NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

December 23, 2016

Group Chairman's Factual Report

AIR TRAFFIC CONTROL

DCA16IA200

A. INCIDENT

Location:	Ellsworth Air Force Base (RCA), Rapid City, South Dakota
Date:	July 7, 2016
Time:	2042 mountain daylight time / 0242 coordinated universal time 7/8/2016
Airplane:	Delta Airlines flight 2845 (DAL2845)

B. AIR TRAFFIC CONTROL INVESTIGATOR

Scott Dunham
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National Transportation Safety Board
Washington, DC 20594

C. DETAILS OF THE INVESTIGATION

This incident was handled as a desk investigation, with pertinent data requested from the Federal Aviation Administration, Midwest Air Traffic Control Services (operator of the Federal contract tower at Rapid City Airport), and the United States Air Force (USAF). Primary contacts were Mr. Terry Bolerjack at Midwest ATC, and MSgt. Ray Graul, chief controller for the Dakota Air Traffic Control Radar Facility (DATCF), located at Ellsworth Air Force Base (RCA). Radar data for the incident was obtained from the airport surveillance radar located at RCA, as recorded by the Standard Terminal Automation Replacement System (STARS) processor at DATCF.

1.0 History of Flight

DAL2845 was an Airbus A320 operating as a scheduled Title 14 Code of Federal Regulations part 121 air carrier flight between Minneapolis and Rapid City, South Dakota (RAP). Weather conditions in the vicinity were reported as clear with 10 miles visibility. Calculated sunset at Rapid City was 2038 local time. RAP has two runways: 14/32 and 5/23. Runway 14/32 is used for air carrier operations, and is 8701 feet long by 150 feet wide. RCA has a single runway 13/31 that is 13497 feet long and 300 feet wide. The runways are located 6.5 nm apart. (Figure 1)

Radar approach control services in the RAP area are provided by USAF controllers at DATCF. DAL2845 first contacted the DATCF Ellsworth Approach (EA) controller at 2029:39, descending to 17,000 feet. The EA controller cleared the pilot to descend to 5,300 feet and told him to expect a visual approach to runway 14, which the pilot acknowledged.

The EA controller provided radar vectors for the visual approach and advised the tower controller at RAP of the inbound flight. At 2036, the EA and RAP controllers engaged in a discussion about DAL2845 being unusually high and fast. At 2037, the EA controller tried to turn DAL2845 to heading 230, but the pilot responded, “Like to keep her a little high. You mind if we keep going out a little bit longer?” The controller instructed the pilot to continue present heading and advise when ready to proceed inbound. The extended downwind track took the aircraft northeast of RCA.

At 2039:08, the EA controller asked, “Delta 2845 are you able to accept a left turn at this time?” The pilot responded, “Uh, we can accept a left turn, and field in sight, Delta 2845.” The controller replied, “Uh, Delta 2845, cleared visual approach runway one-four. Use caution for Ellsworth Air Force Base located six miles northwest of Rapid City Regional.” The pilot acknowledged with, “Kay, cleared visual approach runway one-four, Delta 2845.”

At 2040:10, the pilot transmitted, “Approach, Delta 2845 want us over to tower sir?” The EA controller instructed the pilot to contact RAP tower on 125.85, and the pilot acknowledged. At 2040:39, the pilot contacted RAP ATCT reporting inbound to runway 14, and the RAP controller cleared him to land on runway 14. At 2042:16, about 1 minute and 30 seconds after being cleared to land, the pilot reported that DAL2845 had landed at RCA.

At 2042:24, the RAP tower controller notified the EA controller that DAL2845 had landed at RCA instead of RAP. The EA controller contacted RCA tower and began the process of handling the "wrong airport" landing with the tower and airfield operations personnel.

At 2045, the EA and RAP tower controllers discussed the incident. The RAP tower controller stated, "No, I was watching him too and I, you know, I'm like, he's doing a hundred and forty knots, and then I go over to put my traffic in and then I come back and he's off the radar, and he's like, 'Tower, we just landed at Ellsworth.' Oh no…"

Complete USAF transcripts have been entered in the docket for this case, along with radar data, controller statements, and documentation of RAP and DATCF corrective actions.

2.0 Previous "Wrong Airport" Incidents Involving RAP and RCA

According to information provided by DATCF, similar incidents of pilot confusion between RAP and RCA have occurred in the past, ending in either an unauthorized landing at RCA or a low approach to RCA before the mistake was identified and corrected by ATC or the pilot. For example, on August 17, 2015, a Hawker business jet inbound to the area from the west was vectored northwest of RCA for a visual approach to RAP. The crew misidentified RCA as their destination and completed an unauthorized landing. On June 19, 2004, a Northwest Airlines Airbus A319 also completed an unauthorized landing at RCA after the crew confused RCA with RAP. DATCF reported that pilot confusion between RAP and RCA continues to be fairly common, although the problem is typically detected and corrected by ATC or the crew before landing.

3.0 Additional Mitigation Efforts

Because of the demonstrated possibility of mistaken identity, DATCF standard operating procedures in place before this incident required that pilots be advised of the proximity of RCA to RAP, as was done in this case. In addition, the location of RCA was added to Federal Aviation Administration approach charts for RAP to increase pilot awareness of the base and the possibility of confusion. Following this incident, DATCF management directed that their controllers, "…ensure that pilots arriving north of RCA on a Visual Approach to RAP report both airfields in sight, except for pilots that report that they are familiar with the local area." In addition, RAP ATCT management directed their controllers to not issue landing clearances to aircraft inbound from the vicinity of RCA until the arriving aircraft passed the base.

STARS and other radar data processing systems typically include minimum safe altitude warning (MSAW) functions that compare the aircraft's expected trajectory with its observed trajectory and alert controllers if the aircraft is in danger of collision with terrain or obstructions. This is accomplished by comparing the aircraft's altitude against a digital terrain model until it reaches the vicinity of the destination airport, when the processing changes to compare the aircraft's observed trajectory against expected trajectories for landing aircraft.

In "wrong airport" landings, STARS and similar systems should detect that the aircraft is unexpectedly descending to the ground away from the destination airport and generate a

minimum safe altitude alert. Review of DATCF radar data showed that as DAL2845 approached the RCA area, STARS applied MSAW rules for RCA arrivals instead of RAP arrivals. Consequently, no alert was generated in this incident. This behavior has been identified in other "wrong airport" landings. On May 4, 2015, the NTSB issued safety recommendation A-15-10 to the FAA (which also uses STARS), asking that FAA, "Modify the minimum safe altitude warning (MSAW) software to apply the MSAW parameters for the flight plan destination airport to touchdown, rather than automatically reassigning the flight to another airport based on an observed (and possibly incorrect) trajectory."[1] The recommendation is currently classified "Open – Acceptable Alternate Response." According to information provided by Department of Defense STARS operational support staff located at Patuxent River Naval Air Station (responsible for DATCF STARS), changing MSAW behavior will likely require Raytheon Corporation to modify the STARS baseline software.

Scott Dunham
NTSB ATC Investigations

[1] http://www.ntsb.gov/_layouts/ntsb.recsearch/Recommendation.aspx?Rec=A-15-010

Figure 1 – Ellsworth AFB (RCA) and Rapid City Regional Airport (RAP), located 6.5 nautical miles apart.

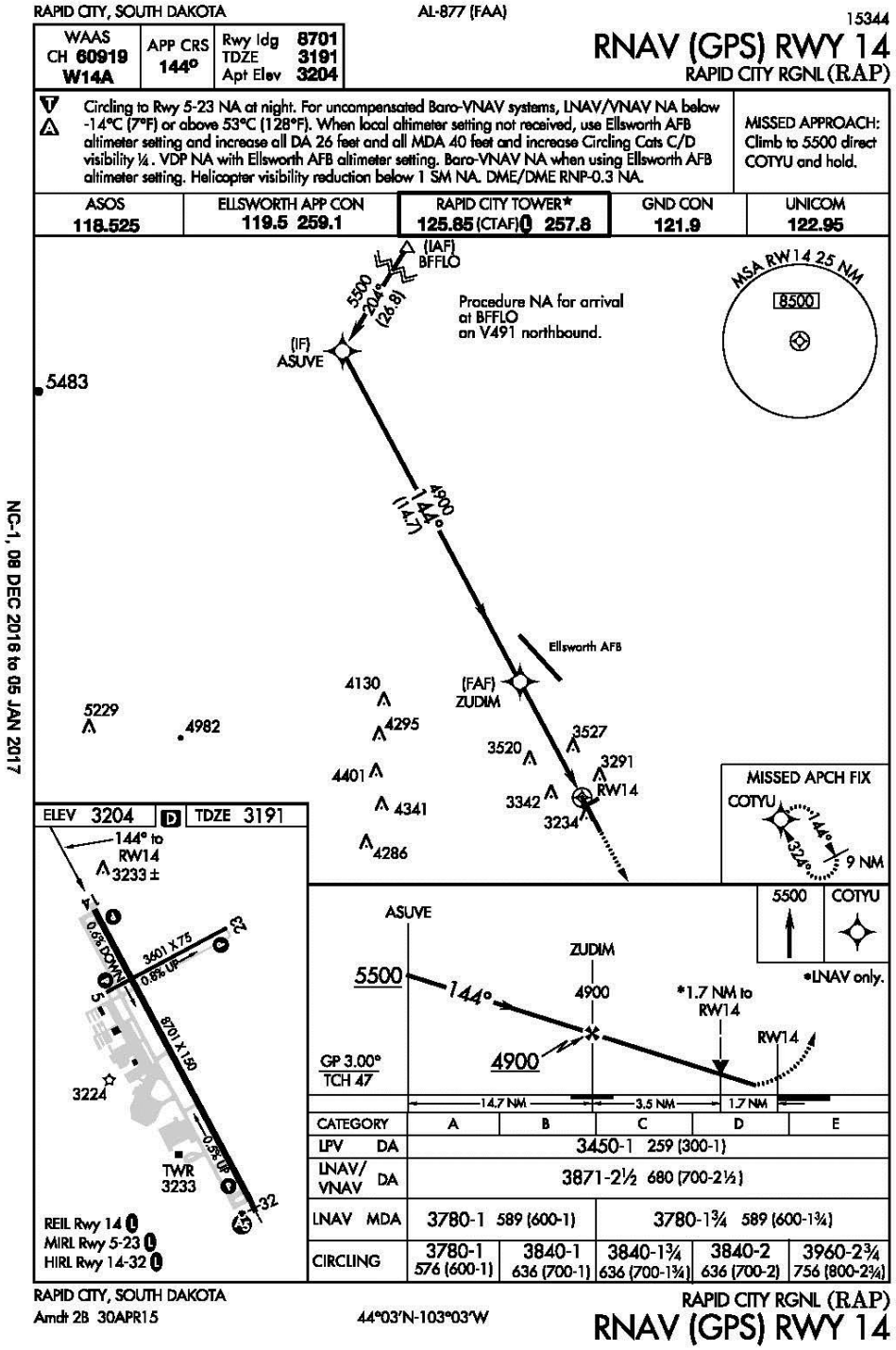

Figure 2 – Example Federal Aviation Administration approach chart depicting Ellsworth AFB near the final approach course to runway 14 at RAP. DAL2845 was cleared for a visual approach.

Figure 3 – DAL2845 track during vectors for the visual approach to RAP (located 6.~~4~~ 5 nm SE of Ellsworth AFB).

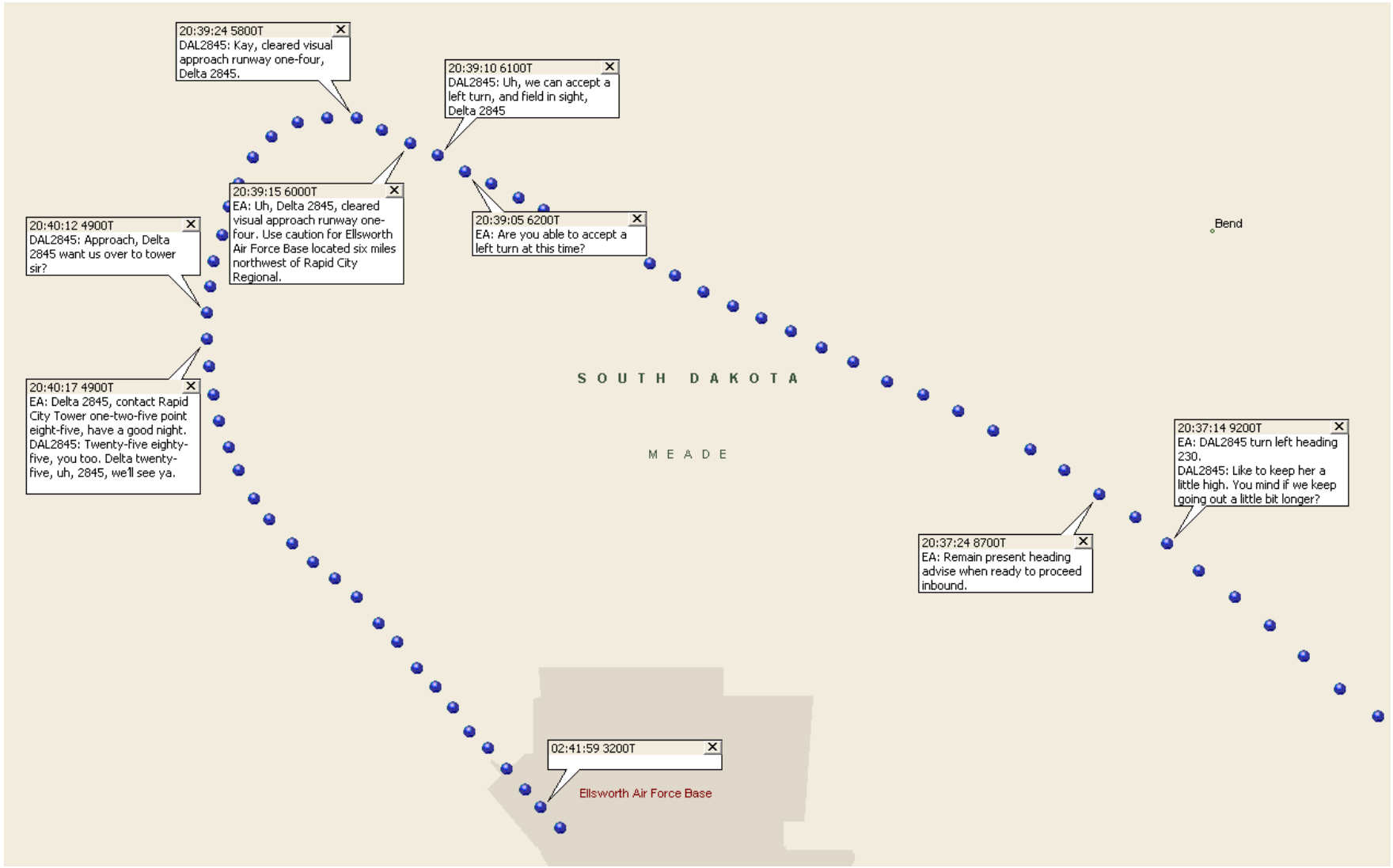

Figure 4 – DAL2845 ground track with selected communications.