

HARRIS



next level solutions



**Microwave
Communications**



**Broadcast
Communications**



**RF
Communications**



**Government
Communications**

Broadcast Communications Overview **HARRIS**



Leitch Solutions



Television Broadcast



Networking & Government Systems



Harris Software Solutions

The Harris Corporation logo consists of the word "Harris" in a large, black, serif font, enclosed within large red square brackets. The background features a faint, stylized globe with latitude and longitude lines, and a binary code pattern of 0s and 1s.

Corporation

12,000+ employees

5,000+ engineers
and scientists

Annual sales
over \$3 billion

Founded in 1895

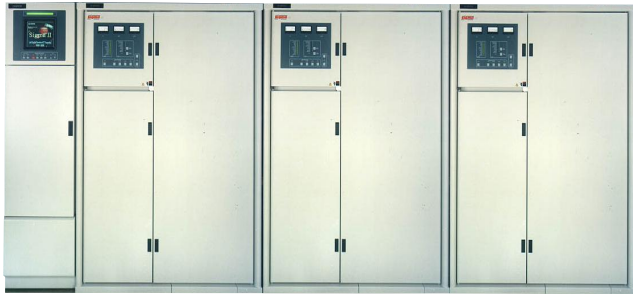
Over 70 years experience
manufacturing transmitters

Expertise in all fields of video
and audio systems

Global Field Service,
Harris Training Center,
24/7 Product Support

Harris TV Product Line Overview

Television Transmitters



***Platinum
Series VHF
Solid State
DTV & Analog***



***Sigma Series UHF IOT
DTV & Analog***



***Diamond CD
UHF Solid State
DTV***



***Platinum HTEL
Series VHF Solid
State Analog***

- *Digital (average) power
1.25 kW to 10 kW*
- *Analog (peak) power
500W to 60 kW*
- *MOSFET Transistors*
- *Air cooled*
- *600 transmitters in service
worldwide*
- *Hot pluggable modules
with distributed and
independent control
system*



Platinum Series



Diamond CD

- Digital (average) power 1.25 kW to 25 kW
- Solid state design
- LDMOS transistors
- Touch-screen GUI
- Remote control
 - Serial
 - Parallel
- Addresses low-medium power U.S. market
- Air cooled
- Hot pluggable amplifier modules and power supply modules

Characteristic	Solid State	IOT
Power: Average Peak	1.25 - 25kW 5 - 100kW	10 - 100kW 40 - 400kW
System cost per Watt (@10kW average power)	Approx. 40% higher*	Reference
10 Year Cost of Ownership	Lowest below 10 kW	Lowest above 15 kW
Redundancy	Very High	Need dual IOT
Performance	Excellent	Excellent
RMS Efficiency	18 - 20%	25 - 30%
Maintenance	1/10 of tube	Reference

** 30% Less than 2-tube system*

- UHF & VHF designs
- Slots & Panels
- Single & Multi-channel
- High Power Designs
- Full Far Field Range
- Unique DTV/NTSC combining plans



- Status of Broadcast Mobile TV Market
- Comparisons of Mobile TV Technologies
- Harris Product Portfolio for Mobile TV
- Harris Services for Mobile TV
- Harris Commitment to Mobile TV

Major Mobile TV Technical Trials



<u>Operator</u>	<u>Location</u>	<u>Technology</u>	<u># Users</u>	<u>Partners</u>
Crown Castle	Pittsburgh	DVB-H		Nokia
KPN	Netherlands	DVB-H	200	Nozema, Nokia
Swisscom	Bern	DVB-H	100	
O2	Oxford, UK	DVB-H	500	Arqiva, Nokia
Telstra	Sydney, Australia	DVB-H	1000	Bridge Networks, Broadcast Australia
Vodafone	Germany	DVB-H	500	T-Systems, Phillips
Digita	Helsinki, Finland	DVB-H	500	Nokia, TeliaSonera
RAI	Turin, Italy	DVB-H		
Orange	Paris, France	DVB-H	500	Nokia, Towercast, Canal+, TDF
Telefonica	Madrid & Barcelona	DVB-H	500	Albertis Telecom, Nokia
MediaFLO	San Diego, CA	FLO		Qualcomm
Various	Seoul, So. Korea	T-DMB		Samsung, LG
BLM	Regensburg & Munich	T-DMB		Samsung, LG
TF1	Paris, France	T-DMB		VDL

Harris Participation

	<u>FLO</u>	<u>DVB-H</u>	<u>T-DMB</u>
VHF/DAB	<i>None</i>	DVB committee developing mod to handle DAB channels	Korea on-air with modified DAB transmitters
UHF	On-air in San Diego; planning demos in Asia & Europe <i>12/1/05: Verizon Wireless signs to offer MediaFLO</i>	Approx. dozen trials in Europe & Australia	<i>None</i>
1.4GHz/DAB	<i>None</i>	DVB committee developing mod to handle DAB channels	Trials in France & Germany
1.67 GHz	<i>None</i>	Crown Castle on-air in Pittsburgh, installing in NYC	<i>None</i>
2.6 GHz	Potential	Potential	<i>None</i>

Commercial
Activity

Potential
Spectrum

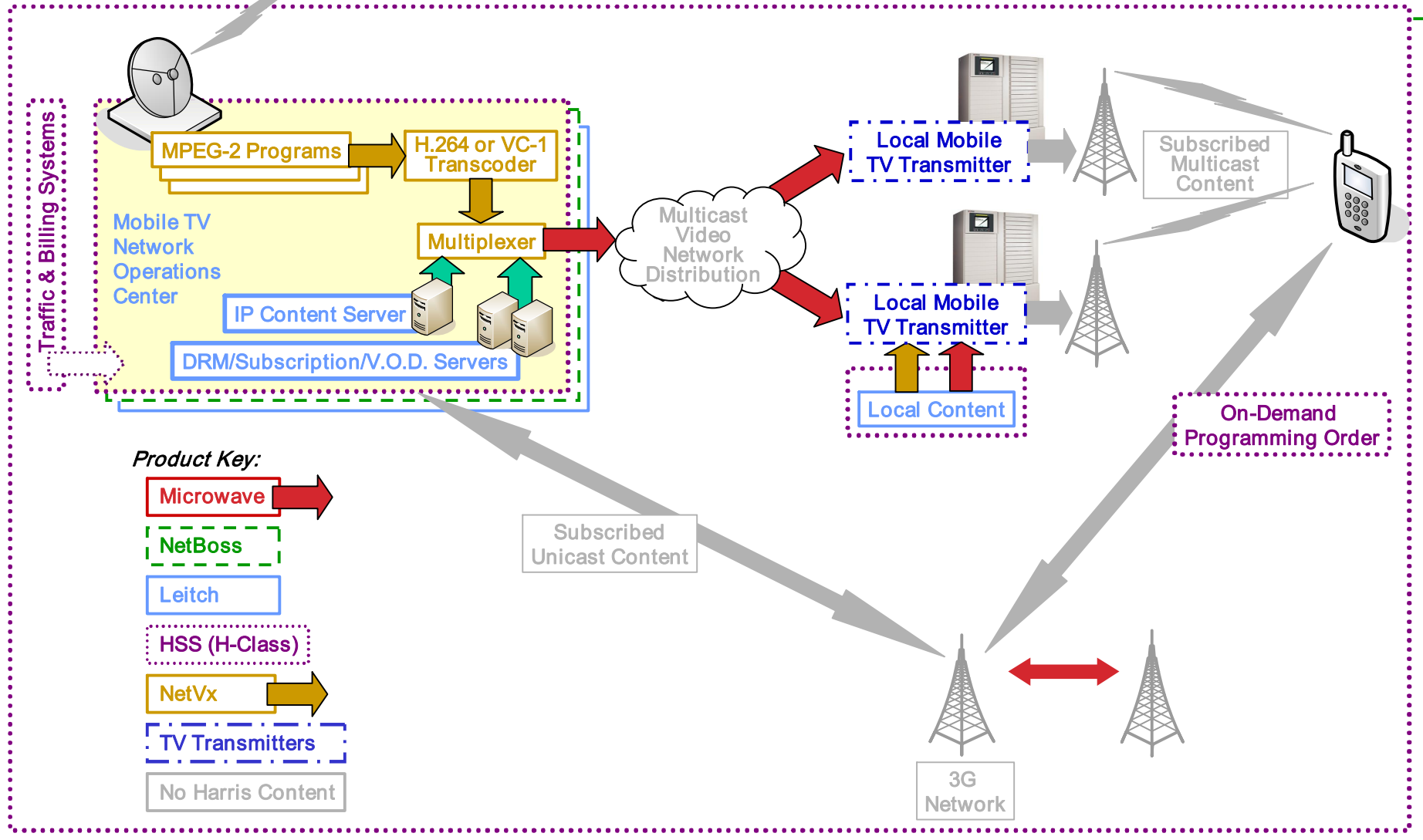
No Current
Activity

Mobile TV Modulation Approaches



	<u>Source Coding</u>	<u>Channel Coding</u>	<u>Transport Stream</u>	<u>Modulation</u>	<u>RF Channel Size</u>	<u>Typical Video Ch per RF Channel</u>	<u>Local Content Injection</u>	<u>Power Reduction Method</u>
DVB-H	H.264 or VC1	Convolution & Reed Solomon	IP	QPSK/16QAM COFDM	5/6/7/8	15	Requires Mixed SFN/MFN	Time-Slicing
FLO	H.264	Turbo & Reed Solomon	IP	Layered 16QAM COFDM	5/6/7/8	20	Yes, SFN	Time-Slicing
T-DMB	H.264	Convolution & Reed Solomon	MPEG2	Differential QPSK COFDM	1.5	5	Requires Mixed SFN/MFN	Bandwidth Shrinking

Harris Mobile TV Opportunities



- Transmitter Products

- DVB-T / DVB-H UHF Transmitters up to 9 kW
- DVB-T / DVB-H VHF Transmitters up to 500 W
- Synchrony SFN adapter for single frequency DVB-H networks
- DVB-H 1670 MHz Transmitters up to 400 W
- FLO capable UHF & VHF transmitters, 100 W to 60 kW

- Solution Products

- Leitch Solutions for Studios and TV Head-ends (servers, routers, switchers, distribution amplifiers, Videotek test & measurement equipment)
- H-CLASS Enterprise Content Management Systems
- NetVX MPEG Compression and Multiplexing Systems
- TruPoint Microwave Link Products
- NetBoss Enterprise Network Management Systems

- Technology base in amplification, modulation
 - Modulation: DVB-H, FLO, and DAB (T-DMB)
 - Frequencies: VHF (TV and DAB), UHF, L-Band (DAB and DVB-H)
 - Powers: 100 watts to 100,000 watts
 - Single Frequency Network enablers
- Largest digital video transmitter installed base
- Network operations and service expertise
- Leading transmitter manufacturing capacity
- Global brand strength and broadcast experience



Cool Play 1670



Atlas FLO & DVB-H



Synchrony SFN Adapter





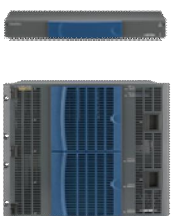
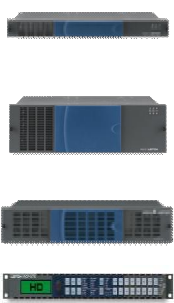
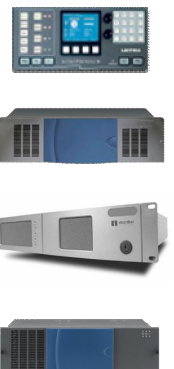




Atlas FLO Exciter



DTV-660 DVB-H Transmitter

Harris Infrastructure Scope



Editing and Graphics	Store and Serve	Routing	Signal Processing	Branding	Master Control	Network Transport	Control, Monitoring and Display	Transmission
VelocityHD Inca Graphics	NEXIO	Panacea Integrator Gold	NEO 6800+ X75	Logo Motion II Inscriber DTP	Opus HD NEXIO MTS DDM- 800 TrimStation	DataPlus Intraplex NetVX NetExpress PISPplus Content Capture DTP	CCS MediaNet VTM- 450E SD/HD NEO SuiteView ReCon CDI	Apex Atlas Diamond Platinum Sigma
								

Harris FLO-Compatible Transmitters



UHF



Ranger



Atlas



DiamondCD



PowerCD

Band

VHF



HTEL-CD



HTEL-CD



PlatinumCD

100 W

Power level

60 kW

Harris DVB-H UHF Transmitters



Air-Cooled

Liquid-Cooled



200 mW

9 kW

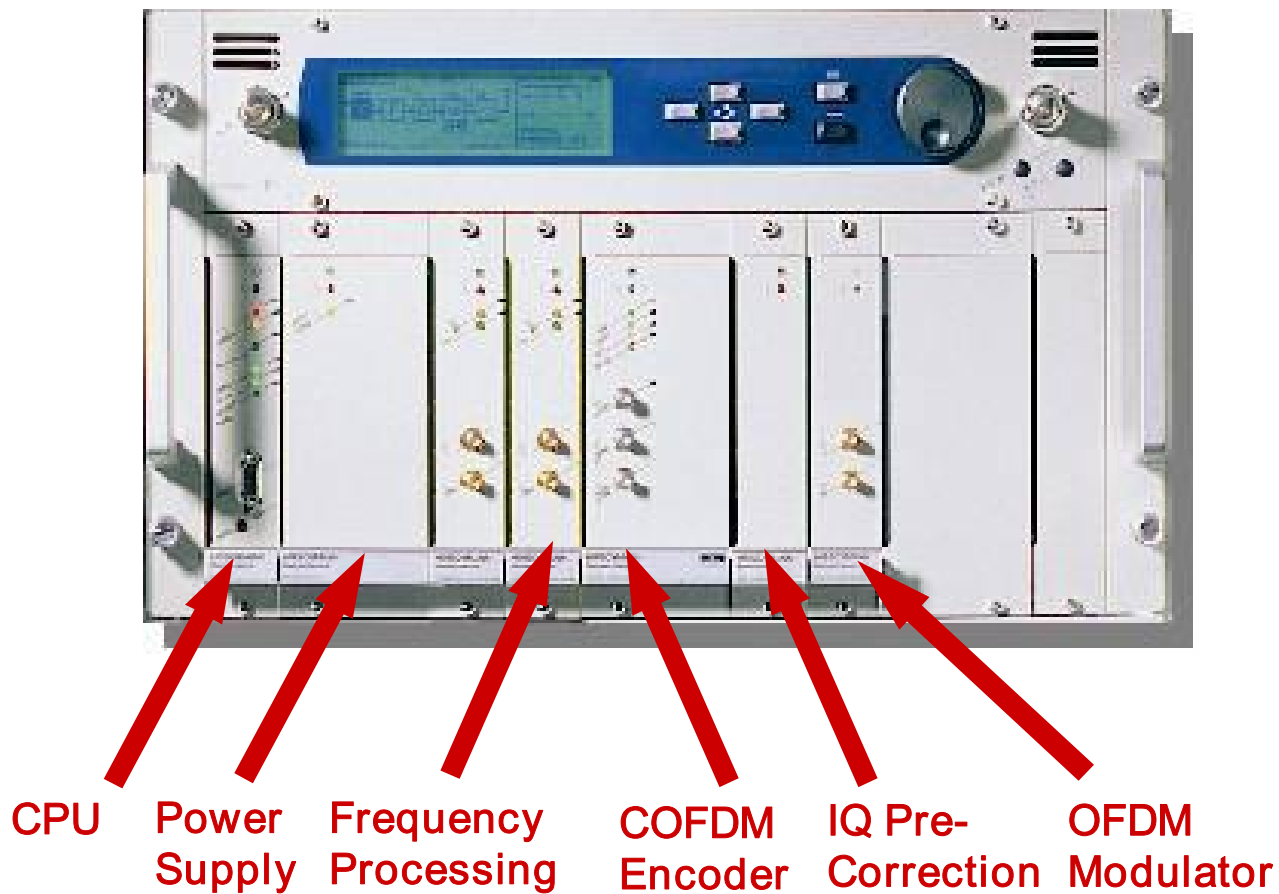


- Initially developed for Modeo
- Power levels: 50 to 400 watts, single and diversity output versions
- Designed for outdoor installations without need for a rack air-conditioning unit
- *Convection Cooled Technology™*—developed in conjunction with Harris Government Communications Systems Division
- Introducing at NAB 2006
- Shipping in July 2006
- Potential platform for other L-band applications and longer term for UHF requirements

Platforms for T-DMB and Video over DAB



DAB-660 exciter platform



- DVB-T/DVB-H head-end SFN adapter for Single Frequency Broadcasting
 - Two ASI inputs for redundancy operation or hierarchical modulation
 - Meets DVB ETS 300 744 and DVB TS 101 191
 - Bit rate adaptation and PCR restamping
 - Internal PRBS generators
 - TCP/IP/SNMP interface for use in global network management systems
- Features
 - 6/7/8 MHz user selectable
 - Internal HTTP server
 - Hierarchical modes
 - Internal GPS receiver option
 - Fully DVB-H compliant



- Harris Broadcast Communications: largest broadcast transmission services organization in the world
 - Installation services
 - Remote diagnostics
 - Contract services
 - Spares and repairs
- Harris Technical Services
 - Experienced IT and communications infrastructure services, including FAA modernization program
- Harris Central Control & Monitoring
 - Melbourne, FL site, monitoring Harris NetVx video encoding equipment used in FOX Sports Network

- DVB-H
 - Fully integrated DVB-H transmission products
 - Harris DVB-H transmitter @ 1670 MHz on air in Crown Castle Pittsburgh test (400 W)
- FLO
 - FLO-compatible exciter based on its market-leading ATSC exciter, the Apex (over 600 Apex exciters in service)
 - All Harris ATSC transmitters, from 100 W to 60 kW, are ready to be qualified for FLO applications
- T-DMB
 - Harris DAB transmitters support major T-DMB initiatives
- Overall: Harris has identified and committed to Mobile TV as a major corporate initiative
 - Active in FLO Forum, DVB, and DAB organizations
 - Vice Chair, TIA TR47 (Mobile Multimedia Standardization)

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