U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
National Policy

ORDER 7910.1A

Effective Date: 04/29/2013

SUBJ: Radar Video Maps Program

1. Purpose of This Order. This order establishes procedures for the preparation and procurement of digital video map data and supporting video map products data for radar equipped FAA terminal air traffic control (ATC) facilities.

2. Audience. This order applies to all ATO personnel, FAA contract tower employees, and anyone using ATO directives in the preparation and procurement of digital video maps and supporting map products data.

3. Where Can I Find This Order? This order is available on the MyFAA employee Web site at https://employees.faa.gov/tools_resources/orders_notices/ and on the FAA Web site at http://www.faa.gov/regulations_policies/orders_notices/.

4. Cancellation. FAA Order 7910.1, Aeronautical Video Map Program dated April 2, 1974, is canceled.

5. Distribution. This order is distributed to the branch level in Washington, and Service Area Air Traffic Offices, Mike Monroney Aeronautical Center (MMAC); Air Traffic Terminal Facilities, and the William J. Hughes Technical Center (WJHTC).

6. Background. Radar Video Maps are used for real-time air traffic management and must be geographically accurate for real-time navigation purposes. Aeronautical Information Management (AJV-2), with liaison between Air Traffic Organization (AJO-0), Aeronautical Navigation Products (AJV-3), air traffic facilities, Service Area Directors of Operations, and Air Traffic Products (AJV-362), is responsible for the coordination, and development of digitally formatted video mapping data and supporting products.

7. Responsibility.

a. ATO Responsibility. The Air Traffic Organization Terminal Services (AJT) responsibilities are divided between the Program Office and the FAA WJHTC. The Program Office is responsible for funding the development of the initial maps prioritized by site. The FAA WJHTC is responsible for managing the adaptation data received from the OSF and facilities, then forwarding this information to AJV-362 for development.

b. Technical Operations and Air Traffic Responsibilities. Technical Operations Services (AJW) is responsible for the proper alignment of the video map with radar returns at facilities

with other than Digital Terminal Automation Systems (DTAS). FAA Order 7210.3, Facility Operation and Administration, states it is the Air Traffic Manager's (ATM) responsibility to ensure that the maps are built with the correct magnetic variation. Air Traffic and Technical Operations must ensure that they are using the same magnetic variation, if applicable. The official source for magnetic variation computation is done by Aeronautical Products, Product Support Group, AJV-34. For all other fix target and permanent echo information, refer to the appropriate order.

c. AJV-362 Responsibilities. The responsibility of AJV-362 is to supply new and revised digital video maps and supporting products to air traffic terminal facilities. AJV-362 analyzes information provided by facilities to ensure it is accurate and verified in the data base. AJV-362 ensures that data, provided by the facility, is accurately represented in appropriate digital formats. AJV-362 certifies the integrity of the data in new and revised digital maps delivered to air traffic terminal facilities but any subsequent altering of these maps invalidates the certification.

d. Air Traffic Terminal Facilities' Responsibilities. Air traffic terminal facilities are responsible for submitting requests for new maps and map revisions. The Air Traffic Terminal facility specifies the content of the requested radar video map displays. Map data shown on each individual map is the responsibility of the Facility Manager, consistent with Air Traffic Facility requirements. Facilities must ensure that all radar video maps prepared by AJV-362 are operationally suitable for their use. As such, the video map should present an accurate representation of the airways, fixes, boundaries, runway approaches, etc., to meet the individual requirements of each facility.

e. Operational Support Facilities (OSF). Operational Support Facilities are responsible for the adaptation of radar video maps into the STARS adaptation software.

8. Radar Video Systems. See appendix A for additional information.

a. Standard Terminal Automation Replacement System (STARS)

b. ARTS Color Display (ACD)

c. Digital Bright Radar Indicator Tower Equipment (DBRITE)

d. GM Cope Digital Video Mapper (GMCOPE)

e. Stand Alone Tower Display System (SATDS)

The following air traffic control systems utilize the SATDS surveillance technology:

(1) STARS Local Integrated Tower Equipment (LITE)

(2) ARTS IE

9. Map Standardization.

a. Symbology. There are standard map symbology that are used by AJV-362 in map production. However, the depiction of any of these symbols can be customized at the air traffic facility and AJV-362's discretion. See appendix B for additional information.

b. Video Mapper Capabilities & Map Ranges. There are numerous maps available to each control position. To display video maps, the controller can select one of many maps or can overlay multiple maps until all maps are shown. Map ranges typically vary from 10 to 60 nautical miles.

STARS and ACD equipment have the capability to utilize long range radar maps out to 250 nautical miles, and AJV-362 will provide support for this additional capability.

c. Survey Positions. The Airport Surveillance Radar (ASR) surveyed position coordinates predicate single sensor video maps positional data. These represent the exact position which builds the radar and is the same position used for the center of the maps. A Point of Tangency predicates other System Plan Map types, such as FUSION. The coordinating FAA OSF Office supplies surveys to AJV-362.

d. Magnetic Variation. The magnetic variation set in the ASR is the same variation used to rotate the video maps. The construction of non-FUSION ACD, DBRITE, and GM COPE Digital Video Mapper systems use this declination. The submitted magnetic variation will not derive from the isogonic lines on the Sectional charts. Aeronautical Navigation Products, Product Support Group, AJV-34 is the official source for magnetic variation. Radar video maps produced for the STARS and ACD Fusion /ADS-B equipment are produced without a magnetic variation. The terminal facility applies the declination when the maps are added to the equipment on site.

e. Map/Data Delivery. Delivery of maps is dependent on the format needed by each facility. AJV-362 delivers EPROM chips for DBRITE maps systems and GM COPE circuit boards for Digital Video Map systems. Deliverables for the ACD and STARS systems are placed on a computer server by AJV-362 and retrieved by the facilities or OSFs.

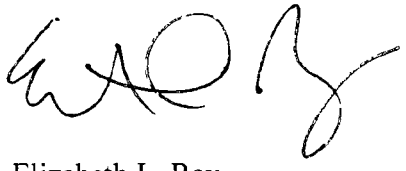
10. Requests for Aeronautical Video Maps and Digital Data.

a. New Terminal Facilities. Terminal facilities must submit their requirements for new maps or programs via a memorandum to the Service Area Directors of Operations for forwarding to Terminal Services Group, AJT-2. The memorandum must include system specification and map symbology specifications as well as other pertinent information. The program office will fund the initial map requirements and then maps will be constructed for testing. After commissioning, facilities will contact the AJV-362 directly for updates and revisions.

b. New/Revised Maps. Existing terminal facilities must request new/revised maps by using the FAA ATC products email address 9-AJV-HQ-ATCProducts@faa.gov. This email must identify all changes requested. along with an electronic copy of the map. This electronic copy must have any additions shown in blue and any deletions shown in red. Any facility which is

unable to comply with this guidance, must contact AJV-362 for additional guidance for handling their requests.

c. **Time for Obtaining Maps.** Facilities are urged to allow sufficient time for planning and ordering video maps. Depending on the complexity of the new/revised maps and the number of radar video maps requests received from air traffic terminal facilities, allow 3 weeks for delivery. **New maps which involve file format changes and/or conversion to a different automation system require six to eight weeks from receipt of the complete package; large Tracons could take up to 12 weeks.** AJV-362, the facility, and the service areas OSFs must keep lines of communication open to ensure timely map delivery. Facilities must allow time for servicing OSFs to process video maps through adaptation software. The normal OSF delivery of STARS adaptation occurs on a monthly schedule, typically the 1st or 15th of the month. Any job request requiring delivery in less than 3 weeks will need justification from the requesting Air Traffic Manager. Approval rests with AJV-362 team lead.



Elizabeth L. Ray
Vice President, Mission Support Services
Air Traffic Organization

Appendix A. Definitions

a. ACD: ARTS (Automated Radar Terminal System) Color Display provides controllers at certain facilities with a stable, high-resolution color display and a graphic user interface for air traffic control functions in a real-time environment. The final map product is a binary file and is delivered via Internet FTP.

b. ADS-B: ADS-B is a key, enabling technology supporting the implementation of the Next Generation Air Transportation System. The incorporation of ADS-B as a surveillance source requires the incorporation of multiple surveillance sources such as ASR, ARSR, ADS-B, and multilateration into existing and future air traffic control automation systems. It has been determined that FUSION is the best method to accomplish this. The Surveillance and Broadcast Services (SBS) Air Traffic CHI Workgroup was established to ensure functional standardization and usability of multiple surveillance sources integration in both the terminal and en route domains.

c. DBRITE: Digital Bright Radar Indicator Tower Equipment maps provide real-time display of all aircraft within 60 nautical miles of an airport and allow air traffic controllers to expeditiously locate and handle terminal area traffic using radar. This display is located in the tower cab where sunlight would normally wash a digital graphic from a standard monitor. The final product is an EPROM (Erasable Programmable Read Only Memory) Set consisting of two microchips that digitally store up to five maps in a sequence determined by the facility.

d. DVM (GMCOPE): Digital Video Mapper – A digital mapping system is a plug-and-play system superimposing digital radar maps on existing Planned Position Indicator (PPI) Displays for real-time aeronautical navigation. Each DVM unit supports ten Map Memory Boards, with one map per board. The Map Memory Board is the final product, which is programmed and shipped directly to the facility via Federal Express from Air Traffic Products.

e. FUSION: FUSION is the combination of all available surveillance sources (airport surveillance radar [ASR], air route surveillance radar [ARSR], ADS-B, etc.) into the display of a single-tracked target for air traffic control separation services. FUSION is the equivalent of the current single-sensor radar display. FUSION performance is characteristic of a single-sensor radar display system. Terminal areas use mono-pulse secondary surveillance radar (ASR-9, Mode S). The performance of this system will be used as the baseline radar system to ensure minimal degradation of current separation operations within the NAS.

f. Non-FUSION ACD: A NON-FUSION ACD facility consists of a short range RADAR to scan for air traffic. It uses the sensor feed from the radar to determine range and azimuth of an aircraft. While a facility can support multiple sensors, only a single sensor at a given time will be given to track aircraft.

g. SATDS: Stand Alone Tower Display System is installed at Visual Flight Rules (VFR) airport traffic control towers (ATCTs) that are not associated with a parent Terminal Radar Approach Control (TRACON). Certified SATDS sites utilize a surveillance source to display

information. The following air traffic control systems utilize the SATDS surveillance technology:

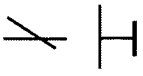
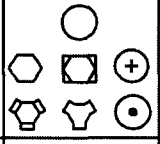
STARS Local Integrated Tower Equipment (LITE): This system is a scaled down version of the Full STARS system. RVMs developed and delivered for STARS LITE are the same as for the full STARS.

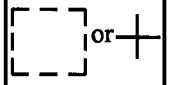
ARTS IE: The ARTS IE SATDS use Common ARTS baseline software and functionality and the R-ACD hardware platform.

h. STARS: Standard Terminal Automation Replacement System is a digital system that tracks all aircraft in real-time within a 250 nautical mile range of the facility. STARS provide the platform needed to facilitate increasing levels of automation functionality, improved weather display, and better surveillance. The final product is a 32-bit binary file delivered in a ZIP file to the facility via Internet. STARS displays Terminal Controller Workstation (TCW) and its tower configuration, Tower Display Workstation (TDW), are air traffic control stations which employ high-resolution color monitors with a graphical interface for the display of radar tracks and targets.

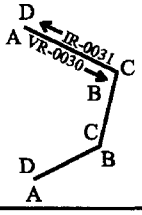
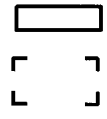
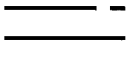
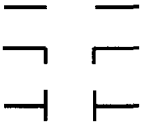
Appendix B. Radar Video Map (RVM) Symbology

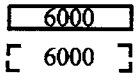
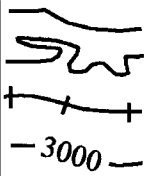
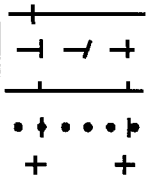
General Statement: Symbol sizes, line patterns, and line lenghts per Facility requests.

AERONAUTICAL OR TOPOGRAPHICAL MAP INFORMATION		
Airports shown by runway (rwy) patterns		To scale
Airports with extended rwy centerlines		Useable rwy(s) drawn to scale. Centerlines drawn using either .5 or 1NM increments (mile space, mile line) starting from the end of rwy. Length of hatch marks .25 NM to 1 NM.
Minor airports Minor airports with rwy patterns Restricted airports Military airports		
Heliports		With or without circle
Navaids		Standard RVM symbol Facility may use the standard RVM symbol or the symbols as shown
Fan marker		

AERONAUTICAL OR TOPOGRAPHICAL MAP INFORMATION		
Airways (Awy)		Use solid or dash linework. NO DOTS.
Awy intersection(s)/off awy intersections(s) or handoff point. When used as an ILS final approach fix, triangle apex will point towards the rwy end.		
Radar Handoff Area or Point (for Terminal Area Approach or Departure or Enroute Handoff)		
Airport Surveillance Radar (ASR)		
Long Range Radar (LRR) Letter used to indentify radar.		
Standard Terminal Arrival Route (STAR) fix		
Waypoint		
Obstructions: towers, buildings, etc.		

AERONAUTICAL OR TOPOGRAPHICAL MAP INFORMATION		
Spot elevation (mountain peaks)	•	
Visual Check Point (VCP): Shopping Mall, Golf course, etc.	□	
VFR Point		
Holding Pattern		
Nuclear Facility		
Point of Tangeny (POT)		
Permanent Echo (PE), Parrot, MTI Reflector	^	Apex of symbol aligned towards the ASR For STARS, the length will be .5 NM
CMPE, MTI Reflector	•	

AERONAUTICAL OR TOPOGRAPHICAL MAP INFORMATION		
Sport arenas, fields, tracks, etc		
Medical facility: hospital, clinic etc May also be used to indicate medical heliport		
MTR linework identified with route and turn points idents.		Solid or dashed linework, with or without turn point letters per Facility request.
Special Use Airspace Prohibited, Restricted, Alert and Warning Areas Military Operations Areas		Drawn to scale. Solid or dash linework per Facility request
ADIZ, ARTCC boundary Sector boundary, Facility Airspace boundary and Internal Sector boundaries Class Airspace.		NO DOTS. Solid or dash linework per Facility request. When dash linework is requested, the Facility may specify the line and space lenghts.
Arrival and Departure gates		Gates may be portrayed by any of the examples listed

AERONAUTICAL OR TOPOGRAPHICAL MAP INFORMATION		
ATC Assigned Airspace Areas		Drawn to actual shape. Solid lines or dash corners. Altitudes as required.
Cultural Features: Roads Shorelines, Rivers, Lakes Railroads Contours		Text may be added to indentify feature (Lake Mead, I-95, etc.) With or without elevation text
Final Approach Course and associated Fixes		Linework can be: solid, dash (1 nm space, 1 nm line or .5 nm space, .5 nm line) or dots. Approach Fixes portrayed as hatch marks, lengths vary .25nm to 1 nm or per Facility request, or waypoints.
Non-Transgression Zone (NTZ)		Dots
Azimuth Change Pulse (ACP) box with text		ACP box size is +/- .25 nm, along radial, by +/- 11 ACPs (+/- .967 degree). Text in box indentifies radar on which it is predicated.

RVMCELL LIBRARY

RADAR VIDEO MAP SYMBOLS

 AIRPORT	 HIGHWAY	 NAVAID	 TACAN	 WAYPOINT
 ARROW	 INTERSTATE HIGHWAY	 NDB	 TRIANGLE	
ARTC	 JOINT AIRPORT	 NUCLEAR	 VFR POINT	
 DIAMOND	 JUMP ZONE	 OBSTRUCTION	 VISUAL CHECK POINT	
 DOT	 MARINE BEACON	 RESTRICTED AIRPORT	 VOR	
 FAN	 MEDICAL	 STAR	 VORDME	
 HELIPORT	 MILITARY AIRPORT	 TRACK	 VORTAC	