

# Similar Call Signs

Kim Cardosi, Ph.D.

August 18, 2010

SERVING THE NATION AS A LEADER IN GLOBAL  
TRANSPORTATION INNOVATION SINCE 1970



# What's "Similar"?

Call signs can be visually similar or similar sounding.

Visually similar call signs increase the chances of controllers picking up the wrong flight strip.

Characters most likely to be confused are:

- 0 and O
- 0 and 8
- 1 and I
- 2 and Z
- 5 and S
- V and U
- Depends on type font / handwritten

Transpositions (e.g., 14, 41) are common.



# Similar Call Signs

Problem first described in the literature (ASRS) - 1983

NATS (UK) study on call sign confusions (437 reports from 2004 and 2005)

- 88% call sign confusions were within same airline
- 81% of reports had only numbers in the call sign (e.g., AC 123 vs AC 12A)
  - But only 65% of the flights have call signs with only numbers
- Only 4% of errors involved call signs with two letters (e.g., AC 2AB)
  - But 14% of the call signs have this format
- “The use of four digit call signs has increased communication error.”



## RSPMs and Tower Personnel (DEN and ORD) brought the issue to Runway Safety Office

- Problem is due to similarity of call signs within airlines, not between airlines.
- 4-digit call signs are much more of a problem than 3-digit call signs.
  - One controller violates protocol and always states digits sequentially, rather than in grouped form.



# 4-digit call signs are more cluttered than 3-digit call signs and have more syllables in common

UAL763	Ø663	DEN	DEN ROCKI7 DVC TBC J236	25		
A32Ø/Q	P1834		EED BARET4 SAN	1834	200	
288	38Ø		ONRP			
UAL743	Ø667	DEN	DEN YELLO6 LAR BOY DLN GEG	340		
A32Ø/Q	P1834		ONRP	1834		
786	38Ø					
SKW6534	1421	KDEN	KDEN YELLO6 LAR BPI IDA	200		
CRJ2/L	P194Ø		KIDA	200		
Ø79	32Ø					
SKW6554	2732	KDEN	KDEN YELLO6 BFF ABR FAR	300		
CRJ2/L	P1955		KFAR	200		
522	33Ø					



# Similar Call Signs - Visually Similar Call signs

Increase chances of controller selecting the wrong flight strip when an aircraft checks-on frequency.

- 4-digit call signs are more visually cluttered than 3-digit call signs
- Printer font makes zero, eight, six, appear similar



# Similar Call Signs

## Visually Similar Call signs

- Increase opportunity for controller to select the wrong flightstrip.
- Opportunity for pilot error depends on whether call signs are similar sounding and on same frequency
  - *For now.*

Similar sounding call signs increase chances of pilots accepting an instruction intended for another aircraft.



# Defining the problem

- How often are confusable signs on the same frequency?
  - Answer depends on definition of “confusable”
- Applying Eurocontrol Guidelines would require changing call signs to combination of digits and letters (especially given the 2-hour timeline)
- Approach: Look at only ‘Highly Confusable Call Signs’
- Defined as 2 of 3 OR 3 of 4 digits in common in same position
  - E.g., 6887 and 6837 (but not 6887 and 6557 or 6887 and 6788)
  - OR identical first and last digits with middle two digits transposed
    - E.g., 6877 and 6787
  - On same frequency within 20 minutes.



# What Needs to be Done – Long Term

- Airlines need to be aware of the risks associated with the practice of assigning flights originating at the same airport the same first digit
- Airlines should not assign call signs to aircraft originating at the same airport with proposed departure times within 20 (30?) minutes that have 3 of 4 digits in common or the first and last digit in common and middle two transposed.
- Partnership for Safety - August 17 2010 – ATA will partner with FAA to examine issue and explore options.



# What Can Be Done – short term

- Grouped vs Individual Digits
  - MOST numbers are easier to identify when spoken individually rather than grouped (1954 study)
    - ESPECIALLY for foreign pilots
      - When spoken individually, the complete set of numbers is 0-9, not 0-99
      - Different languages construct numbers differently
        - » E.g. In French “80” is constructed as
      - Foreign pilots are used to hearing their call sign spoken as individual digits, since that is the ICAO standard.
    - Controllers need to be aware of this and 7110.65 needs to be changed.



[Kim.cardosi@dot.gov](mailto:Kim.cardosi@dot.gov)



**John A. Volpe National Transportation Systems Center**

U.S. Department of Transportation  
Research and Innovative Technology Administration

# Call Sign Discrepancies

In 1% of controller transmissions, the pilot responds with a different call sign than the controller used.

- Very rarely results in an adverse event..
- Only about half are corrected. (less than half, directly)

How often does this occur?

- Approximately once every 1 ½ hours per frequency in TRACONs
- Approximately once every 40 minutes per tower (local) frequency.

Pilots are too reluctant to correct a call sign discrepancy – they just reply with the correct call sign

