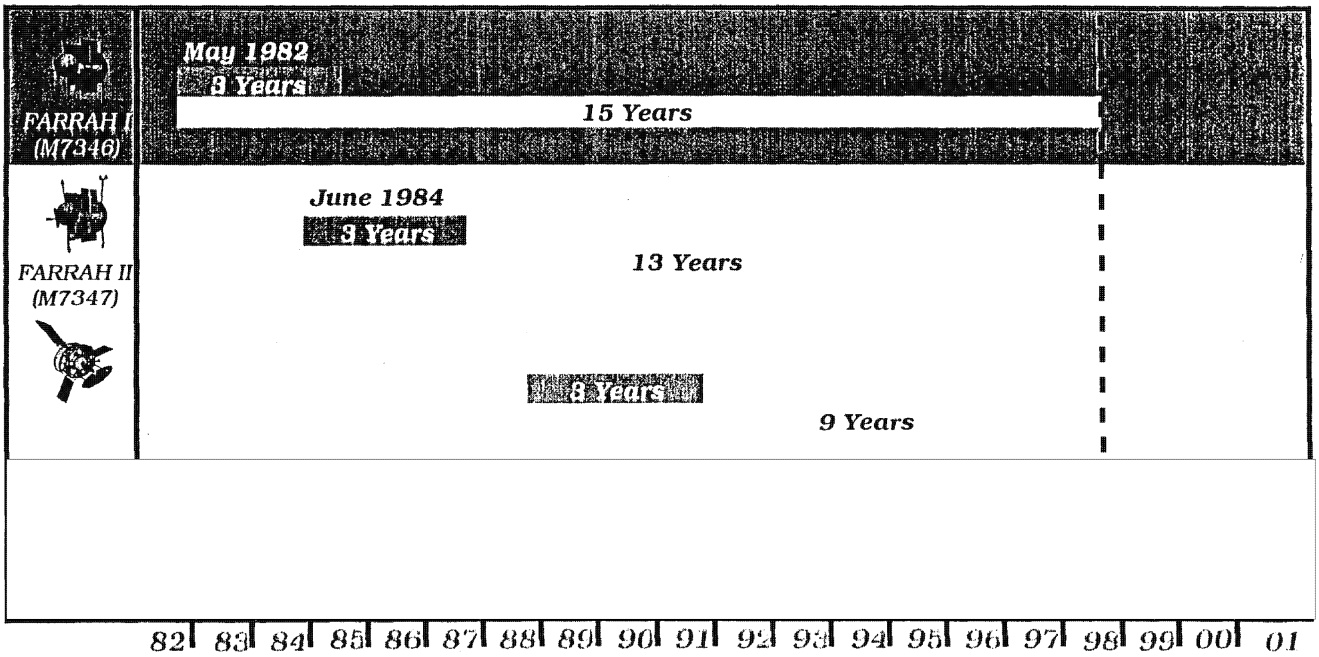
M7200 & M7300 SYSTEM OVERVIEW

FARRAH Vehicle Longevity

Still Alive in 2005!



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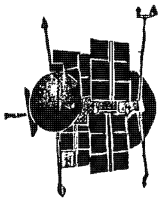
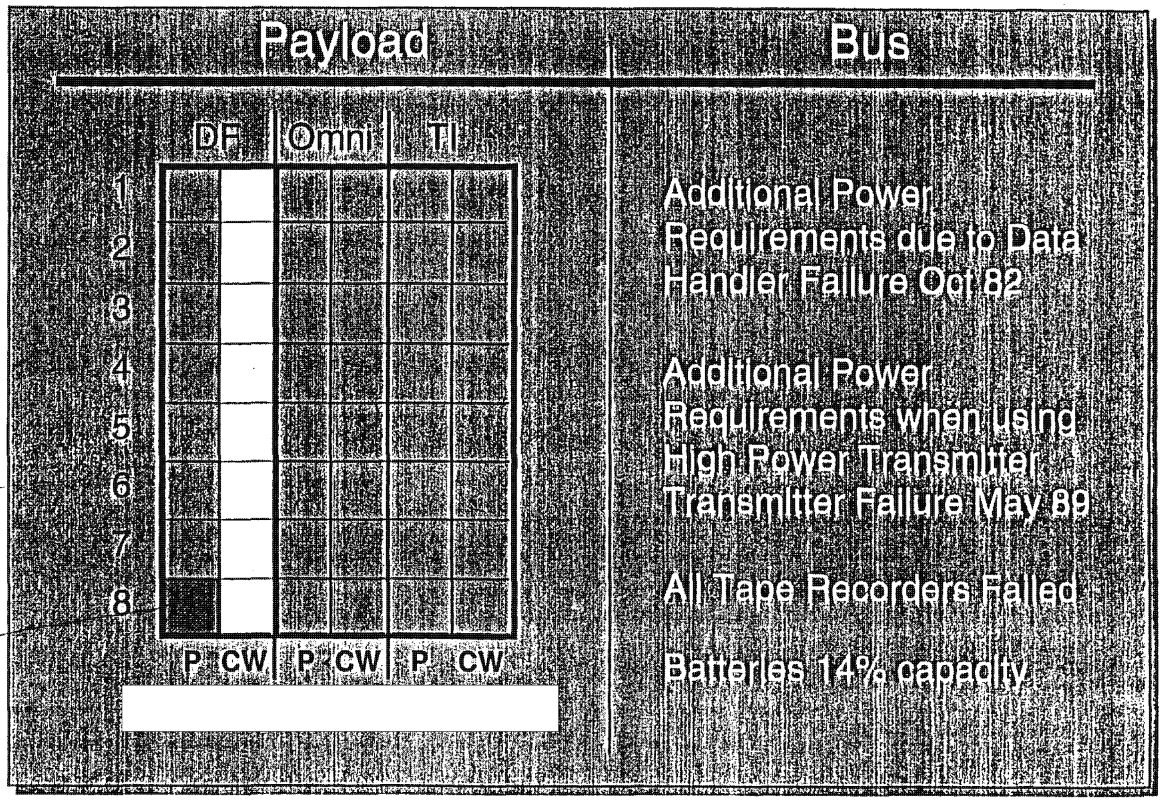
M7200 & M7300 SYSTEM OVERVIEW

M7346



green = operational

red = not operational



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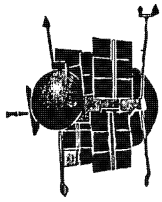
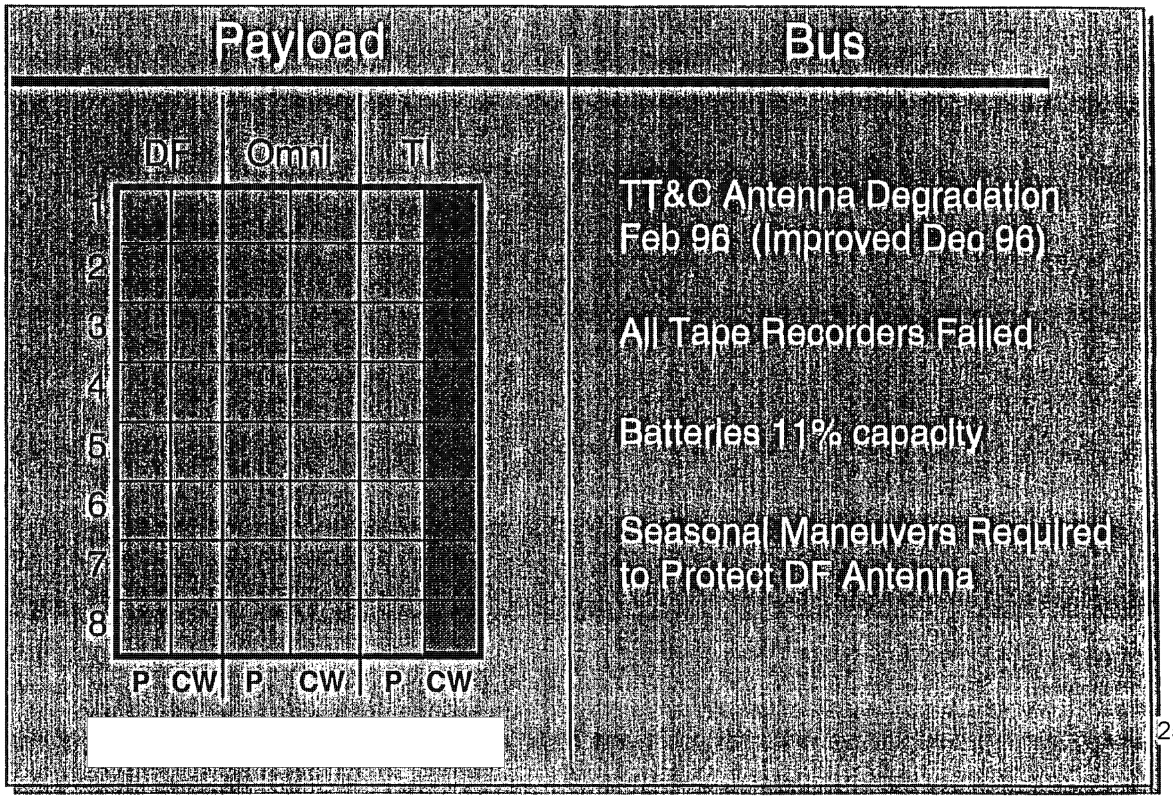
M7200 & M7300 SYSTEM OVERVIEW

M7347





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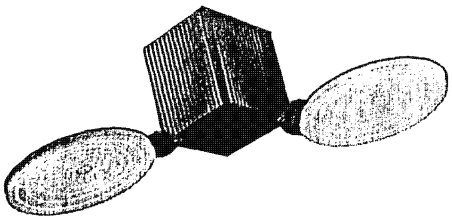
M7200 & M7300 SYSTEM OVERVIEW

M7245



- Launched: March 1994
- Design Life: 1 year
- 100 - 850 MHz COMINT Mapper
- Onboard Data Processor
- All Subsystems Healthy

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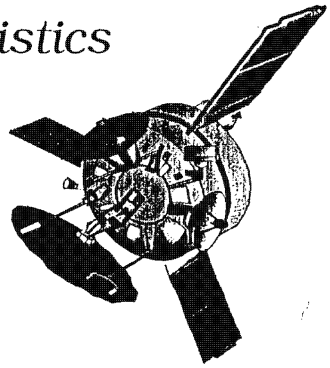
M7200 & M7300 SYSTEM OVERVIEW

M7300 General Spacecraft Characteristics



- Spin Stabilized - North/South Oriented
- Spin Rate: 50 RPM - allows [redacted] w/ single vehicle
- 3 High Gain Antennas (Sidelobe Collection)
- 6 Omni-directional Antennas (Mainbeam Collection)

25X1

[redacted]

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- [redacted] with High Gain Antennas

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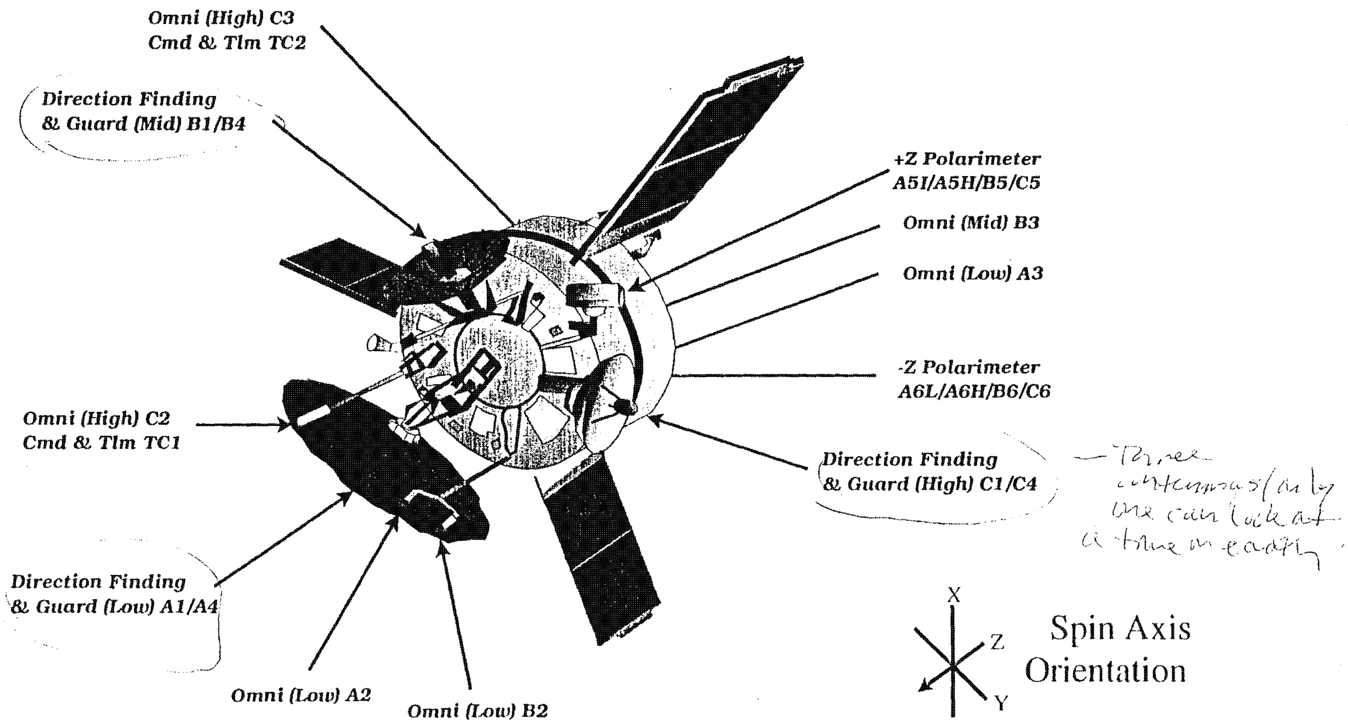
M7200 & M7300 SYSTEM OVERVIEW

M7300 Antenna Locations



— Three antennas / only one can look at a time in earth

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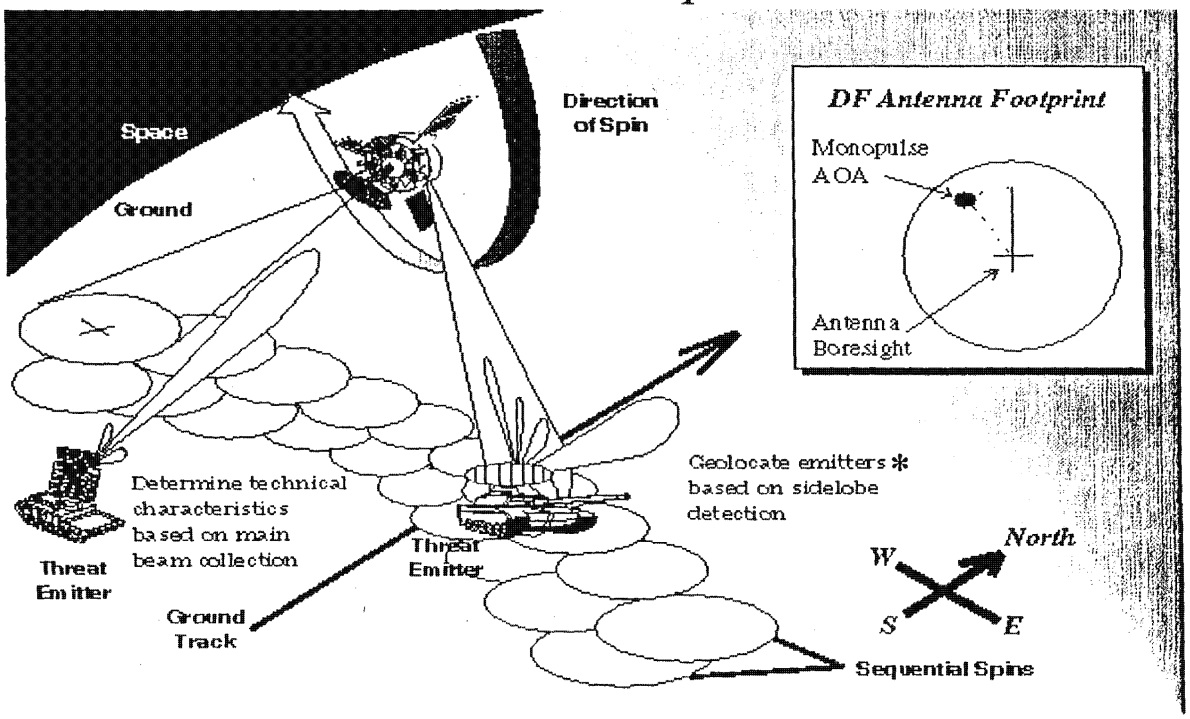
M7200 & M7300 SYSTEM OVERVIEW

DF & Omni Orbital Intercept Characteristics



*Sidelobe collection will not allow measurement of scan parameters

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M7200 & M7300 SYSTEM OVERVIEW

M7300 Frequency Coverage

25X1

A	2 or 3 Bands can be tasked at a time	Band 1	2 - 4 GHz	25X1
		Band 2	4 - 6 GHz	
B	Only 2 Bands can be tasked at a time	Band 3	6 - 8 GHz	
		Band 4	8 - 10 GHz	
		Band 5	10 - 12 GHz	
C	Only 1 Bands can be tasked at a time	Band 6	12 - 14 GHz	
		Band 7	14 - 16 GHz	
		Band 8	16 - 18 GHz	

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M7200 & M7300 SYSTEM OVERVIEW

- not every signal is seen at one point of time

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M7200 & M7300 SYSTEM OVERVIEW

5 BAND OF THE DAY STEPPING SCENARIO

25X1

Scenario	Farrah I	Farrah II
1	12347	12457
2	12346	12456
3	12457	12347
4	12456	12346
5	12346	12458
6	12457	12348

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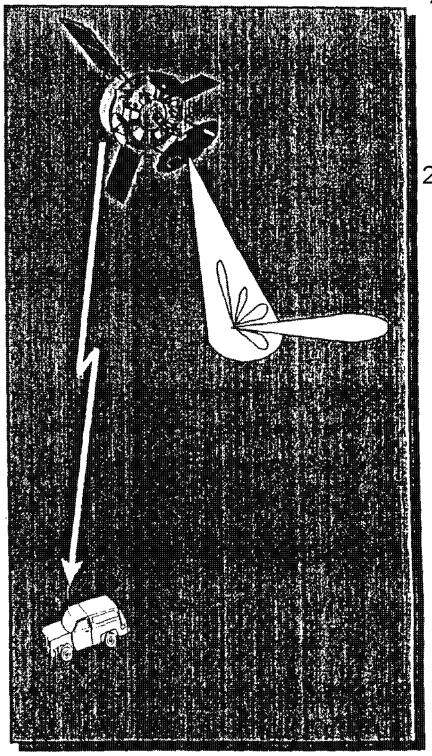
M7200 & M7300 SYSTEM OVERVIEW

Tactical On-board Processing System (TOPS)

25X1

25X1

- Support to Military Operations (SMO)
- [redacted] Formatted Messages
- Realtime to Users with TRE Systems
- [redacted] from Intercept to Report depends on
- SOI Identification & Geolocation ← Could be a signal it doesn't recognize
- COMINT Recognizer Reports



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25X1

M7200 & M7300 SYSTEM OVERVIEW

TOPS Facts

- *Correlation Index is JI*
- *Frequency is* [redacted] *(Not same as TRAP)* 25X1
- *1500nm Field of View for the Downlink* (must be w/in 1500nm of user for transmission)
- *Reports SOIs and SNOIs from 1.2 - 18 GHz*
- *SOIs are high-confidence subset of full capability*
- *No Exercise Flag on TOPS Data*
- *Databases are Modified for Users*
- *Quality Control Team monitors performance*

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M7200 & M7300 SYSTEM OVERVIEW

TOPS [redacted] Geolocation Accuracies

(TALON Sword Phase V)

25X1

- [redacted]
  - TOPS -> [redacted]
  - [redacted] ->

25X1

25X1

- [redacted]
  - TOPS -> [redacted]
  - [redacted] ->

Note: Actual miss distances from known ground truth of emitters

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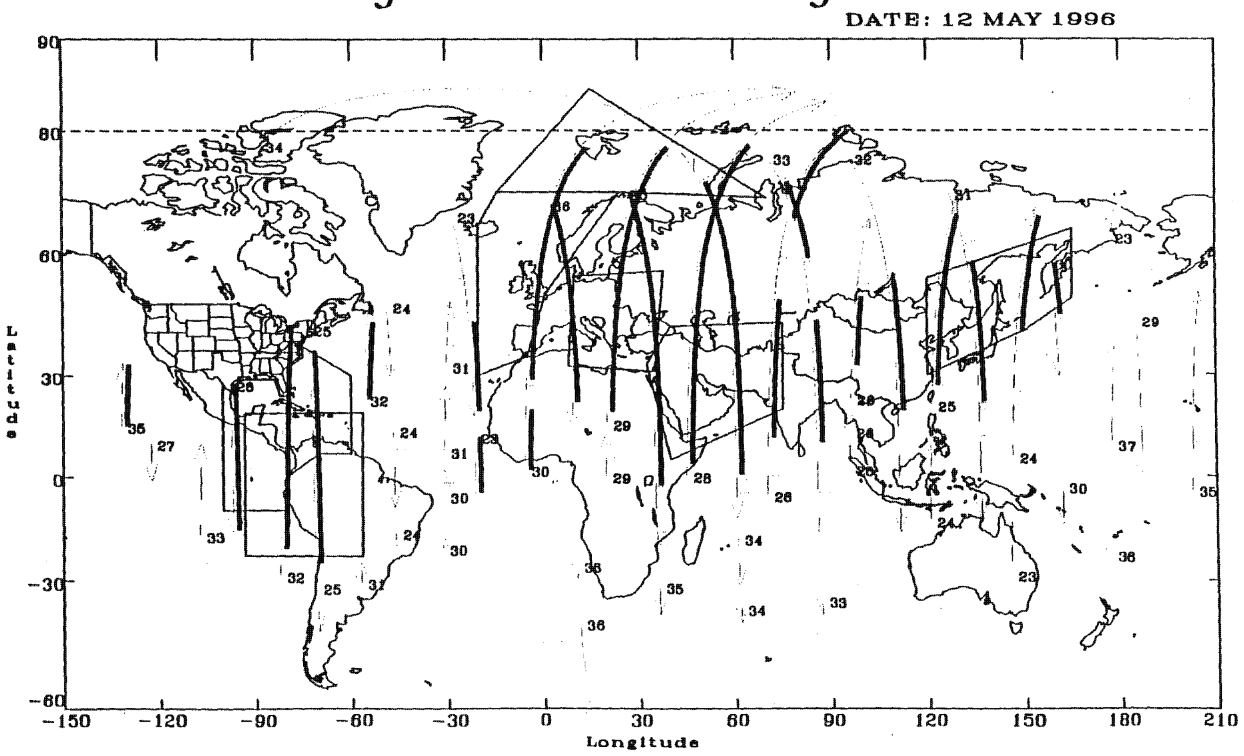
25X1

M7200 & M7300 SYSTEM OVERVIEW

Pre-Defined TOPS Areas of Interest



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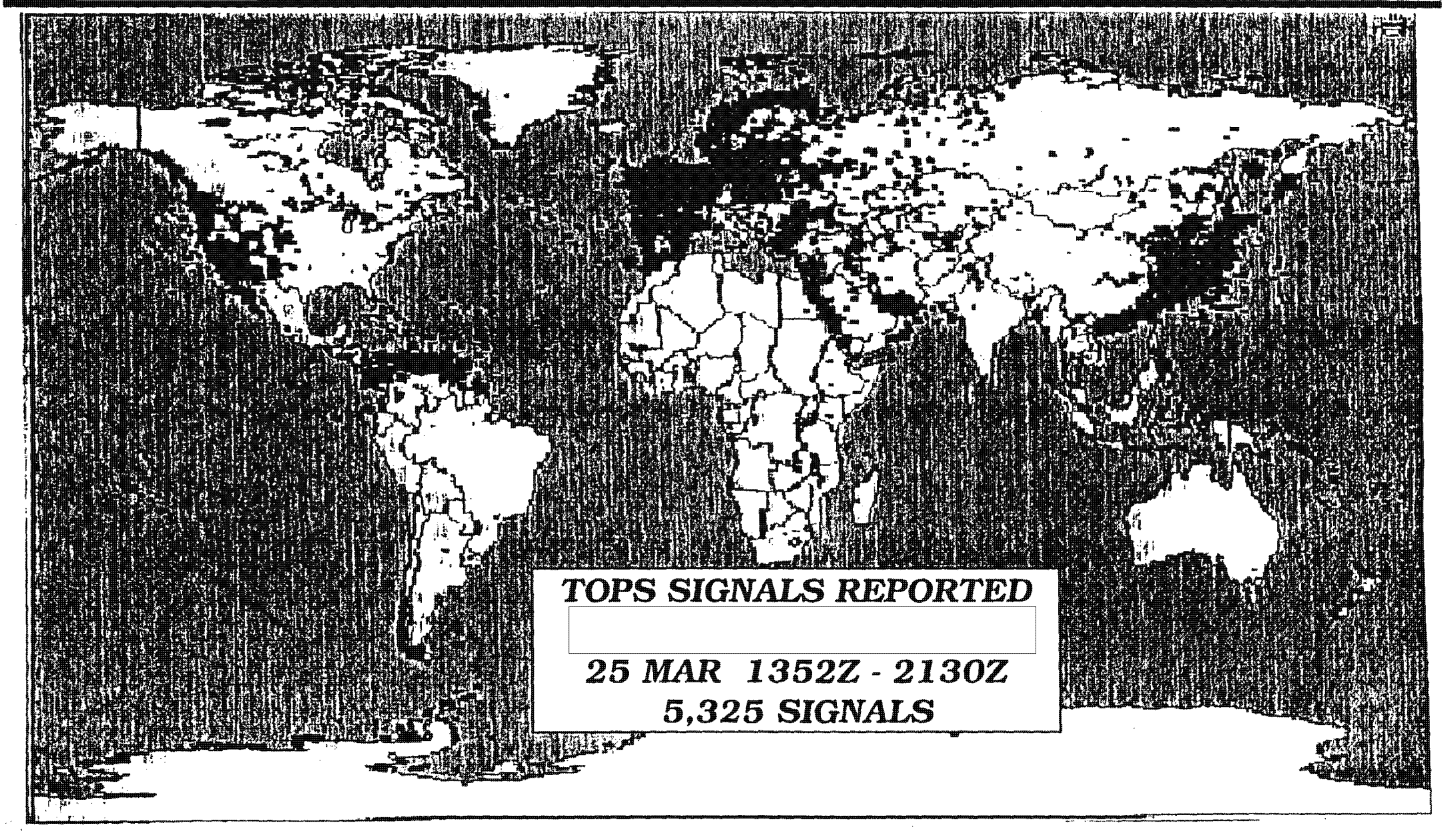
M7200 & M7300 SYSTEM OVERVIEW



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M7200 & M7300 SYSTEM OVERVIEW

COMINT Recognizer

- Only measures emitter EXTERNALS
  - Frequency
  - Baud Rate
  - Modulation

- Modulations Recognized:
  - AM/PPM
  - FM/FDM
  - FM/FSK
  - PM/BPSK & QPSK
  - Unmodulated Tone

- Fixed-tune or Handover from DF/CW Receiver

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M7200 & M7300 SYSTEM OVERVIEW

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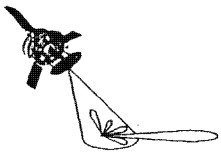
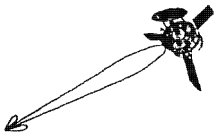
M7200 & M7300 SYSTEM OVERVIEW

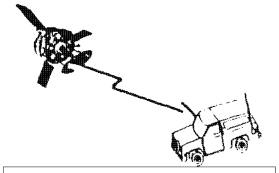
Things to Remember



Sidelobe Collection



Mainbeam Collection



CAPABILITIES

- Broad Area Coverage (LEO)
- Large Frequency Coverage
- Direct Transpond or Record
- Instantaneous Geolocation (AOA)

LIMITATIONS

- Short Time on Target (LEO)
- Not a Vacuum
- Two-day Planning Cycle
- No Scan Parameters from DF Collection

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Acronym List

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M7200 & M7300 SYSTEM OVERVIEW

M7300 Overview Acronym List

AARS: Advanced Analyst Remote Station
ADPS: Analog Data Processing System
AFSCN: Air Force Satellite Control Network
AM: Amplitude Modulation

AOL: Alternate Operating Location
AR: Action Report

BDP: Blip Data Processing
Blip: Collected signal energy; pulse and CW

CATS: Consolidated Analysis Tools Station
CC: Comand and Control (C^2)
CCS: Command and Control Software

CG: Command Generation
COTS: Commercial Off-The-Shelf
COMINT: Communications Intelligence
COP: Collection Opportunity Prediction
C-R: COMINT Recognizer
CROSS: C-R Operational System Simulator
CSTC: Consolidated Satellite Test Center
CVS: Clock, Vector, Spin processing

DAT: Digital Audio Tape
DBCR: Database Change Request 25X1
DDPPS: Digital Data Preprocessing Subsystem
DDPS: Digital Data Processing Subsystem
DDT: Direct Data Transfer
DF: Direction Finding
DMS: Data Management System
DOA: Direction Of Arrival 25X1
DSCS: Defense Satellite Communications System
DSIS: Defense Satellite Information System
DSM: Data System Modernization

ECLIPSE: Emitter Characterization, Location, Identification in a Parallel Structured Environment 25X1
EGCF: Enhanced Graphics Change Function
EPA: ELINT Processing Analyst
EPDS: ELINT Processing and Dissemination System (U.S. Army)
EPL: ELINT Parameters Limits

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M7200 & M7300 SYSTEM OVERVIEW

M7300 Overview Acronym List

EOB:	Electronic Order of Battle
FM:	Frequency Modulation
GCCS:	Ground Communications and Control Subsystem
IRDB:	Identing Reference Data Base
IRM:	Intelligence Requirements Management
IWG:	Intercept Word Group data
IWO:	Intelligence Watch Officer
LFE:	Low Frequency Extension
MC:	Mission Controller
MCC:	Mission Control Complex
MCT:	Mission Control Team
MD:	Mission Director
NRO:	National Reconnaisance Office
NSA:	National Security Agency
OAS:	Onizuka Air Force Station
OCMC:	Overhead Collection Management Center
OD:	Operations Director
OI:	Operational Intelligence
O&M:	Operations and Maintenance
OMNI:	Omni-directional
PA:	Performance Assessment
PAL:	Palletized payload
PAR:	Polarimeter Analysis Receiver
PCIX:	Preconfigured Interface Experiment
PCM:	Pulse Code Modulation
P/L:	Payload
PM:	Phase Modulation
PPM:	Pulse Position Modulation
PPDS:	Parametric Pulse Data Search
Post-D:	Post Detected Signal Data (Digital)
Pre-D:	Pre-detected signal data
QA:	Quality Assurance
QC:	Quality Control / Check

25X1

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M7200 & M7300 SYSTEM OVERVIEW

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M7300 Overview Acronym List

RATS: Reference Analysis Technical Station
RM: Resource Management
ROL: Remote Operating Location
RTS: Remote Tracking Station
SCS: Spacecraft Command Sequence
SIFT: Selectively Improved Flagging Technique
SMO: Support to Military Operations
SOI: Signal Of Interest
SORS: SIGINT Overhead Reconnaisance Subcommittee
SNOI: Signal Not Of Interest
SP: Support Programs
SUL: Station Utilization Listing

TACELINT: Tactical ELINT Report
TACREP: Tactical Report

25X1

TALAN: Time Amplitude Logical Adaptive Network
TAP: Timimg, Attitude and Position data
TEL: TOPS Electronic Laboratory
TEP: Tactical ELINT Processing
TI: Technical Intelligence
TIPS: TI Processing System

25X1

TOM: Time Of Measurement
TOPS: Tactical On-board Processing System
TRG: Timing Reference Generator
TSG: Test Signal Generator
TSS: Task Selection & Scheduling

UMOP: UnIntended Modulation On Pulse

WDR: Wideband Digital Receiver

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