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NBAA

Terminal Weather Information for Pilots (TWIP)

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Terminal Weather Information for Pilots (TWIP)

- Take advantage in new weather reporting services:
  - Terminal Doppler Weather Radar (TDWR), and
  - Integrated Terminal Weather System (ITWS)
- These systems are installed at major airports in the U.S. NAS
- Desirable to report this information directly to pilots via data link as opposed to relying on voice communication
- Text-only message and character graphics map
  - May look “dated”, remember this was developed in the mid-1990’s
- TWIP guidance is furnished to users in AIM 7−1−26. Microbursts, paragraph 6

Terminal Weather Information for Pilots (TWIP)

AIM guidance

- Description of microburst alerts, wind shear alerts, significant precipitation, convective activity within 30 NM surrounding the terminal area, and expected weather that will impact airport operations.
- When inclement weather within 15 NM of airport:
  - Text messages are updated once every minute, and
  - Graphic messages updated every 5 minutes
- Primary focus is on precipitation, wind shears, and microbursts
- AIM guidance refers to 9 test location airports. However, the number of operational airports is much larger:

TWIP Operational Airports

ICAO	IATA	Airport Name	Location
KADW	ADW	Andrews AFB	Camp Springs, MD
KATL	ATL	Hartsfield-Jackson Atlanta International Airport	Atlanta, GA
KBNA	BNA	Nashville International Airport	Nashville, TN
KBOS	BOS	Logan International Airport	Boston, MA
KBWI	BWI	Baltimore/Washington International Thurgood Marshall Airport	Baltimore, MD
KCLE	CLE	Hopkins International Airport	Cleveland, OH
KCLT	CLT	Charlotte/Douglas International Airport	Charlotte, NC
KCMH	CMH	Port Columbus International Airport	Columbus, OH
KCVG	CVG	Cincinnati/Northern Kentucky International Airport	Cincinnati, OH
KDAL	DAL	Dallas Love Field Airport	Dallas, TX
KDAY	DAY	James M. Cox International Airport	Dayton, OH
KDCA	DCA	Ronald Reagan Washington National Airport	Washington, DC
KDEN	DEN	Denver International Airport	Denver, CO
KDFW	DFW	Dallas-Fort Worth International Airport	Dallas, TX
KDTW	DTW	Detroit Metropolitan Wayne County Airport	Detroit, MI
KEWR	EWR	Newark Liberty International Airport	Newark, NJ
KFLL	FLL	Fort Lauderdale-Hollywood International Airport	Fort Lauderdale, FL
KHOU	HOU	William P. Hobby Airport	Houston, TX
KIAD	IAD	Washington Dulles International Airport	Dulles, VA

TWIP Operational Airports

KIAH	IAH	George Bush Intercontinental Airport	Houston, TX
KICT	ICT	Wichita Mid-Continent Airport	Wichita, KS
KIND	IND	Indianapolis International Airport	Indianapolis, IN
KJFK	JFK	John F. Kennedy International Airport	New York, NY
KLGA	LGA	LaGuardia Airport	New York, NY
KMCI	MCI	Kansas City International Airport	Kansas City, MO
KMCO	MCO	Orlando International Airport	Orlando, FL
KMDW	MDW	Midway International Airport	Chicago, IL
KMEM	MEM	Memphis International Airport	Memphis, TN
KMIA	MIA	Miami International Airport	Miami, FL
KMKE	MKE	General Mitchell International Airport	Milwaukee, WI
KMSP	MSP	Minneapolis St Paul International	Minneapolis, MN
KMSY	MSY	Louis Armstrong New Orleans International Airport	New Orleans, LA
KOKC	OKC	Will Rogers World Airport	Oklahoma City, OK
KORD	ORD	O'Hare International Airport	Chicago, IL
KPBI	PBI	Palm Beach International Airport	West Palm Beach, FL
KPHL	PHL	Philadelphia International Airport	Philadelphia, PA
KPIT	PIT	Pittsburgh International Airport	Pittsburgh, PA
KRDU	RDU	Raleigh-Durham International Airport	Raleigh/Durham, NC
KSDF	SDF	Louisville International Airport	Louisville, KY
KSLC	SLC	Salt Lake City International Airport	Salt Lake City, UT
KSTL	STL	Lambert-Saint Louis International Airport	St Louis, MO
KTPA	TPA	Tampa International Airport	Tampa, FL
KTUL	TUL	Tulsa International Airport	Tulsa, OK

TWIP Message

Textual

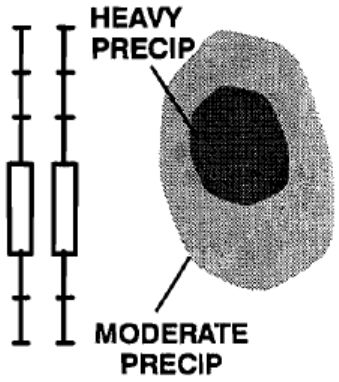
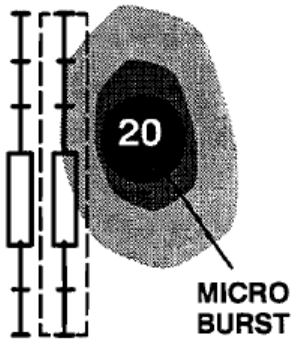
- Four sections: header, runway impact, storms and expected/previous
- Second section (identified by a leading asterisk(*)) is included if any runway or Area Noted for Attention (ARENA), which includes arrival and departure corridors associated with runways, is impacted by a micro burst, gust front, heavy precipitation (NWS level 3 or above) or moderate precipitation (NWS level2). For microburst or gust front impacts, the magnitude of the gain or loss is indicated on the next line
- In order of decreasing precedence, the reported hazard will be:
  - microburst (30 knot or greater loss),
  - wind shear with loss (less than 30 knots loss),
  - wind shear with gain
  - (gust front),
  - heavy precipitation or moderate precipitation.

TWIP Message

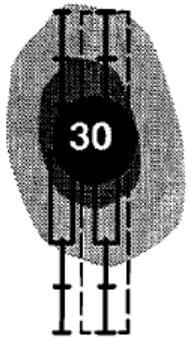
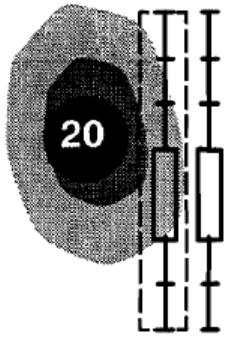
Textual

- Third section (identified by a leading dash (-)) is included if there are any storms (level 2 or greater) within 15 nm of the airport. The first line of the section indicates the presence of one or more storms. The next lines list the three closest storms to the airport reference point (ARP)
- Fourth section of the message (identified by a leading period (.)) is included if there is expected precipitation, previous wind shear or microburst, or no storms within 15 nm of the airport. If moderate or heavy precipitation is expected at the airport within 20 minutes, then the expected precipitation line is issued, followed by a line that includes the time the precipitation impact is expected to start If more than one type of precipitation impact is expected, then only the most severe expected impact will be included
- If there are no storms within the airport area, the forth section will note:
  - " NO STORMS WITHIN 15 NM"

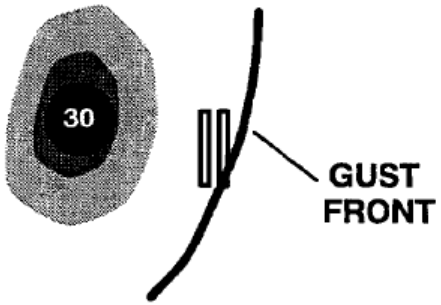
Examples

WEATHER SITUATION	TWIP TEXT MESSAGE
	MCO 1800 TERMINAL WEATHER –STORM(S) 3NM N–E MOD PRECIP 4NM NE HVY PRECIP MOVG W AT 15KT .EXPECTED MOD PRECIP BEGIN 1805
	MCO 1810 TERMINAL WEATHER *MODERATE PRECIP BEGAN 1805 –STORM(S) ARPT ALQDS MOD PRECIP 1NM N–E HVY PRECIP MOVG W AT 15KT .EXPECTED HVY PRECIP BEGIN 1815

Examples

	MCO 1820 TERMINAL WEATHER *MICROBURST ALERT 30KT LOSS BEGAN 1815 –STORM(S) ARPT ALQDS HVY PRECIP ARPT ALQDS MOD PRECIP MOVG W AT 15KT
	MCO 1830 TERMINAL WEATHER *HEAVY PRECIP BEGAN 1825 –STORM(S) ARPT ALQDS MOD PRECIP 1NM W–NW HVY PRECIP MOVG W AT 15KT .PREVIOUS MICROBURST BEGAN 1815 END 1825

Examples

WEATHER SITUATION	TWIP CHARACTER GRAPHICS MAP
	MCO 1830 MAP 15NM TERMINAL WEATHER INFO 15 10 5 NORTH 5 10 15 10 5 —+++— G ——+++—— G —++MM+— XX G W —+++++— XXG E ——+++—— X* ——— G 5 GG G 10 15 10 5 S 5 10 15 +=HVY —=MOD M=MB G=GF X=RWY *=RWY MB/GF STORMS MVG SE AT 6KT

TWIP Transmission Architecture

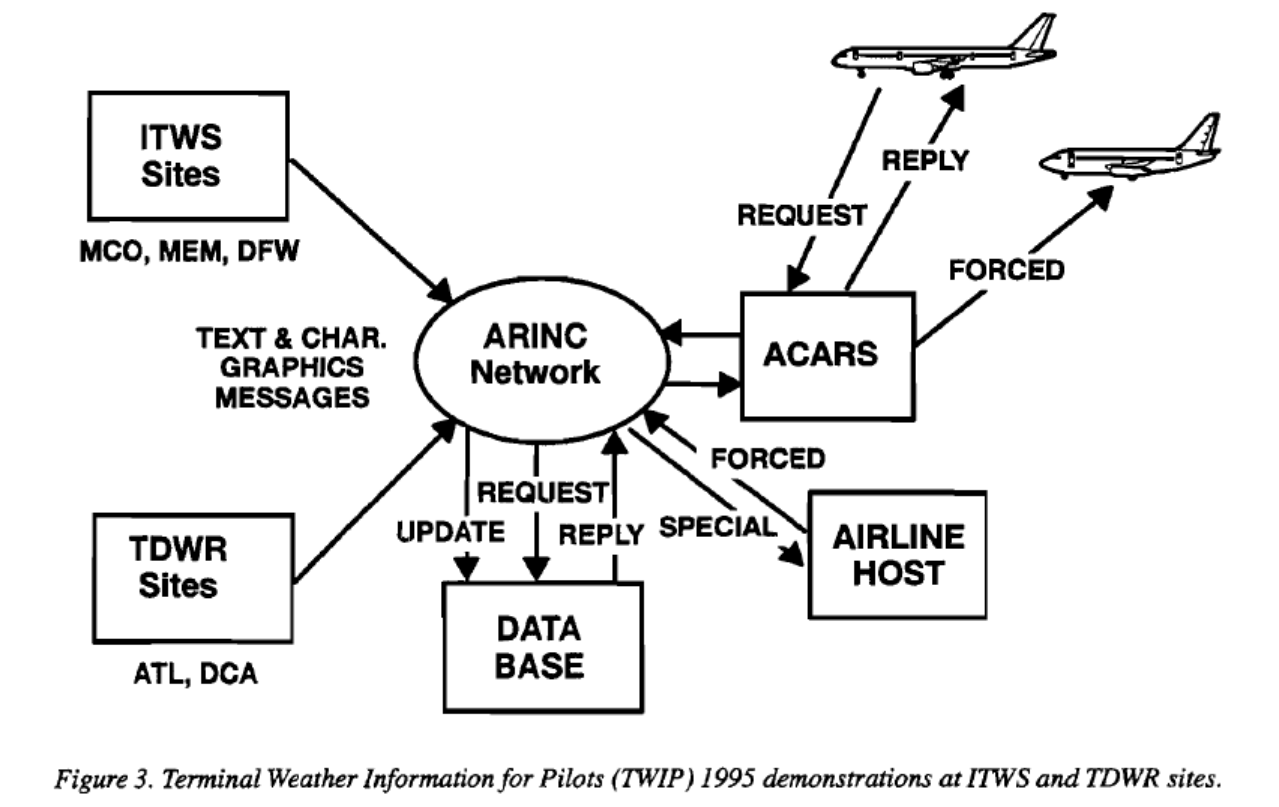


Figure 3. Terminal Weather Information for Pilots (TWIP) 1995 demonstrations at ITWS and TDWR sites.

Key Benefits of TWIP

- The TWIP Text Message is generated **once per minute** whenever weather **is near the airport**.
  - When there is no weather within 15 nm, the update rate is reduced to once every 10 minutes.
  - NEXRAD mosaic imagery shows where the weather ***was***, **not where the weather is**. The weather conditions may be 15 to 20 minutes older than the age indicated on the display.
    - Reference AIM 7−1−29. Thunderstorm Flying, April 2014 change

TWIP

The Weather Report That You Never Heard of Before

- AIM is the only FAA publication that discusses TWIP, and that information is way out of date
  - Does not furnish a complete list of TWIP airports
    - References only 9 “test locations”
  - Does not discuss or furnish examples of message formats
  - No operational use information furnished to pilots
- TWIP is not mentioned in these FAA publications:
  - Airplane Flying Handbook
  - Instrument Flying Handbook
  - Instrument Procedures Handbook
  - Pilot’s Handbook of Aeronautical Knowledge, or
  - Aviation Weather Services

TWIP

NBAA Recommendations

- Include “TWIP” on IAP, SID, & STAR procedure charts as a data link capability element, as proposed in 05-01-289
- Update the AIM discussion on TWIP
  - Recommend elevating TWIP into its own paragraph within AIM section 7-1
  - Remove reference to “test basis at 9 locations”. The system operational at 43 airports in the U.S. NAS
  - Provide a list and graphic map of TWIP locations
  - Furnish examples of TWIP reports and operation instructions on how to use them
- Update AIM 7-1-29 Thunderstorm Flying to include reference to TWIP reports and their operational use in avoiding thunderstorm hazards (e.g. thunderstorm activity, wind shear, microburst, etc.)
  - Airborne radar identifies location of the storm
  - TWIP provides real-time information on the hazards being generated by the storm

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