

C/AFT Advanced Navigation Focus Group
Seattle, WA
Wednesday, Jan 19, 2000

Attendees:

Brian Harkness, Air Canada
Dave Jones, United
David Oliver, Qantas
Peter Bates, Qantas
Mike Adams, Alaska
Steve Kuo, ITRI
John Ackland, Boeing
Ken Simmons, Boeing
Scott Hilton, Boeing
Bob Michael, Boeing
Bob Schwab, Boeing
Kathleen Pirotte, Boeing
Monica Alcabin, Boeing

Background:

At the last ANFG telecon in December, we decided to model the benefits of RNAV using a specific situation in which we had data. San Francisco was selected because we have good weather data and an RNP RNAV approach is one of the alternatives identified for increasing throughput in MVMC conditions.

San Francisco primarily uses two closely spaced parallel runways (750'), 28s, for landing. When the ceiling goes below approximately 3500', they are forced to operate with only one runway. This condition cuts the arrival rate in half producing long delays and ground holds.

Discussion/presentations:

65% of the aircraft today are RNAV equipped. Over the next 8 years, 90% of the aircraft will be RNAV equipped.

Brian said that it will take millions of dollars to equip his aircraft for GLS and that it will take approximately 5 years but that he needs solid benefits to justify the investment.

Review of Toulouse presentation. We didn't assume that we had to retrofit for RNAV in the model. Discussion about delay, increase in block time over the last number of years and how do we model that. We can leave a placeholder in the model to account for downstream effects and the cost of delay.

We have to figure out the threshold equipage for the benefit mechanism. Brian said that Nav Canada is doing a simulation to look at the benefit of RNAV routes in Toronto, Montreal, Ottawa triangle. Want to put aircraft on an RNAV route parallel to aircraft going in to Montreal or Toronto. Simulation will be completed by Feb 20, 2000. Brian is willing to share results of the data with us. This will be a TAAM simulation for Nav Canada. Brian said that they are starting RNAV arrivals in Toronto next month. Brian said that in Canada they don't have as many DME's as in the US and that they have a lot of backcourse localizer approaches. However, their Airbus aircraft cannot do backcourse localizer approaches, so they are looking at either putting more DMEs until GNSS comes on board and also using DMEs as backup.

GPS, RNAV, and RNP are baseline on Boeing aircraft. David Oliver says that they are looking for RNP values of 4, 2, 1, 0.3. Brian said that the US wants to use 2, 1, and 0.3, and 4 over the ocean. Boeing aircraft come with 12, 2, 1, 0.5 as default values.

David Oliver is here and he will be able to see the assumptions and the data requirements for the model so that we can apply it to Sydney for the Melbourne airline meeting.

One of the big questions will be how much equipage is required to get the benefits. In San Francisco, the majority of the unequipped aircraft are the non-airline aircraft. That might be different in Sydney. The big missing piece in the US is FAA policy. The airlines were forced to pay big money to become Stage 3. TCAS is similar, RVSM is similar. Mike Adams thinks this is not different. This is an operational scenario that requires a policy solution. Alaska justified equipping their entire fleet for RNP just on Juneau alone. If you require air traffic to move dissimilar aircraft around your aircraft for the procedure to work, then it won't work.

If an RNP procedure were to be accepted into SFO, it wouldn't require any additional ground infrastructure. Plus, an aircraft that can do the approach creates a hole for an unequipped aircraft. Any RNP proposal would also have to work for the new reconfiguration of the runways.

We should do the analysis for RNP approaches independent of the PRM alternative going into SFO. We might have to make some assumptions about surveillance.

Brian wants to validate the RNAV numbers. Once he gets his simulation results from the TAAM model for Nav Canada, we will be able to apply the results to validating the RNAV numbers. Kathleen said that they need to get in contact with Eurocontrol to see if they have any results that we can use in the model.

RNP approach at SFO.

The model will evaluate the benefit of a hypothetical San Francisco RNP RNAV approach path to runway 28R. The assumption is that lower missed approach points and decision heights would allow much lower minima than is the current practice (approx 3000-3500' ceiling) before the airport is forced to discontinue using both runways.

Other than the air traffic procedures, we are assuming that no other equipment is required to do this type of procedure. For now we will assume that RNP 0.3 is required.

The rest of the meeting centered on completing estimates for the model variables and constants specifically for SFO. An important point for the model is whether the Alaska approach would allow for RNPs > 0.3 which could have the effect of adding a large population of aircraft to the equipage curve. For example, for RNP 0.5 – 0.6, fleet qualification could allow DME-DME updating to suffice, bringing in all FMS aircraft without GPS and RNP (60+% of the SFO fleet). However, fleet qualification for RNP operations to that level is still in work and an analysis needs to be done in SFO to determine minimum RNP levels based on ground nav aids.

The next steps for the ANFG are:

1st run of model completed: 2/1/00

Telecon: 2/3/00

Ken Simmons will arrange the telecon.