GOVERNMENT/INDUSTRY AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
(Originally presented at ACF 92-02)
HISTORY RECORD

FAA Control # 92-02-110

SUBJECT: Cold Station Altimeter Settings

BACKGROUND/DISCUSSION: The United States Air Force and the Canadians apply corrections to minimum instrument approach altitudes from the FAF inward, during periods of very cold weather conditions, or cold weather conditions in combination with terrain more than 2,000 feet above airport elevation. Where terrain significantly higher than the airport elevation underlies approach segments the problem is exacerbated. At Medford, Oregon, for example, there is terrain that is 6,000 feet higher than the airport, which underlies the intermediate segment of the VOR/DME-C SIAP. The minimal 500 feet of intermediate segment obstacle clearance can be completely compromised with a surface temperature no colder than -50 degrees c.

RECOMMENDATION: The FAA should institute a directive procedure similar to that used by the USAF for cold weather operations. Where individual SIAPs are identified to have minimal obstacle clearance over terrain that is greater than 2,000 feet above the airport elevation, such procedures should be annotated to apply cold altimeter corrections to the intermediate and initial approach segments, in addition to the FAF inward.

COMMENT: This recommendation would affect directive information contained in the Airman's Information Manual pertaining to the use of instrument approach procedures. It would also affect FAA Order 8260.19B to the extent that flight procedures personnel would be directed to identify and annotate SIAPs that have significantly high terrain underlying intermediate and initial approach segments.

Submitted by: Charles K. Guy
May 13, 1992
AIR LINE PILOTS ASSOCIATION

INITIAL DISCUSSION (Meeting 92-02): Records of the initial discussion and minutes of meetings 93-01 through 94-01 are not AVAILABLE.

MEETING 94-02: Mr. Ruana observed that this is a problem with a long history, and the group agreed to leave open.

ACTION: Non-specific/open item

MEETING 95-01: Mr. Lyle Wink, AVN-220, agreed to research this on-going problem, pending a study by AVN-100. He will also look into the possibility of a conversion chart. ACTION: AVN-220.

MEETING 95-02: Lyle Wink, AFS-422, outlined concepts; however, due to the AFS/AVN re-organization he did not have sufficient time to prepare a full briefing for this meeting. Report deferred to the next meeting. ACTION: AFS-421.

MEETING 96-01: Lyle Wink, AFS-440, led discussion on this issue. Criteria development is in progress but not mature enough to be presented to the group. Every attempt will be made to present draft criteria at the next meeting. ACTION: AFS-440.

MEETING 96-02: Lyle Wink, AFS-440, briefed that the initial criteria they had developed was too broad in its application and needs further refinement. Don Pate, AFS-450, noted that he had recently attended an ICAO Obstacle Clearance Panel (OCP) meeting where this issue was discussed. To date, there is no international consensus on this issue. ACTION: AFS-440.

MEETING 97-01: Jim Nixon, AFS-440, briefed that criteria development is progressing, albeit slowly. He noted that the impact on BARO-VNAV must now be addressed. Areas of concern are the possibility of a requirement for dual minimums and the impact on VDP's and descent angles. Jim stated that AFS-440 hopes to have criteria development completed by the end of the year. ACTION: AFS-440.

MEETING 97-02: Jack Corman, AFS-440, briefed that criteria development is progressing. He noted the following recommendations: 1) Publish a temperature adjustment chart in the front of the approach booklets; 2) Publish instructions in the AIM specifying how and when to use the chart; 3) Have air carriers identify locations exhibiting significant indicated altitude error, and make the following annotation on approach charts at these locations: "USE TRUE ALTITUDE WHEN AIRPORT TEMPERATURE IS BELOW ISA". Pilot education issues have to be addressed. Recommendations were well received and initiatives are to be work further. Don Pate, AFS-440, expects to present proposed criteria at the next meeting. ACTION: AFS-440.

MEETING 98-01: Jack Corman, AFS-420, briefed that criteria development is progressing, and presented a developmental conversion table for group review. Initial reaction from the group is that the table shows steps are being taken in the right direction. Jack noted that the recommendation to: "Publish a temperature adjustment chart in the front of the approach booklets; publish instructions in the AIM specifying how and when to use the chart; have air carriers identify locations exhibiting significant indicated altitude error; and make the

following annotation on approach charts at these locations: "USE TRUE ALTITUDE WHEN AIRPORT TEMPERATURE IS BELOW ISA" is still on the table. Wally Roberts, ALPA, recommended implementation prior to next Winter. Jack briefed that several air traffic issues as well as pilot education issues have to be addressed. The AFS-420 recommendation for a subgroup on this issue was adopted. AFS-420 will continue criteria development, as well as establish a working group to address implementation, and provide an updated report at the next meeting. ACTION: AFS-420.

MEETING 98-02: Due to higher priority issues, AFS-420 has not had sufficient time to work this issue. Howard Swancy, AFS-420, briefed that the U.S. is considering the Canadian, Russian and ICAO models for acceptance. Rule-making and an Advisory Circular are also being worked as promulgation methods. It was noted that the rule-making process will take 12-18 months. Another meeting of the ad hoc group studying this issue is scheduled for next month. Hopefully some interim adjustment measure will be available by the end of the year. ACTION: AFS-420.

MEETING 99-01: Howard Swancy, AFS-420, provided a hard-copy handout outlining progress on this issue. He also provided a briefing on actions within the ad hoc committee (co-chaired by AFS-200 and ALPA) along with specific examples of near terrain impacts and a sample corrective table. Implementation of a national cold weather adjustment plan is hoped for by October, 1999 with public awareness training beginning in May, 1999. Don Pate, AFS-420, emphasized that whatever is adopted/published in the U.S. must be harmonized with ICAO. This issue will be addressed at the ICAO OCP/12 meeting. While working this issue, it was discovered that another industry/government working group was also unilaterally addressing this issue, unbeknownst to the ACF. Kevin Comstock (ALPA) indicated that it was counter productive that another group was addressing this issue in secrecy when he has repeatedly requested input from all sources. This demonstrates once again where the effectiveness of the ACF is limited by attendance. ACTION: AFS-420.

MEETING 99-02: Howard Swancy, AFS-420, briefed efforts thus far. There is a draft Advisory Circular (AC) currently in FAA internal coordination. Air Traffic still has some issues to resolve; however, a representative was not available for discussion. Flight Standards is still working with ATA-130 for charts in the TPP booklets. The FAA is still targeting implementation by the end of November. ACTION:AFS-420.

MEETING 00-01: Howard Swancy, AFS-4, briefed efforts thus far. There was a draft Advisory Circular (AC) circulated for comments. Comments have been received and a new AC is currently under development by AFS-420. The FAA was targeting implementation by the end of November, 1999; however, the issue is contentious and formal adoption was not realized. The plan now is to educate the aviation community this summer and implement procedures next winter. ACTION: AFS-420.

MEETING 00-02: Dave Eckles, AFS-420, presented a status update paper prepared by Carl Moore, AFS-420. A comprehensive FAA policy for cold weather induced altimetry is still under development. Informational material regarding cold temperature induced altimeter error and a cold temperature error table will be published in the January 2001 AIM. When questioned, Deborah Martin, Transport Canada, briefed that cold weather altimeter procedures have been in use in Canada for some time without problems. She stated that this is due to extensive pilot and controller education programs. Kevin Comstock, ALPA, asked who is working the issue formally for FAA and requested the status of the draft AC on this issue. He further stated that his organization would like to see more aggressive action on this issue and recommended a FAA sponsored ad-hoc group be formed to work the issue. Dave responded that he is uncertain of the status of the AC and that AFS-420 will take initiative to lead the effort and consider establishing a formal FAA/industry group to work the issue. ACTION: AFS-420.

MEETING 01-01: Dave Eckles, AFS-420, briefed that Carl Moore, AFS-420, has been assigned to work this issue. Brad Alberts, FedEx Pilots Assn., asked when the FAA would have something in writing. Kevin Comstock, ALPA, again briefed that this issue must be worked with input outside of AFS-400. He noted that ALPA has repeatedly requested that an ad-hoc FAA/industry group be formed to work the issue. Dave agreed to carry this message back to Carl. ACTION: AFS-420.

MEETING 01-02: Norm LeFevre, AFS-420, briefed that Carl Moore, the AFS-420 specialist assigned this issue, has proposed that procedures be designed with a cold temperature adjustment. The final approach segment altitudes will be adjusted by the pilot based on current temperature. Other procedure segments would include year round adjustments based on the mean temperature minus 3 standard deviations. Statistically, if this were followed, there would be only 12 hours per year where the adjustment would be insufficient. Carl's analysis indicates that segment altitudes, other than final, already have adjustments (airspace, ATC, etc.) that in most cases preclude the necessity for an additional cold weather adjustment. NACO has provided a list of terrain impacted airports, which will be ranked based on temperature and terrain, and then AFS-420 and AVN-100 will discuss implementation alternatives. Kevin Comstock, ALPA, once again briefed that this issue must be worked with input outside of AFS-400. He noted that ALPA has repeatedly requested, to no avail, that an ad-hoc FAA/industry group be formed to work the issue. Norm agreed to carry this concern back to AFS-420. ACTION: AFS-420.

MEETING 02-01: Norm LeFevre, AFS-420, briefed that the FAA had a meeting in mid-April to discuss some Baro-VNAV temperature compensation test results from the FAA Technical Center in Atlantic City. AFS-420 is coordinating to have Clyde Jones, the AFS-400 National Resource Specialist (NRS) for weather related issues, to lead this effort. Norm also stated that AFS-420 believes that a single point of contact should help move this effort and the weather NRS is the logical office to do so. If accepted, Clyde will be briefed that industry desires to participate in this effort and that AFS, ATP, AIR, DOD, ALPA and AOPA all have expressed an interest in this issue. ACTION: AFS-420.

MEETING 02-02: Tom Schneider, AFS-420, briefed that after the last meeting, AFS-420 wrote AFS-400 requesting that the National Resource Specialist (NRS) for weather related issues lead this effort. Pre-ACF conversation with Clyde Jones, who is currently handling weather issues, indicated that he had not been directed to assume this responsibility. Subsequent conversation between the managers of AFS-420 and AFS-400 clarified that Clyde would work this issue. As a result of the miscommunications, no progress has been made since the last meeting. Tom agreed to ensure that Clyde is forwarded all relevant ACF material as well as all background material from Carl Moore's efforts as the previous OPR. Kevin Comstock, ALPA, reaffirmed industry's concern over lack of progress on the issue and noted that currently, only the inner surface of the final segment has cold temperature adjustments included in draft 8260.RNP. ACTION: AFS-420 & AFS-400 Weather NRS.

MEETING 03-01: Tom Schneider, AFS-420 briefed that no progress has been made since the last meeting. AFS-420 has done all that is possible to work the issue from a criteria perspective; it is now an operational issue. The Manager of AFS-400 has been formally requested to provide an OPI to work the issue; however, one has not been assigned. Kevin Comstock, ALPA, suggested that adding an adjustment to allow a procedure to be used down to a predetermined temperature as is done with BARO-VNAV seemed a simple fix. Al Herndon, MITRE, stated that some FMS auto-adjust for temperature. Mark Ingram, ALPA stated that his experience is that the pilot must input temperature. Tom will continue to pursue an AFS-400 staff assignee to work the issue. ACTION: AFS-420.

MEETING 03-02: Bill Hammett, AFS-420 (ISI), briefed that this issue has been transferred to AFS-410 for action. All past AFS-420 studies have been forwarded and AFS-410 has been advised of ALPA's willingness to assist in resolving the issue. Mark Steinbecker is the appointed staff specialist assigned to work the issue. He is currently reviewing the background to determine what operational procedural options exist. TAOARC and RNAV Task Force coordination is also planned. ACTION: AFS-410.

MEETING 04-01: Mark Steinbicker, AFS-410, briefed that his office has looked into the issue. There appears to be three options; 1) ignore the risk, 2) recognize the risk and mitigate via procedure design changes, or 3) incorporate operational changes through ATC/pilot procedures). The general consensus is that the risk cannot be ignored; therefore, the discussion focused on whether a solution would be criteria-based or operational. Frank Flood, Air Canada, stated that implementation of cold temperature adjustments is necessary because, as we move toward a RNP NAS, it is vitally important to know exactly where the aircraft is. Frank further briefed that Air Canada publishes a correction table in the front of their flight manuals. Pilots are instructed when and how to make adjustments. He also pointed out that awareness is essential and applauded efforts to educate pilots of the problem. Frank also mentioned a recommended procedure provided by ICAO. The pilot's own 'rule of thumb' is that -10 Celsius = -10% altitude error (too low). Vincent Chirasello,

AFS-410, suggested the ACF decide on a recommendation that would be presented to the Performance-based Aviation Rulemaking Committee (PARC). John Moore, NACO, asked why the PARC. Kevin Comstock, ALPA, responded that the PARC is already addressing incorporating cold temperature adjustments in RNP criteria. If incorporated in RNP criteria, it should be applicable to all procedures. Of primary concern is that the greater the distance from the altimeter reporting station, the greater the risk of an altitude error induced by cold temps. Most affected are initial, intermediate and final approach altitudes. Unless a cold temperature adjustment is made, aircraft are flying too low and required obstacle clearance (ROC) as well as ATC separation is reduced. After discussion, the group agreed that the initial focus should be on procedural design followed by ATC procedures. Tom Schneider, AFS-420 recommended taking the Canadian procedures to the PARC. Mark Ingram, ALPA, stated that incorporating a correction in procedure design is preferred; however, the Canadian procedures could be used in the interim. Randy Kenagy, AOPA, questioned the safety and operational impact, emphasizing that data was needed. Kevin Comstock, ALPA, noted that the FAA's Atlantic City Technical Center has validated that the ICAO values are correct. Mark will take the ACF feedback to the PARC and report at the next meeting. ACTION: AFS-410.

Editor's Note: *At this meeting, Ted Thompson, Jeppesen, presented the following cold temperature related issue. The forum recommended that the new issue be addressed by AFS-410 concurrently with issue 92-02-110. Ted agreed. AFS-410 will respond to both issues under 92-02-110. The full text of the initial discussion may be viewed on the ACF-IPG web site under History of Closed Issues, Issue # 04-01-251.*

AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
Meeting 04-01 – April 28-29, 2004
History Record

FAA Control # 04-01-251

Subject: Cold Temperature Correction Procedural Notes

Background/Discussion: *Currently, cold temperature correction procedural notes on applicable U.S. FAA SIAPs state "Baro /VNAV not authorized below -XX°C." As currently worded the notes are often misinterpreted by pilots. The wording unduly singles out and penalizes newer navigation systems that provide the means to perform constant angle descents using VNAV. Pilots who encounter these notes/conditions may be inclined to divert to an alternate location entirely, or continue to the original destination but revert to a 'dive & drive' descent instead of using VNAV. Neither option is appropriate, as cold temperature conditions have an affect on all types of operations, including conventional 'dive & drive' procedures.*

Also, in some situations, the procedural notes may be included on approach procedures where extreme cold temperature conditions are highly unlikely to occur, such as airports in southern Florida. In these examples, credibility and effectiveness of the note comes into question.

Recommendations: *The ATA FMS/RNAV Task Force and the ATA Chart & Data Display Committee both recommend the FAA continue to actively address cold temperature correction procedures and coordinate an appropriate solution on an industry-wide basis, as well as on an international level. It is understood the subject is quite complex and solutions may be difficult to achieve.*

For example: The FAA should uniformly assess a baseline cold temperature. The condition does not relate exclusively to VNAV operations. Cold temperature procedural notes should be modified to address the need to use "appropriate cold temperature correction procedures" – in general – not just for VNAV operations. The same compensations should apply to conventional procedures.

Comments: *The subject was originally presented to the ATA FMS/RNAV Task Force by the Boeing Company. The Task Force's Chart & Database Compatibility Subcommittee reviewed the proposal, and coordinated with the ATA's Chart & Data Display Committee. The recommendation was endorsed by both the FMS/RNAV TF and the CDDC, to be carried forward for presentation to the FAA for consideration.*

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MEETING 04-02: Vinny Chirasello, AFS-410, briefed that his office submitted the issue to the Performance-based-operations Aviation Rulemaking Committee (PARC) and a task force was formed. FAA has received no feedback thus far. Kevin Comstock, ALPA, briefed that he was at the PARC when the issue was presented and the PARC tasking was limited. Kevin recommended that AFS-400 ensure that the PARC is aware that a comprehensive temperature compensation policy is needed to include required actions for all segments of an approach, other procedural minimum altitudes, ATC assigned altitudes, altitudes specified by procedure designers, avionics coded altitudes, etc. Frank Flood, Air Canada, offered his organization as a resource for the FAA on the issue. Ted Thompson, Jeppesen, commented that FAA Notice 8000.287 requires charting of both minimum and maximum temperature limitation notes. Ted noted that most maximum temperatures are extreme to the point of being comical, and of no operational value to pilots; e.g., some cases in excess of 158 degrees Fahrenheit. Ted suggested that FAA might want to re-examine the min/max temperature range values to be included in notes, or change the required wording of the notes to make them meaningful in the context of reasonable, real-world weather values while still addressing the potential affect on operations. The MITRE representatives supported Ted's comments. ACTION: AFS-410.

MEETING 05-01: Mark Steinbicker, AFS-410, briefed that, after the last meeting, the issue was presented to the Performance-based Aviation Rulemaking Committee (PARC). The PARC took no action. Discussion within AFS-400 indicates that all believe there is a hazard associated with cold temperature altimetry; however, the magnitude is undetermined. Discussion on how to attack the problem is ongoing. Mike Riley, NGA, asked what is the solution? Tom Schneider, AFS-420, responded that there are several solutions, all of which affect the ATC system. Mike asked if there is a band-aid fix that could provide temporary relief; e.g., a correction table in the approach charts. Mark stated that there was a Flight Safety Foundation (FSF) white paper study on the issue that documents actual aircraft altitude vs. indicated altitude. Mike stated that the issue has been on the agenda for over 13 years, if there is an interim fix, it should be addressed. Mark replied that there is a process under consideration to assess the impact at high-risk airports. Monique Yates, NGA, briefed that the USAF Advanced Instrument School (AIS) has an excellent class on the issue. The USAF courseware refers to at least 10 near misses with terrain in aircraft directly related to the cold temperature issue. The source for this statistic was ALPA. Monique agreed to put AFS-410 in touch with the USAF AIS representative to coordinate AFS-410 access to the USAF training material for review. Tom stated that the issue would be placed on the AFS-400 Technical review Board (TRB) agenda. ACTION: AFS-410.

MEETING 05-02: Mark Steinbicker, AFS-410, briefed that Flight Standards has not determined whether to pursue an operational solution (charted notes on procedures or pilot procedures to correct for temperature) or a criteria solution (adjust procedural altitudes to account for worst case expected conditions) to the issue. AFS-410 has requested a contract risk assessment analysis to determine the scope of the problem; i.e., the number of airports and air traffic facilities affected. However, the request did not make it into this year's budget and without funding; the project is in a HIA status. There is a possibility of receiving fall-out money for funding this year. There was much discussion on the issue as well as industry concern that FAA does not take the issue seriously. Monique Yates, NGA, stated that Canada and the U.S. military address the problem through pilot education and

application of the ICAO Cold Temperature Error Table in the AIM (Table 7-2-3). USAF air traffic controllers at northern tier locations broadcast "use cold temperature procedures" over the ATIS. Monique emphasized her point by noting an instance where a U.S. operator nearly struck a mountain while on approach in Canada because of not complying with cold weather adjustment procedures. Deb Martin, Transport Canada, confirmed that the incident occurred at Kewlona, BC and the aircraft was very close to impacting the terrain. Monique recommended that FAA initiate an effort to educate the flying public and air traffic controllers on the errors associated with cold weather altimetry in general. She also advocated using the ICAO Table within the NAS. Mark Washam, ATO-T, questioned the impact on ATC of applying the adjustment. Deb Martin replied that this has not been a problem in Canada as both controllers and pilots are educated on the subject. Cold weather procedures are effective for certain months during the year and all minimum vectoring altitude charts in Canada are temperature corrected. Deb volunteered Canadian support toward resolving the issue in the US. Kevin Comstock, ALPA, supported Monique's recommendation. Kevin also questioned the need for another study as the Flight Safety Foundation CFIT and the CAST initiative have already conducted studies to assess cold temperature impact. Kevin offered to provide the previous study material to AFS-410. Mark stated that if procedure design is feasible, it is preferable in lieu of implementing pilot procedures. However, FAA needs to know the extent of the issue prior to expending resources; therefore, the need for the risk analysis. Mark emphasized that he did take the issue to the PARC for further support; however, that group decided not to work the issue. Kevin responded that other countries are applying cold weather corrections, how do we ensure that our pilots are trained? He recommended that if the FAA is to pursue a risk analysis, expand the study to include international application. It was further noted that this issue has been on the agenda with no action for 13 years. Monique questioned whether the FAA may be relying on global warming to resolve the issue. ACTION: AFS-410.

MEETING 06-01: Vincent Chirasello, AFS-410, briefed that the issue is not being worked due to lack of money and resources. The FAA position, as briefed at the last meeting, is to contract a risk analysis study to determine the validity of the problem and whether to address the issue through an operational or criteria solution. Lt Col Monique Yates, NGA, provided a presentation from the USAF Advanced Instrument School curriculum to demonstrate the significance of the issue. The presentation demonstrated an excellent example of the impact of cold temperature on required obstacle clearance (ROC) by approach segment using an actual approach chart and the ICAO table. In her example, assuming minimum ROC in each segment, actual obstacle clearance vs. ROC was reduced as follows: Initial segment: 235 ft vice 1000 ft; Intermediate segment 32 ft vice 500 ft; Final segment: 97 ft vice 250 ft. Monique concluded by stating that both Canada and the DOD agree that using the ICAO Cold Temperature Error Table and pilot education is a better solution to the problem and should not overly impact FAA money and resources. Contributing to the problem is that the FAA Air Traffic system is not on board. Bill Hammett, AFS-420 (ISI), asked if the USAF is implementing cold weather corrections. Monique responded, yes, at their U.S. 'northern tier' locations. Controllers advise pilots to implement cold temperature adjustments on initial contact and via the ATIS. Pedro Rivas, ALPA, stated that, by and large, air carriers do not apply any cold temperature correction except for FMS procedures. Paul Ewing, AJR-37 (AMTI), added that FAA MVA charts are not temperature corrected. Bill noted that from previous meetings, the Transport Canada representative stated that all MVA charts in Canada are temperature corrected. Vinnie stated that the MVA altitudes didn't matter as the pilot didn't know the actual MVA anyway.

Richard Boll, NBAA, briefed that he received a GPWS alert while descending from 4,000 ft to 2400 ft to intercept the glide slope on the ILS RWY 19R IAP at Fairbanks Alaska at -22 degrees. When he queried the Control Tower, they responded, "It happens all the time". Vinnie again stated that the issue should be addressed by the PARC; however, when presented, the PARC declined to accept it. Lyle Wink, AFS-400, questioned the need to adjust all procedure altitudes since most (other than the DA/MDA) are controlled by airspace requirements. Vinnie agreed stating that this would be included in the risk analysis to determine whether we have a problem. A majority of the group believe that cold temperature altimetry is a problem and a study is not needed. After more discussion, the ACF consensus is that a combination of pilot education and use of the ICAO Cold Temperature Error Table should be endorsed by FAA. Tom Schneider, as Chair of the ACF-IPG, took an IOU to write the Manager, AFS-400, emphasizing the ACF consensus and requesting that AFS-400 elevate the issue within FAA. AFS-410 is still the OPR for action. A copy of Monique's briefing slides is attached.  ACTION: AFS-410 and ACF-IPG Chair.

MEETING 06-02: Tom Schneider, AFS-420, briefed that, as requested at the last meeting, he forwarded a memorandum as Chair of the ACF-IPG, to the Manager, AFS-400, emphasizing the ACF consensus and requesting that AFS-400 elevate the issue within FAA. Robert (Rico) Carty, AFS-410, briefed that AFS-410 is still considering to get MITRE involved for a study on the issue. Monique Yates, NGA, emphasized that there is no need to do another study on the effects of cold temperature on altimetry; that has already been determined. She recommended the MITRE initiative be limited to determining the better solution; either to educate pilots/controllers on use of the correction table or to apply cold temperature adjustments during procedure design. Monique also noted that procedural adjustments may cause international aircrews to double the necessary adjustment and could require "un-training" pilots already using the ICAO adjustment table. Rico also noted that it would be difficult to apply procedural adjustments to accommodate airports with extreme changes; e.g. Fairbanks, AK where temperatures can vary from +80 to -60 degrees. Rich Boll, NBAA, asked whether the Fairbanks radar MVA charts were temperature corrected. The response was that no FAA charts are temperature corrected. Pamela Coopwood, AJT-2300, stated that problems could result if pilots are applying different standards and ATC is not aware of it. Training must be in ATC manuals. She offered to work with AFS-410 to develop controller training as the process moves forward. Mitch Scott, Continental, stated that the study should address en route as well as terminal adjustments. He noted that Continental does apply cold temperature adjustments to en route operations. The group consensus is that the issue is real and should be addressed with greater urgency. ACTION: AFS-410.

MEETING 07-01: Ernie Skiver, AFS-410 briefed that MITRE has been contracted to assess cold weather impact in the lower 48 states. Tom Schneider, AFS-420, stated that it has been agreed that a correction is necessary; the study is to determine which locations require correction. Ernie further stated that AFS is still undecided whether to make the adjustment procedurally or operationally. Lance Christian stated that DOD believes the issue should be addressed through standardized pilot training and use of a conversion table. Bill Hammett, AFS-420 (ISI) recommended that the study should include MVA and MIA charts. Frank Flood, ACPA, stated it is a science issue and a pilot responsibility. It is up to the government to determine how to implement cold temperature adjustments. Frank also

offered assistance to both the FAA and MITRE by contributing operational experience to the study. Mark Ingram, ALPA, stated that a Boeing study indicates cold temperature adjustments can be applied via avionics. Brad Rush, AJW-321, responded that while the Boeing criteria may be good for large aircraft, it is of no use for smaller aircraft. Kevin Comstock, ALPA, re-iterated ALPA's previous requests that industry and ATC participate in any cold temperature altimetry study. ACTION: AFS-410.

MEETING 07-02: Mark Steinbicker, AFS-470, briefed that the contracted MITRE study to evaluate risk assessment is underway. On Thursday, during the ACF Charting Group meeting, Mike Cramer, MITRE provided a detailed briefing on the study parameters and the evaluation process MITRE will use. A copy of Mike's briefing slides is attached here. The plan is to analyze all airports with instrument flight procedures. Historical temperature data obtained from NOAA will be used to determine the representative coldest temperatures at an airport. These values will then be used to determine the greatest negative International Standard Atmosphere (ISA) deviation at an airport. Then, a calculated cold temperature altimetry error from the Vertical Error Budget will be used as a comparison against the required obstacle clearance (ROC) for each segment of the approach procedure. An error factor expressed in feet will be used to determine the potential operational risk. The resulting degree of risk from the study will be used to by Flight Standards to determine appropriate ways to address the matter within the United States. Options previously discussed include incorporating adjustments into procedure design (ROC), charted notes, use of conversion tables, pilot education and training, etc. Rich Boll, NBAA, asked whether the study would include radar minimum vectoring altitude charts. Mark responded that the study is initially focused on instrument approach procedures. Bill Hammett, AFS-420 (ISI), stated that standard TERPS ROC values from Order 8260.3 may not always be appropriate as basic ROC values are often increased; e.g., remote altimeter setting, precipitous terrain, etc. Bill noted the only source for actual ROC used in a procedure is the associated Form 8260-9. AFS-470 will continue to monitor the study and provide an update at the next meeting. ACTION: AFS-470.

MEETING 08-01: John Swigart, AFS-470, briefed that the contracted MITRE study to evaluate risk assessment is underway. He stated they wanted to consider a few additional assumptions for the study and that a full briefing will be provided at the next ACF-IPG meeting. Al Herndon, MITRE, added that some of the original assumptions originally briefed were false and the study had to be re-run with corrected assumptions. Tom Schneider, AFS-420, asked whether consideration has been given to including MVA charts in the study. John replied that he is uncertain; however, en route operations are included and perhaps that would include MVAs as well. Mark Ingram, ALPA, stated that everyday US aircrews fly over/to Canada, Alaska, Russia, etc., without a clue regarding cold temperature procedures. Bill Hammett, AFS-420 (ISI), asked why only the lower 48 states are included in the study. Tom responded that if the lower 48 states are impacted, adjustments would automatically include Alaskan procedures. Frank Flood, ACPA, added that the problem is not new. It has been published in the Boeing Performance Manual since 1985 although the onus is always on the pilot and the carrier. The problem is not just within the FAA, but with pilot education material; e.g., the Instrument Procedures Handbook and the AIM. AFS-470 will continue to monitor the study and provide a full briefing at the next meeting. ACTION: AFS-470.

MEETING 08-02: Mark Steinbicker, AFS-470, provided a briefing on the MITRE study as provided by Mike Cramer. The purpose of the study is to assess cold temperature impact on required obstacle clearance (ROC) for instrument procedures in the lower 48 states. The results will then be used to base a decision for a course of action to mitigate the issue if required. The impact analysis assessed airports with and without climate reporting stations. The report provided statistics only for approaches where full ROC was lost in the initial, intermediate, or final segments. A copy of Mark's briefing slides is included here ( ). Mark Ingram, ALPA, questioned why there was only concern when all ROC was lost, which results in a relatively low number of procedures impacted. For example when 500' of ROC is required, it appears that the study indicates a problem only when the cold temperature adjustment is 500' or greater; however a 490' loss of ROC where only 10' of ROC is provided is not shown as a problem. Mark recommended the study identify all procedures where the TERPS required clearance was not provided. Anytime TERPS **required** obstruction clearance is compromised presents a problem. This opinion was supported by several other attendees. Tom Loney, Canadian Air Force (CAF), stated that the US was overly complicating the issue. Criterion is regulatory and it is known that cold temperature impacts ROC; therefore, adjustments must be made to ensure design requirements are maintained. As a quick and easy methodology, the CAF applies cold temperature corrections, using the ICAO cold temperature table, to the final segment whenever the temperature is at zero or below and to all segments when the temperature is -30 or below. Tom Schneider introduced Canadian cold temperature guidance from the Canada AIP noting that both ATC and pilots are involved in the adjustment process. It should also be noted that ATC minimum vectoring charts are compensated for cold temperature. A copy of the extract from the Canada AIP is included here ( ). Bill Hammett, AFS-420 (ISI) stated that he had attempted to input cold temperature corrections when developing criteria for minimum vectoring altitude charts (MVACs); however, this was not acceptable to ATC. Mark Ingram, ALPA, also noted that some US carrier pilots fly over Canada and Russia daily without thought of cold temperature impact. On the other hand, other carriers have mandated an additive of 1000' to initial segment altitudes and 500' to the intermediate fix altitude to compensate for cold temperature altimetry. Bill Hammett, AFS-420 (ISI), again questioned why we were analyzing the lower 48 first and not Alaska where we know the problem exists. We have reports included in the ACF history of this issue where pilots have reported GPWS alerts while on approach to Fairbanks during cold temperature conditions and the ATC response is "happens all the time". He reminded Mark that several industry groups have volunteered to assist the FAA in the study and in developing cold temperature procedures for the US. Mike Frank, AJT-22, responded that his organization is looking into cold temperature adjustments in the terminal environment. Mark stated that he will have MITRE do further analysis. The study has shown that there are instances where all ROC could be lost; it needs to be determined whether there is a point prior to total ROC loss where adjustments should be made. Lance Christian, NGA, stated once again that Canada and the DOD realize there is a problem in a cold temperature environment, why expend more money on further study. Rich Boll, NBAA, questioned the end result of the studies; e.g., "will it determine what is an acceptable amount of ROC loss; will it lead to procedure adjustments, recommendations or requirements in the AIM for the pilot to apply cold temp compensation; etc." Kevin Comstock, ALPA, said there already is a consolidated industry position from the PARC to AVS-1 to apply the charted temperature limit currently present on some approaches to all segments of all approaches. Kevin, Rich, James Taylor, AFFSA; Tom Loney, CAF; and Frank Flood, Air Canada, (at previous meetings) have offered to assist Mark in developing a plan to address temperature compensation. ACTION: AFS-470.

Editor's Note: *The following pertinent extracts from the October 31, 2006 PARC letter to AVS-1 are included at ALPA's request:*

Cold Temperature Policy: Current procedure design policy uses the controlling obstacle on the final approach segment as the basis for calculating minimum temperature for the procedure. The team recommends that this policy be reviewed so that obstacle clearance on any segment would be maintained. Attachment 4 contains proposed text for a revised policy.

Attachment 4 - Cold Temperature Policy: The team recommends that the criteria for establishing the charted cold temperature limit be changed to analyze the appropriateness of that limit in all segments of the approach rather than only the final segment. While this recommendation is applicable to all approaches, not just basic RNP, the team recommends that the criteria be developed first for basic RNP and then applied to TERPs for all procedures."

MEETING 09-01: Catherine Majauskas, AFS-470, briefed that MITRE is still conducting analysis and there is nothing to report at this time. Bill Hammett, AFS-420 (ISI) noted that at the last meeting it was briefed that the initial MITRE study only indicated a problem when ROC was totally lost. One of the ALPA representatives questioned this methodology and recommended the study provide details whenever any portion of ROC was compromised and the group agreed. Bill asked whether the study was revised to address this concern. Catherine responded that it was and hoped to present the results at the next meeting. ACTION: AFS-470.

MEETING 09-02: Catherine Majauskas, AFS-470, briefed that there is nothing new to report on this issue. John Swigart, AFS-470, added that the Branch has been understaffed (down three personnel) and two staffers are working RNP issues. Two recent new hires should prompt action. Tom Schneider, AFS-420, asked the status of the MITRE study. John responded that it is on-going. AFS-470 will continue to work the issue and report progress of the MITRE study. ACTION (AFS-470).

MEETING 10-01: Catherine Majauskas, AFS-470, briefed that there has been recent renewed interest from Air Traffic and FAA employees working within the Aviation Safety Information Analysis and Sharing System (ASIAS) regarding the impact of cold station altimeter settings. AFS-470 recognizes the need for special attention to be placed on avionics systems in regards to cold temperature corrections. Catherine added that data from the MITRE study is being used to make some decisions to develop an operations concept for temperature correction. Her office will continue to work with MITRE to formulate an AVS position. ACTION (AFS-470).

MEETING 10-02: Kel Christian, AFS-470, briefed that a meeting was held in July with AFS 470, AFS-420, AFS-460, AVP-210, AIR-130, and MITRE in attendance to review the MITRE study. All agree that there are inherent risks associated with cold weather altimetry. The

AFS participants and MITRE met again in September to discuss how to fine tune the study and add variables. The question of how to mitigate the issue, either through a procedural design adjustment, or through an operational adjustment was discussed and the procedure design option favored. A second MITRE study is underway and expected to be complete by the end of November, at which time another meeting will be held. This meeting will include AJT, ATE, AJS, AOV and ATSAP to discuss how to proceed based on the second MITRE study. Gary Fiske, AJT-28, asked what was expected of AT. Kel responded AT actions are undetermined at this time; AFS just wants to ensure AT is involved early in the discussions. Larry Wiseman, AOV-310, asked whether MVA and MIA charts were considered in the MITRE study. Kel responded that only non-precision approaches were considered. Vince Massimini, MITRE, stated that MVA/MIA must also be covered. Kel responded that we are not there yet. Gary added that ATO is not dealing with cold temperature affects on MVA/MIA charts yet. The problem is determining a minimum monthly mean temperatures at different locations within the US. Brad Rush, AJV-3B, cautioned that the method of computing high and low temperature variables has changed in Order 8260.54. He noted an example where the current high temperature limitation of 90 degrees on a procedure, when re-computed using current criteria, now equals 27 degrees. Mark Ingram, ALPA, asked at what airspeed is 1,000 Ft/NM descent calculated. Brad responded the final approach airspeed is calculated for all Categories. Valerie Watson, AJV-3B, asked what locations are being looked at in the MITRE study. Kel responded that MITRE has narrowed down the impact area to about 60 airports. Mike Cramer, MITRE, stated that MITRE is reviewing airports and procedures over the past 5-years to assess impact. Roy Maxwell, Delta, asked whether FAA was ruling out the option for pilots checking temperatures and making adjustments. His concern is that procedural adjustments may cause FAA to say not to use the procedures. Roy stated that Delta has adjusted (blue page) procedures for cold temperature use so capacity isn't terminated. Kel stated that it is not FAA's intent to terminate current operations, but the long range goal is to delete the requirement for pilot manual adjustments. AFS-470 will continue to work the issue with MITRE and report progress. ACTION: AFS-470.

MEETING 11-01: Kel Christian, AFS-470, briefed the results of the MITRE study thus far. The study examined 10,328 approach segments considered at potential risk. The study reveals that there are 41 airports with 60 approaches at potential risk where the altitude error could exceed ROC. The risk is considered excessive if the condition exists more than 1% of the time. The proposed solution is to publish a minimum temperature at which ROC will not be exceeded and annotate the procedure accordingly. It was noted that the study did not include Alaska or precision approaches. Kel added that additional studies are continuing; however, MVA and MIA charts are not included as they not under AFS-470 purview. Steve Serur, ALPA, noted that, Mark Ingram, also an ALPA representative, had expressed concern at previous meetings over the fact that the MITRE study only indicates there is a problem when **all** ROC is lost. It appears that the current concept will apply a temperature correction that compensates to the zero ROC point; if so, this concept is flawed. Mitch Scott, Continental Airlines, asked what is the long term goal of the study. Rick Dunham, AFS-420, responded that the current goal is to publish a minimum temperature at which point the procedure is no longer authorized vice having pilots do the math; continuing analysis will include additional factors. Rick added that until a final solution is reached, AFS does not want to impede pilots from applying current AIM guidance and the associated correction table. Steve asked what weather data was considered. Kel responded the analysis was based on the coldest temperature recorded

in the last 5-years. Rich Boll, NBAA, stated that the aforementioned 1% risk factor was misleading. He stated that any time the temperature gets cold, the risk is there. FAA needs to move past the study and get the information and procedures before the pilot. He recommended publishing the ICAO table that is in the AIM in the front of the TPP and tell the pilots to apply it. Additionally, he recommended publishing corresponding guidance in FAA Order JO 7110.65 so controllers are aware of what it means when a pilot states he is applying cold temperature altitude corrections. Ted Thompson, Jeppesen, advised that Jeppesen does publish the table in its Airway Manual. Brad Rush, AJV-3B, expressed support for the TPP recommendation if the table is to be a part of the overall solution. JD Hood, Horizon Air, stated the MITRE study may cause confusion by indicating no correction is required at a temperature that, according to AIM guidance, DOES require altitude compensation. JD also supports developing guidance in the 7110.65 to ensure controller awareness of the AIM guidance. Paul Eure, AJE-31, agreed that pilots and controllers must be on the same page. He also stated that the ATO is revising MVA and MIA policy to consider cold temperature adjustments when considering rounding down ROC. These initiatives are expected to be complete this Summer. AFS-470 will continue to work the issue with MITRE support through the US-IFPP; and, AJV-3B will bring publication of the correction table before the IACC for consideration. Action: AFS-470 and AJV-3B.

MEETING 11-02: Kel Christianson, AFS-470, introduced Mike Cramer, MITRE, who has been serving as the lead analyst for the cold temperature altimetry analysis contract. Mike provided a briefing to explain the methodology used in the study and to clear up misconceptions of the earlier MITRE study. He also briefed the changes in the current study and explained the parameters being used. Significantly, the study has been automated and was expanded to include Alaska and Hawaii and all runways 4000 ft or greater in length. A total of 8,177 non-precision and ILS (initial and intermediate segments) approaches at 1,869 airports were analyzed using the lowest recorded temperature over the last 5-years. Data was analyzed to determine the probability that total altitude error may exceed the ROC for a given procedure segment at the coldest temperature. This probability defines the risk, if the segment were to be flown at the coldest temperature. If the risk exceeds 1%, the coldest temperature at which the risk is equal to or less than 1% is applied as the minimum temperature at which the procedure may be flown without compensation. This temperature will be published in some manner on the procedure chart. This will provide the desired cold temperature loss of ROC mitigation. Based on these assumptions, Mike offered a mitigation plan and recommended the issue be closed; a new issue should then be opened to track implementation, pilot educational material, etc. A copy of Mike's briefing slides is included here. (📌)

A lengthy discussion ensued. Rick Dunham, AFS-420, stated that it is an AFS-400 Division goal to develop some type standard that pilots and controllers alike can accept. Mike interjected that there is no current required procedural mitigation although application of the altitude corrections published in the AIM will accomplish it. Steve Serur, ALPA, expressed concern over closure, especially when there is the total loss of ROC. Mike clarified that the risk is not 1% of the time, but 1% of altitude error exceeding ROC when an aircraft is flying the approach at the minimum temperature. The risk factor of 1% is the same as the allowed risk of exceeding the laterally protected area in the missed approach on an RNP approach upon loss of GPS at DA. Roy Maxwell, Delta Airlines, stated 1% may be acceptable for unintended circumstances; GPS loss is random, but the temperature is known. Rich Boll,

NBAA, asked whether the analysis included non-airliner type altimetry. Mike responded that they had data from Cessna and others. Bruce McGray, AFS-410, stated there are special procedures in Alaska for small aircraft operations below -10F. He suggested that perhaps some feedback could be obtained from these users. Paul Eure asked whether any consideration had been given to aircraft vertical separation. The AIM allows pilots to apply the ICAO table correction at their discretion; therefore, some pilots may, while others may not. Additionally, there is no requirement for a pilot to advise ATC when applying cold temperature corrections. Tom Schneider, AFS-420, stated that this was a good point and asked whether ATPAC has addressed the ATC issue. He stated that we do not want to add further confusion by bringing ATC concerns into the ACF-IPG agenda item. Pierre Laroche, Transport Canada, voiced the concern that as this would only apply to US charts, it is possible that American pilots flying into Canada might not apply the standard ICAO compensation as is the standard practice in Canada. Tom Schneider, AFS-420, responded that it is the pilot's responsibility to be aware of the rules for the host country in which he/she is flying. JD Hood, Horizon Air, questioned the application of the AIM standard vice individual charts. Kel responded that the proposal will not take away the pilot's option to compensate manually as prescribed in the AIM. Valerie Watson, AJV-3, stated that the AeroNav Products IOU to bring publication of the ICAO table in the US TPPs and DOD FLIPs was discussed at the last IACC MPOC meeting. She stated that the MPOC members indicated they would support publication of the table and explanatory language. This option will remain on hold pending a decision on what will be implemented. Mike again recommended the issue be closed and a new issue opened regarding how to implement the MITRE study. Tom Schneider, AFS-420, commented that the results of the study have produced significant progress toward a solution; however, much work remains to be done regarding implementation and applicable pilot and controller guidance. Due to lingering concerns from ALPA, NBAA, Delta, and others, it was decided that an ad hoc group be formed to re-validate the MITRE model used to identify at risk airports & procedures and focus on implementation issues. Hopefully, the group can reach a conclusion prior to the next ACF meeting. The following personnel signed up for the cold temperature altimetry ad hoc working group:

Kel Christianson,	AFS-470,	202-385-4702,	kel.christianson@faa.gov
Mike Cramer,	MITRE,	616-296-9210	mcramer@mitre.org
Steve Serur,	ALPA	703-698-4333	steve.serur@alpa.org
Marc Gittleman	ALPA (United)	571-723-7524	marc.gittleman@alpa.org
Rich Boll,	NBAA	316-655-8856	richard.boll@sbcglobal.net
Roy Maxwell,	Delta Air Lines	404-715-7231	roy.maxwell@delta.com
JD Hood,	Horizon Air	800-451-0222x44346	jd.hodd@horizonair.com

Editor's Note: *Anyone not listed above who wishes to participate should contact Kel Christianson, AFS-470.*

ACTION: AFS-470 and MITRE.

MEETING 12-01: Kel Christianson, AFS-470, briefed that the cold temperature ad hoc working group formed at meeting 11-02 met and validated the parameters used in the MITRE study. Kel added that the AIM has cold temperature adjustment guidance similar to ICAO; however, to date, there is no published directive that states it must be implemented. The MITRE model is valid and automated; however, work is on-going to develop an

implementation methodology. Rich Boll, NBAA, stated that making cold temperature changes to IAPs seemed to be the easiest solution. Tom Schneider, AFS-420, responded that one reason for not modifying procedure design criteria is because the FAA does not want to permanently "penalize" all operations for seasonal conditions, or create separate procedures based on those conditions. Kel commented that many options are being considered. The current thought is to have pilots add the ICAO correction to all IAP segments from IAF through missed approach at specific airports. Rich questioned whether an IAP design fix is off the table. Kel said that nothing is off the table. Tom noted that the ad hoc working group had no ATO representation. Kel responded that the working group was primarily established to validate the MITRE model and AFS-470 is now actively working with Air Traffic to develop an implementation scheme. Paul Eure, AJE-31, stated that the En Route Service Unit has provided input. Paul added that they are concerned when AFS issues non-directive policy memorandums, AIM changes, etc., that may not drive an associated change to AT requirements, whereas a directive document; e.g., an FAA Order, will also drive ATO changes. Gary Fiske, representing AJT-2A3, stated that the cold temperature adjustment issue is not controversial, but the application is. He asked whether rulemaking will be affected. There was no answer to this comment. Kel closed by stating that AFS-470 will continue to develop and coordinate an implementation plan.
ACTION: AFS-470.

MEETING 12-02: Kel Christianson, AFS-470, briefed that the MITRE study has been vetted through FAA. It was determined in the study that the required obstacle clearance (ROC) could be exceeded on 289 procedures at 131 airports when operating into these airports using the lowest temperature recorded for the last five years. AFS-470 is working on several fronts to get the information to the public. A Graphic Notice is under development for inclusion in the Notices to Airmen Publication (NTAP) that will include background information and requested pilot actions as well as a listing of affected airports. The AIM is being updated to provide expanded information and guidance for pilots. Consideration is also being given to expanding the program to include airports with runways of 3,000' or greater (the standard is 4,000'). AFS-470 is also addressing the issue of whether to allow pilots to manually compensate current RNAV and RNP approaches with temperature restrictions. The immediate goal is to make pilots aware of the issue and develop corrective actions and an implementation plan. ACTION: AFS-470.

MEETING 13-01: Kel Christianson, AFS-470, provided an update briefing on the MITRE study and modeling process that identified airports affected by cold temperatures. The current study only assessed impact at those airports with a runway of 4,000 ft or longer. It is hoped that in the future, the study will be expanded to a re-assessment of all airports with runways of 2,500 ft or longer. The current plan is to publish a Graphic Notice in the Notices to Airmen Publication (NTAP) with a listing of affected airports and procedure segments. A copy of the Graphic Notice, which was discussed at length, is included here (). Kel also briefed a draft AIM change outlining pilot procedures to notify ATC when implementing a cold temperature adjustment. This AIM guidance, the draft of which is included here (), will be referenced in both the air traffic control and operational sections of the AIM. John Collins, GA Pilot, asked why an alert to apply a cold temperature correction is not on the approach chart of airports identified as potentially affected. Kel responded that there are no plans to accommodate this as of yet. John stated that the NTAP is not enough in itself and

recommended that FAA use all possible mediums to ensure pilots know when an adjustment is necessary. Mark Steinbicker, AFS-470, stated that the plan is to reinforce pilot awareness for implementation this year, then update the AIM when all data is in. Paul Eure, AJE-31, stated that the ATO will pinpoint controller training to applicable areas. He added there is concern over the cold temperature adjustment table remaining in the AIM only and not being more readily available to pilots. Paul added that they hope to get pilot confidence to use the AFS list and only adjust at those airports. Lev Prichard, APA, asked how MITRE studied impact. Kel provided a brief recap of the process as noted in previous meeting minutes. Several attendees were interested to know if the FAA might ever amend approach charts. Kel responded that a charting update/notification is not out of the question; however, Flight Standards would like more data before pursuing this avenue. Val Watson, AJV-3B, briefed that when the charting specialists first looked at the cold temperature correction process, they also were skeptical regarding sole reliance on the NTAP and AIM for pilot awareness. She stated that to avoid the complications related to the regulatory nature of placing a cold weather alert on individual 8260 source forms, they proposed a process whereby AFS develop a boilerplate notice to send to NFDC that would add an airport to the cold temperature adjustment list. An airport remark, indicating that temperature correction may need to be made, would be added to the National Airspace System Resources (NASR) database and published in the daily National Flight Data Digest (NFDD). Publication of this remark would, in turn, trigger a "cold temp icon" (to be developed) be placed on the affected procedure chart(s). The icon would cue pilots to check the TPP legend where cold temperature procedures and the cold adjustment table would be shown. Tom Schneider, AFS-420, supported using the NFDD for this type procedural charting change as it is fast and non-regulatory. Michael Stromberg, Air Wisconsin, supported an attention symbol saying that if pilots see something new, they will instinctively check it out. Ted Thompson, Jeppesen, commented that when (if ever) a future decision is made to annotate affected airport charts with an icon or a note, the information should be included on an FAA source to “trigger” chart producers to include a notation or cold temperature icon (i.e., “snowflake”) on affected charts. Valerie stated that her proposal, noted above, is that the NFDD would serve as such an FAA source for chart producers. Mark Steinbicker again emphasized that no decision will be made about the inclusion of a chart indicator until some operational experience is gained and feedback has been examined. ACTION: AFS-470.

MEETING 13-02: Kel Christianson, AFS-470, provided a brief history update. A Safety and Risk Management Panel (SRMP), including Flight Standards operations and Air Traffic (AT), was originally scheduled to meet in October but that meeting was delayed by the government shutdown. It has been rescheduled for December. The SRMP will discuss the plan to publish, as a Graphic Notice in the Notices to Airmen Publication (NTAP), a list of affected airports and procedure segments, and required ATC training. Exact time frames for both the meeting and timelines for ATC training development are not available. Kel added that MITRE has revised their runway length data base for affected airports, reducing the original 4000’ down to 2500’. MITRE will run this list through their model and provide an updated list of affected airports. Bill Hammett, AFS-420 (ISI/Pragmatics Contract Support) asked whether implementation is targeted for this winter. Kel responded we will try. Val Watson, AJV-3B, asked if adding the cold temperature icon (snowflake) to affected charts had been approved and Kel responded yes, noting that there will be an exception made for Midway so as not to impact O'Hare. Michael Stromberg, Air Wisconsin, asked whether FAA has any idea how long it will take to get all charts updated with the snowflake. Val responded that this would have to be coordinated within the Terminal Charting Team. Val

also inquired how many procedures are there to change. Kel responded about 135 airports, but that number will increase. Val stated AeroNav products will look at publication scheduling, but the hope is that when the cold temperature remark is published, all procedures at that airport will be worked in a single chart cycle. She added that because this is a non-regulatory action, it can be done fairly quickly. Val also added that Flight Standards needs to supply AeroNav Products with explanatory text to be published in the front matter of the Terminal Procedures Publications (TPP) for the snowflake icon so that users will understand what it means and will go to the NTAP (or AIM) for further guidance. ACTION: AFS-470.

MEETING 14-01: Kel Christianson, AFS-470, provided a brief history on the issue. He reviewed previous ACF discussions and subsequent activities. A Safety Risk Management Panel (SRMP), including Flight Standards operations and Air Traffic (AT), met and discussed the development of a Safety Risk Management Document (SRMD). This document will determine what needs to be done, specifically pilot/controller education. Once the controller education is close to completion, the FAA will place this guidance in the Notices to Airmen Publication (NTAP), and try to get out as much information thru as many organizations as possible. The goal is to be ready for this coming winter. Ted Thompson, Jeppesen, inquired about usage of a "snowflake" on the approach chart. Kel discussed this would have pilots look to front of book to determine if this is a cold temperature restricted airport, and will provide a link to the NTAP for the airport. This icon will be on every approach to the applicable airport. Val Watson, AJV-3, advised that the source for information will be the National Flight Data Digest (NFDD). The plan is to publish an airport remark for each affected facility, advising that cold temperature adjustment may need to be applied below a listed temperature. Publication of this airport remark would prompt the "snowflake" and a numerical temperature value to be charted on all procedures at a given airport. Ted inquired if data will be sourced via NFDD, but not on the 8260 form? Val responded that this is correct and will avoid the necessity of formally amending all affected procedures. Lynette Jamison, AJR-B1, asked about the number of affected airports. Kel responded that the runway length criteria change from 4000 down to 2500 feet increased the numbers and they are still working on the final list. Ted asked if the current temperature notes [such as "For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15 C (5 F) or above 43 C (109 F)."] on the 8260 form will still be there. Tom Schneider, AFS-420, said yes and that the note only applies to LNAV/VNAV approaches. Ted envisioned two pieces of source for one aspect of charting and suggested this may be confusing. Tom said the LNAV/VNAV cold temp limitation note is different than the note Kel is referring to, which applies to altitudes on all procedures. Ted said he understands that, but that implementation will be complex because of the two different source streams of procedural temperature information. He restated his concerns with data capture. Bob Lamond, NBAA, will endorse the AOPA Letter to Airman plan and Kel stated this would be welcome. Gary Fiske, AJV-8, asked who will validate/approve this letter. Group discussion followed, touching on scope, format, dissemination, and charting issues. Tom stated that the issue will remain open, with a lot of work continuing. Rick Dunham, AFS-420, stated that this issue is progressing and the hope is to close (mostly) by end of year.

Status: AFS-470 will continue developing an implementation plan. Item Open (AFS-470).

MEETING 14-02: John Blair, AFS-410, said he has been directed to send the cold temperature NTAP information out for publication on Dec 12, 2014. Valerie Watson, AJV-344, asked Kel Christianson, AFS-470, to brief the Bruce DeCleene, AFS-400, proposal to include separate temperature values for different segments on the approach. Kel briefed that the proposal would involve charting Intermediate (I), Final (F), and Missed (M) cold temperature values, rather than the single temperature previously agreed upon. Valerie asked if we could discuss that, since she had made a charting specification that had already gone thru both Flight Standards and the users, and all had signed off on it. The usefulness of this information to a pilot was discussed and whether this should be documented on the approach chart. Michael Stromberg, Air Wisconsin, said what would be extremely useful with all these digital charts is if the pilot could just enter in a temperature, and then the digital charts would tell you what the new altitude would be. John and Valerie agreed that this would be the simplest for the user, but this would not be possible at this time. Michael said although the FAA is not able to accomplish this, other manufacturers of charts might. After a lengthy discussion, the consensus of pilots in attendance voiced that multiple cold temperature values for the different segments of the approach is not supported. Overwhelming opinion is that this would not be utilized by the pilot and would only add confusion. Lev Prichard, APA, said he would prefer to correct for worst case across the board, so calculation can be made en route, planned and briefed. Charles Wade, Delta Airlines, voiced that multiple temperatures and multiple corrections is far too complicated and requests that the FAA "keep it simple". Ted Thompson, Jeppesen, briefed that at the request of the FAA, he reached out to users, and the overwhelming consensus was to chart the single (warmest) temperature only. The ACF pilot group participants in attendance concurred. Tom verified with Kel that the multiple temperature depiction was a proposal only, suggested by Bruce, and based on input from the group; the FAA will go forward with a single altitude correction value on the chart. Kel said he would inform Bruce that the pilots at the ACF did not support the multiple temperature proposal. John restated that the NTAP cold temperature information should still be in published on 12 December and pilots are expected to know how corrections are to be made. If pilots choose not to correct when an FAA inspector is on board, there will likely be consequences. Tom inquired about the list of affected airports, and asked if they have been NFDD'd? Kel stated he is prioritizing the list of airports. Valerie stated they cannot begin publishing the airport remark in the NFDD until the charting specification is signed off, and that should be happening soon. Kel briefed that he coordinated with Valerie that a maximum of 175 charts (not airports, since some have multiple procedures) will be revised each 8 week cycle. Tom asked Kel about Aeronautical Information Manual (AIM) guidance. Kel advised that AFS-initiated cold temperature guidance will be in the January publication. He also said the ATO would be including some AIM guidance, but was not sure if this would make it into the AIM this January. Rick Dunham, AFS-420, tasked Mason Curling, AFS-405, to ensure the information gets into the AIM (critical). Mason said if info is provided from Kel, he will ensure it is included in the AIM. Michael asked if there is a list of when the chart changes will be published so the airlines will know. Valerie said all of the changes will be in the NTAP in December and will be published incrementally on the charts. Kel restated that the NTAP will document all airports that require correction, regardless of chart publication cycle. He stressed that the approach plate is not the trigger, the NTAP is. Rich Boll, NBAA, said he understands that initially the NTAP will be the only source of temperature correction airports and that have a correction and that corrections are mandatory, but pilots do not always fly with the NTAP in hand. He stated that publishing only an NTAP listing will not be sufficient, and this list needs to be

sourced someplace else also. Kel suggested pilots carry a copy in their flight bag. Rich said this is not feasible, and asked if we could place in the list in the TPP. Valerie said they had discussed placing this list on a web site. Pilots commented about not having internet access on the aircraft. Rich stated with info in the TPP, at least information is in the aircraft, but acknowledged that this was not a perfect solution. Brad Rush, AJV-344, advised this would require the extra information be in all the books, including Florida, where the issue will never be applied. Lev asked why the information would not be disseminated via D-NOTAMs. Tom advised that to his knowledge, the information would not go out as NOTAMs. Michael said the difficulty is enforcing a procedure where there is no cue for the pilot on the approach plate, but they are responsible for compliance. Lynette said NOTAMs could be issued, but questioned whether the pilot community wants 200+ NOTAMs. The group discussed the NOTAM subject, but no clear preference was expressed. Valerie suggested AeroNav Products could issue a Safety Alert to inform users of the affected airports and to point them to the NTAP & AIM for further guidance. She shared that there would also be a list of the airports posted on the AeroNav Products website on the TPP page. Tom asked Rich if this would suffice. Rich said he is concerned about distribution.

Status:
Continue to work AIM/AIP guidance: AFS-470 to keep AFS-420 updated regarding IPH guidance required; AFS-405 will follow up with AFS-470 regarding AIM updates; and AFS-470 to provide a status update at the next meeting. Valerie Watson, AJV-344, will finalize charting specifications, work with AFS-470 to issue a Safety Alert and will keep Jeppesen informed. **Item Open:** AFS-405, AFS-420, AFS-470 and AJV-344

MEETING 15-01: Kel Christianson, AFS-470, briefed that a Notice to Airman Publication (NTAP) was published in December 2014, making cold temperature altitude corrections at cold temperature restricted airports mandatory. The language in the NTAP was changed in Feb 2015 to non-mandatory to allow operators additional training time. In September of 2015, the language in the NTAP will change back to mandatory and cold temperature altitude corrections will become mandatory. An Information for Operators (InFO) was published in Feb 2015 detailing the change. In March 2015, a "snowflake" icon with associated temperature began being placed on affected FAA approach plates and will be completed by March of 2016. The procedures in the NTAP will be evaluated during the 2015/2016 winter season to see if any changes need to be made. If no changes need to be made, the information from the NTAP may be included in the AIM. Rick Dunham, AFS-420, reemphasized all the efforts to promulgate the information, so there should be no surprises. Rich Boll, NBAA, asked if the InFO should be released again, and Kel said he would take the suggestion to his management. Michael Stromberg, Air Wisconsin, asked if there is any change in the airport listing. Kel advised that MITRE is running a new list and he will compare them. Ted Thompson, Jeppesen, questioned if an airport is added to NTAP list, what triggers a NFDD change notifying chart makers of changes? If the list is dynamic, procedures need to be in place for when changes occur for NFDD action to take place. Kel acknowledged this and if a new airport is affected, will send the cold weather airport remark to NFDC for publication. The NASR airport remark will continue to serve as the trigger to add the snowflake and temperature to the charts. Kel asked if Jeppesen will use the snowflake icon and Ted said their policy is to explain in word form vs. icons. Pilots at the ACF said they just need to know if an airport is affected. Michael asked about turnaround time from once an

airport is identified as a cold weather location to the information reaching the chart. Kel stated that the list will be updated each year in time for changes to be published by the fall. Charles Wade, Delta Airlines, inquired about how to get on the notification list for changes so that they had more lead time to react. Ted said if approaches are added, there may be a period where some approaches at an airport have the information on the chart and some do not, and inquired if these criteria will be in TERPS policy; the answer is currently "no" (see comment below about incorporating into an FAA directive or Advisory Circular). Valerie voiced that since the "cold weather" trigger is a NASR airport remark, the snowflake (or in Jeppesen's case, the note) should be added to ALL approaches at that airport. Gary McMullin, Southwest Airlines, brought up ATC issues of not allowing pilots to fly corrected procedures and would like a meeting discussing what is actually happening. Kel said ATC must allow the procedure to be flown, and Gary Fiske, AJV-82, said controllers cannot disapprove a procedure, but ATC can delay. A military participant questioned about military airfields not being in the NTAP. The military said they are not worried about their aircraft since they have procedures; however, they are concerned about the civilian operators flying into military airfields. They are also concerned about GA airports in airspace controlled by military. Tom Schneider, AFS-420, acknowledged a lot of work has been accomplished, and now all of this needs to be quantified into an FAA directive; i.e., Order and/or an Advisory Circular. All the requirements/policies need to be put into writing in addition to the information that goes into the NTAP and AIM/AIP. Ted added that in addition to adding affected military fields, FAA Form 8260-7A (Special instrument approach procedures) needs to be included (since these are not maintained by the same folks).

Status: AFS-470 will review these comments/questions and report back at the next meeting. **Item Open:** AFS-470

MEETING 15-02: Kel Christianson, AFS-470, briefed the original issue regarding cold weather affect on altimeters and the procedures needed to compensate. The FAA worked with MITRE and identified approach procedures affected by cold weather. Those procedures are now listed in the Notice to Airman Publication (NTAP) and procedure plates have been updated to reflect a numerical temperature at which adjustment needs to be made. Cold weather procedures are mandatory this winter at identified locations. Every year the list of affected procedures will be updated using temperature records from the previous five years. The NTAP entry will be revised and an InFO listing the changes will be published. Airports may be added, deleted or the specific numerical threshold temperatures may be revised in this annual reassessment and will precipitate revised National Flight Data Digest (NFDD) airport remarks and resultant chart changes. Rich Boll, NBAA, inquired about Midway Airport in Chicago, where all approaches have a snowflake icon, yet a cold temp adjustment does not apply to all the approaches. Kel stated why this happens and Rich understood, but noted when a snowflake is charted on "all" the approaches at the airport, the pilot would apply the temp correction to all approaches. Kel said the wording at the front of the TPP will be changed to reflect more clearly what is meant (i.e., Cold Temperature adjustment "on this approach" will be revised to "at this airport."). The disparities at Midway occurred because of O'Hare traffic separation issues, and Gary Fiske, AJV-82, added that. Midway is unique and he does not see this happening anywhere else. Kel said if any pilot decides to correct at a different temperature, rather than the NTAP value (or if no correction value is published), they will likely encounter delays by ATC. Kel said the intent is to release a new NTAP in

the late summer or early fall every year with the annual changes. Gary said some FAA Order JO 7110.65 (and AIM changes) did not make the cut-off for publication, so a notice may be issued to bridge the gap. Ted Thompson, Jeppesen, advised that he is receiving a lot of feedback on the number of removed and added airports in the program and those with only a one-degree change. He also voiced that users are confused by the cold temperature values and those in the Baro-VNAV notes. Kel said he is willing to handle any questions and that user concerns could be referred to him. A general discussion followed touching on issues/concerns such as: should AFS-470 put FAQs on their web site? (Kel will consider); the opportunity for miscalculation of numbers in the cockpit (i.e., should the numbers be in the NAV data base?); speculation that some concerns may arise or be alleviated once procedures have actually been utilized; application of cold temp correction to procedure segments vs. the entire procedure; and lack of time to preplan in case of diverted destination. Kel proposed the issue be closed, saying that it is his position that the original ACF issue has been addressed and any new items related to cold temperature should be submitted as new ACF agenda items or via other means. He said that even though the issue is closed in the ACF, his office will provide support for any Cold Temperature related issues. Tom Schneider, AFS-420, suggested that all participants give the program two years, determine whether changes are needed and if so, bring them forth as new agenda items.

Status: Item Closed.