Leadership on the Flight Deck: The Influence of Crew Social Relations and Crew Member Experience on Leadership Style Effectiveness in Civil Aviation Flight Crews

by J. R. Harris, B.Sc., M.Sc., and H.C. Muir, M.A., Ph.D.

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"The views expressed herein are those of the authors alone and do not necessarily represent those of the Institute."
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SUMMARY

Effective leadership is now recognised as a major influence of flight crew performance. However, little empirical research has centred on what constitutes effective leadership style on the flight deck.

Following research on other work groups, this study examined the proposition that, rather than one leadership style being "universally ideal", the effectiveness of a given style is determined by the "group" situation in which the leader finds himself.

To this end, a survey of civil aviation captains was conducted, eliciting descriptions of incidents in which the respondent felt his leadership to be most effective. Details of leader-member social relations and crew member experience were included. In addition, leadership style of each respondent was assessed by the Least Preferred Co-worker (LPC) scale. (High LPC scores are theorised to indicate primary concern with establishing good working relations in the group. Low LPC scores indicate primary concern with orderly task completion)

Based on 20 respondents, analysis indicated a greater tendency of task oriented (low LPC) leaders to report maximal effectiveness in conditions of good crew relations and positive experience gradients, when compared with their relationship oriented (high LPC) peers.

Whilst these differences conformed to predictions from earlier research, they did not reach statistical significance.

However, when a further analysis isolating co-pilot experience and leadership style was conducted, a statistically significant result was obtained. The analysis showed a clear trend for task oriented leaders to report maximal effectiveness in crews with co-pilots of moderate experience levels. In contrast relationship oriented (high LPC) leaders tended to report their maximal effectiveness, when commanding relatively experienced or inexperienced co-pilots.

Whilst limitations imposed by the small sample size were noted, it was concluded that the findings did demonstrate the effectiveness of leadership style on the flight deck to be "situationally specific", particularly in regard to co-pilot experience levels.

Implications of the findings, in terms of promoting flight crew performance, were discussed with reference to possible rostering programmes and leadership skills training.
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INTRODUCTION

Whilst Civil Aviation has been successful in improving its safety standards to the current high levels, there remains a concern with "Human Error" on the flight deck. This concern is widely recognised, as evidenced by the industry's continuing efforts to instigate and support Human Factors research projects.

However, it is of note that the majority of the research has centred on the performance of flight crew members as individuals. In contrast, comparatively little attention has centred on the performance of flight crew members in terms of their integrated performance, i.e. the effectiveness of their teamwork or co-ordination. In his very recent paper, Kohn (1985) notes, "The world of airline flying is a literary desert with regard to guidance on how people feel, interreact or respond to one another." (p. 8)

This is despite the fact that the accident investigation bodies, from both sides of the Atlantic, have cited co-ordination problems as a contributory factor in a number of accidents, e.g. the Boeing 727 at Tenerife in 1980 (AIB, 1981); the McDonnell-Douglas DC-8 at Portland, Oregon in 1978 (NTSB 1979). Indeed, Jackson (1983) has reported that, in the last ten years, approximately 60% of all air carrier accidents have had, as one causal factor, some aspect of poor crew co-ordination.

These data clearly indicate a need for further investigation of co-ordination problems, with particular emphasis on identification of factors which influence co-ordination effectiveness in flight crews.

Central to the current study was the assumption that effective leadership was one such factor. This assumption is supported by recognition of effective leadership as a necessary prerequisite in pilots promotion to captain (Holdstock, 1980; Grob, 1980), and by the fact that an increasing number of airlines that are adopting a leadership skills programme into command training, (Foster & Garvey, 1980; Bowles, 1985).

However, as Foster & Garvey note, there has yet to be agreement on what constitutes effectiveness leadership on the flight deck.

Research on other work groups does shed some light on this problem. Interestingly, findings indicate that rather than one leadership style being ideal in all situations, the effectiveness of a given leadership style is dependent on the situation in which the leader finds...
himself. In other words leaders of differing styles can be equally effective, provided they are "matched" to an appropriate situation.

These findings have been formalised in the Contingency Model of leadership (Fiedler, 1967). The model also aims to provide operational definitions of leadership style and the situational differences, discussed above.

Leadership style is assessed by the Least Preferred Co-Worker (LPC scale). High scores on the scale are theorised to indicate extreme relationship oriented leadership i.e. a leader whose primary concern is to establish good relations within his work group. Low LPC scores indicate a leader of extreme task orientation, i.e. a leader whose greatest concern is successful completion of the group's task through strict adherence to standardised work procedures.

The relative effectiveness of the two approaches to leadership depends on the degree of control and influence which the leader exerts on the group's performance. (termed situational control)

At a theoretical level, the Contingency model postulates that situational control levels should be divided into three zones (high, moderate and low). On this basis, the relative effectiveness of high and low LPC leadership styles are theorised to be as shown in fig 1

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**Fig 1 The Relative Effectiveness of High and Low LPC Leaders, under Conditions of High, Moderate and Low Situational Control (from Fiedler, 1977)**

As shown in Fig 1, high LPC leaders are theorised to be maximally effective in conditions of moderate situational control, whereas low LPC leaders are most effective when situational control falls in the high or low zones.
It is this contingent relationship between leadership style and situational control, as defined by the Contingency Model, which the current study investigated, in relation to flight crew co-ordination levels.

As discussed above Contingency model research has universally used the LPC scale for operational definition of leadership style. However, in order to quantify situational control levels, research has used a variety of subscales, each scale relating to factors concerning the nature of the groups' task or attributes of the groups' members. For the purposes of the current study the number of these factors was limited to three, whose selection was determined by the following criteria.

Firstly, the variable has been discussed, in accident analysis, as contributory to crew co-ordination problems.

Secondly, the variable has been discussed in relation to the Contingency Model, and was likely to vary across flight crews.

The three selected factors were as follows.

1) Group atmosphere. Group atmosphere has been defined as the level of loyalty, dependability and support which is accorded to the leader by his co-workers. Group atmosphere was discussed in accident analyses by the NTSB (1975) and ALPA (1978). Considerable research (e.g. Fiedler, 1955) has suggested that good group atmosphere is associated with high situational control levels, whereas poor group atmosphere tends to fall within the moderate or low situational control zones.

2) Co-pilot experience. The AIB (1974) concluded that low co-pilot experience was a primary contributory factor in the Staines crash of a Trident G-ARPI. In terms of the Contingency Model, little empirical research has been conducted on this factor. However, Fiedler (1972) has theorised that subordinates experience levels are related to situational control levels, although the nature of the relationship has not been subjected to empirical investigation.

3) Experience gradient. For current purposes, experience gradient was defined as the relative levels of the captain's experience as an aircraft commander and the co-pilots experience level, and quantified by subtracting co-pilots experience from the captains experience. Experience gradient was implicated in the 1977 Tenerife accident by the ICAO (1978).

In terms of the Contingency Model, little concern has been directed at experience gradient, per se. However,
METHODOLOGY.

Overview.
The study adopted survey techniques, with a questionnaire being distributed to civil aviation captains. In general terms, the questionnaire was designed to elicit data on an incident in which the respondent felt his leadership to be of greatest effectiveness, in conjunction with assessment of his leadership style (LPC score). Details of the sampling and questionnaire are given in the following sections.

Sampling.
The questionnaire was distributed through the co-operation of the Guild of Air Pilots and Air Navigators (GAPAN), and thus the sample was drawn from its members, within the constraint that they should currently hold the rank of captain and be flying in civil aviation operations. A total sample of 60 were contacted.

Questionnaire Description.
The questionnaire was distributed, appended to an introductory letter, requesting respondents to participate in a survey on crew co-ordination and containing assurances of anonymity and confidentiality.

The questionnaire consisted of four sections

Section 1 Details of the respondent's experience in civil aviation.

Section 2. An LPC scale of standardised format from Fiedler, 1967

Section 3 Description of an incident, occurring within the last year, in which the respondent felt his leadership to be of greatest effectiveness in promoting good teamwork within his flight crew. Items included a Group Atmosphere scale, a standardised instrument (Fiedler, 1967) which has been widely used to assess leader-member relations. The section also requested details of other crew members rank and experience on the selected incident.

Section 4. A self perception measure of leadership style in terms of task and relationship orientation. This section was included for research into the properties of the LPC scale. As this is not of immediate relevance to this report, and for the sake of brevity, this section is not discussed further.

A copy of the full questionnaire is included in Appendix A.
Questionnaire Distribution.

Questionnaire distribution was accomplished by post. Random selection of the sample was undertaken by GAPAN, who also undertook the distribution.

Questionnaire return was also by post, with each respondent being given a freepost envelope addressed to the Applied Psychology Unit at Cranfield. No follow-up mailings were made to respondents who initially failed to return questionnaires.
RESULTS.

Response Rates.
A total of 26 completed questionnaires (43%) were returned within two months of distribution. However, time constraints for research completion dictated that only data received within one month could be included in the analysis. On this basis, the results are based on 20 completed questionnaires, received within this time limit.

Situational Specificity of Leadership Style Effectiveness
The analysis took the form of categorising respondents, according to the levels of the situational control factors as indicated in the incident description, and examining differences in leadership style (LPC scores) between the groups so formed.

Separate analyses, relating to each of the three situational control variables were undertaken, and the results of each analysis are described below

1) Leader-member Relations. Respondents were categorised into low and high leader-member relations groups on the basis of a median split of Group Atmosphere scores. Thus two groups of ten respondents were formed.

The mean LPC scores of the two groups, formed on this basis are shown in Fig. II

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<th>30</th>
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Fig II Mean LPC Scores of Respondents, reporting Maximal Leadership Effectiveness in Conditions of Low and High Leader-member Relations.

As can be seen from Fig II, LPC scores of captains, reporting their leadership to be most effective at low
levels of leader-member relations, tended to be higher than those of their counterparts, who reported maximal leadership effectiveness under conditions of high leader-member relations. However, subsequent analysis indicated that the difference between groups did not reach statistical significance (p>0.05).

2) Experience levels of co-pilot and flight engineer. Only seven respondents chose to report an incident involving a three man crew operation. As such, it was concluded that this constituted insufficient data for analysis of flight engineer experience to be included in the analysis. Thus, this section refers only to co-pilot experience levels.

Initially, it was intended that the analysis should follow that of leader-member relations, in categorising respondents into two groups.

However, inspection of the data suggested a curvilinear relationship between LPC scores and co-pilot experience levels. Thus, co-pilot experience levels were categorised into three groups of approximately equal ranges, namely 3 to 9 years (low experience), 10-15 years (moderate experience), and 16-21 years (high experience).

Mean LPC scores of each group are shown in Fig III.

![Graph showing Mean LPC scores of Respondents, reporting Maximal Leadership Effectiveness under Conditions of Low, Moderate, and High Co-pilot Experience Levels.](image-url)
As shown in Fig III, the findings indicated a trend for captains with relatively low LPC scores to report maximal leadership effectiveness in crews with co-pilots of moderate (10-15 years) experience. In contrast captains with relatively high LPC scores reported their leadership to be most effective in crews with relatively inexperienced or very highly experienced co-pilots.

Subsequent analysis of LPC scores between groups did indicate that differences did reach statistical significance (p<0.05).

3) Experience gradient. Experience gradient levels were assessed by subtracting co-pilot experience levels from the captains experience as an aircraft commander.

For the purposes of analysis, the incidents were then categorised into two equal sized groups on the basis of an experience gradient median split.

In fact, due to the distribution of experience gradient levels, this resulted in one group containing reports of incidents with negative gradients, and the second group containing reports of incidents with positive gradients.

The mean LPC scores of each group are shown in Fig IV.

![Graph showing LPC scores]

**Fig IV Mean LPC Scores of Respondents, reporting Maximal Leadership Effectiveness under Conditions of Negative and Positive Experience Gradients.**

As can be seen in Fig IV, captains reporting maximal leadership effectiveness in crews with negative experience gradients tended to have higher LPC scores than their counterparts who reported their leadership to be most effective in crews with positive gradients.

However, differences were found not to be statistically
significant (p > 0.05)
DISCUSSION

It was the primary purpose of this study to test the validity of the Contingency Model of leadership, in application to civil aviation flight crews, i.e. to determine whether maximal leadership effectiveness is achieved by matching the "appropriate" leadership style to levels of situational control.

Each of the three characteristics, considered by the study as determining situational control levels on the flight deck, are discussed in the following paragraphs.

With reference to leader-member relations, the findings indicated that leaders reporting maximal effectiveness in conditions of low leader-member relations tended to have higher LPC scores than their counterparts, who felt their leadership to be most effective in crews with high leader-member relations, i.e. the data show a trend for task oriented (low LPC) leaders to report effective leadership when leader-member relations are good, and relationship oriented (high LPC) leaders to perceive their leadership to be most effective when leader-member relations are relatively poor.

The direction of this difference accords with Contingency Model prediction, in that high LPC leaders are theorised to be most effective in situations of moderate situational control, a zone in which low leader-member relations is theorised to fall. In contrast, conditions of high leader-member relations are theorised to fall in the zone high situational control, in which low LPC leadership is deemed most effective.

However, it must be noted that the differences in LPC scores between the groups did not reach statistical significance (p>0.05), precluding any firm conclusions as to the effect of leader-member relations on leadership style effectiveness.

Two explanations can be offered for this finding.

Firstly, it may be due to the relatively small sample size, on which the analysis was performed, which reduced the "power" of the research design.

Secondly, whilst Fiedler presents a generalised position that leader-member relations are an important determinant of situational control, he has suggested that certain work groups may be atypical, particularly when the task is extremely well defined (Fiedler et al., 1976). In that flight crews do perform a task which does have a high degree of definition (standard operating procedures) this
may explain the failure to establish leader-member relations as a determinant of situational control levels.

The validity of each explanation could be tested by further research, conducted on a larger scale.

With reference to subordinate crew members experience, the relatively few incidents involving three man crews lead to the analysis centring on co-pilot experience only. In these terms, findings indicated a trend for captains, reporting maximal leadership in crews with relatively inexperienced or highly experienced co-pilots, to have relatively high LPC scores, i.e relationship oriented leadership. Captains with low LPC scores, indicating task orientation, tended to report their leadership to be most effective in crews with co-pilots of moderate experience.

Differences in LPC scores, between the three groups were found to be statistically significant, (p<0.05) supporting a conclusion that co-pilot experience levels were a determinant of situational control, and thus leadership style effectiveness.

In terms of the zonal definition of situational control, the superiority of high LPC leadership in crews with relatively inexperienced and highly experienced co-pilots would suggest that crews in both these categories fall in the moderate control zone.

The superiority of low LPC leaders in crews with co-pilots of moderate experience indicate that these crews could fall into either the low or high control zones.

However, the fact that Fiedler (1972) has theorised that the presence highly experienced subordinates reduces control levels and that, as argued above, highly experienced co-pilots constitute moderate control levels, it can be concluded that crews with moderately experienced co-pilots fall in the high control zone.

This has interesting implications, in terms of effective leadership behaviour on the flight deck.

Thus far, interpretation of LPC scores has been undertaken in terms of leadership style rather than behaviour. Leadership style concerns the "motivation structure" of the leader, with low LPC (task oriented) leaders primarily concerned with task completion, with the establishment of good crew relations as a secondary concern. The hierarchy is reversed in high LPC (relationship oriented) leaders. The expression of either motivation, in behaviour, is dependent on the
certainty that the leader’s primary motivational goal can be achieved.

In conditions of moderate or low situational control, achievement of that primary goal is relatively uncertain, and thus is retained as the primary concern. Thus it is the primary goal that finds expression in behaviour. However, in conditions of high control, achievement of the primary goal is relatively certain, and the leaders concern becomes centred on the secondary goal, which then finds expression in overt behaviour.

In terms of the findings, analysis suggests that high LPC leaders are superior with co-pilots of either high or low experience co-pilots, i.e. conditions of moderate control. In that high LPC leaders are primarily relationship oriented and that in conditions of moderate control leaders behaviour is directed by the primary motivation, it can be suggested that relationship oriented behaviour may be most effective in these crews (i.e. behaviour characterised by considerate treatment of crew members and being friendly and approachable (Rice, 1973).

With reference to crews with moderately experienced co-pilots, as argued above, captains of these crews find themselves in conditions of high control, i.e. conditions in which the secondary motivation determines behaviour. In that the findings indicate the superiority of low LPC (task oriented)leaders, who in these conditions find their secondary motivation expressed in behaviour, it is suggested that relationship oriented behaviour is also most effective in these crews.

Thus the findings can be interpreted as indicating that relationship oriented behaviour may be "ideal" in all crews, although it is to be noted that such behaviour will only occur when leadership style and co-pilot experience is appropriately matched.

Whilst such a conclusion must be tentative, without further research on leadership behaviour, per se, it is supported by earlier research on crew co-ordination problems. Wheale (1983), in a survey of crew co-ordination problems, reported that captains behaving in "autocratic and abrasive" manner were perceived as a common reason for co-ordination break down. In that such behaviour could be considered the antithesis of relationship oriented behaviour, the findings of the two studies are in accord.

With reference to experience gradient, the analysis paralleled that of leader-member relations, in that the respondents were divided into two groups according to
experience gradient levels. Due to the distribution of the variable, this resulted in one group with positive values and the second group with negative values.

Differences in mean LPC scores between the groups, indicated a trend for captains in the negative gradient group to have higher LPC scores than their counterparts in the positive experience group.

This direction of this difference between groups again accords with the Contingency model, following the assumption that positive experience gradient constitutes a higher level of situational control than negative experience gradient conditions.

In that the higher LPC scores associated with negative gradients suggest that this constitutes moderate control zone conditions, it follows that positive gradient conditions fall in the high control zone, and can thus be predicted to be associated with low LPC scores, according with the findings.

However, again it must be noted that differences in LPC scores did not reach statistical significance. As with the leader-member relations analysis, the two explanations of inadequate methodological "power" or the fact that experience gradient does not affect situational control levels can be put forward. As with the earlier analysis, further research, on a larger sample, is required to test between the validity of the two possibilities.

It is of interest to note that the reported incidents, which by definition were incidents of effective co-ordination, showed a considerable range in the experience gradient continuum.

This range would suggest that effective co-ordination can be achieved, regardless of the experience of the crew, and that the implication of experience gradient, per se, as a cause of co-ordination problems (e.g. AIB, 1973; ICAO, 1978) could be questioned.

Rather, the findings of this study would suggest that co-ordination problems, associated with experience levels of crew members, are mediated by the leadership style of the captain, i.e. crew co-ordination breakdown occurs when a crew of given experience level are commanded by a captain with the inappropriate leadership style.

The implications of these findings, particularly in terms of promoting effective crew co-ordination, are discussed in the following section.
CONCLUSIONS

Whilst reservations on the small sample size, particularly in relation to three man crews, must be noted, the findings of this study do suggest that Fiedler’s Contingency Model of leadership is valid in relation to civil aviation flight crews, i.e. the effectiveness of a given leadership style is dependent on situational variables, with co-pilot experience being of primary importance.

In terms of promotion of effective co-ordination on the flight deck, this conclusion has interesting implications, in that it suggests that captains cannot be classified as good or bad leaders, but rather that all can be equally effective, provided that they are matched with the appropriate crew in which their leadership style is most effective.

Two methods of achieving this end can be suggested.

Firstly, and most simply, attention could be given to rostering practices.

As discussed by the AIB (1973), airlines have considered the necessity of ensuring that crew rostering avoids allocation of inexperienced crew members to the same crew (e.g. the "Brown Line" system of British Airways)

The Contingency Model would suggest that the second factor of leadership style should also be included for consideration. By this means appropriate matching of leadership style and crew member experience could be ensured, maximising leadership effectiveness and thus crew performance.

The second technique entails leadership skills training. Interestingly, Fiedler argues that leadership style is dispositional in nature, and thus resistant to change through training. However, he does suggest that the leader can be trained to "engineer his situation" by adopting behaviours which can change situational control levels to those appropriate to his leadership style.

Training, following these guidelines have been reported as successful in other work groups (reviewed by Fiedler & Mahar, 1979)

This training has been undertaken by means of a "self teaching" manual (Fiedler & Chemers, 1984) which includes guidance on self assessment of leadership style and situational control level, together with suggestions of techniques for situational control adjustment.
The manual, being 250 pages long and reckoned to require 4-8 hours for use, provides a cost effective and easily instigated leadership training programme.

Clearly, further research testing the validity of the Contingency Model, is required before either of these methods is adopted in practice. However, it is hoped that the findings of this study shed some light on the question of effective leadership on the flight deck, and thus suggest the means of improving flight crew efficiency to levels exceeding the current high standards.
ACKNOWLEDGMENTS

The authors would like to express their particular thanks to Captain P. Wilson of GAPAN, both for his keen interest in the research project, and for his assistance in questionnaire distribution.
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Management on the Flight Deck. NASA Conference Publications, 2120


ICAO (1978) KLM, B-747, PH-BUF, & Pan Am, B-747, N736, Collision at Tenerife Airport, Spain on 27 March 1977. ICAO Circular 153-AN/56


APPENDIX A

The full text of the questionnaire and covering letter are reproduced on the following pages
My Ref QUESTL:6

FLIGHT CREW CO-ORDINATION SURVEY

You have been contacted in order to request your co-operation in research, which is centred on crew co-ordination on the flight-deck. The research programme is based on a survey, aimed at identifying factors which promote good co-ordination on the flight deck, and thus, effective performance of flight crews as cohesive integrated teams.

The research is being conducted by Cranfield Institute of Technology, after consultation with the Institute of Aviation Medicine. Your name was selected entirely randomly from a list of Captains, maintained by GAPAN, along with approximately 45 others. It is with GAPAN’S co-operation that you have been contacted.

Any information which is provided to us will be treated in a completely confidential manner. In fact, researchers conducting the analysis will remain unaware of the identity of those with whom contact has been made. That information can remain with GAPAN only.

If you decide to help with the research, please complete the attached questionnaire. This should take no more than 10 minutes of your time. Work through the items in the order in which they are presented. Follow the incorporated instructions, until the questionnaire is finished.

Completed questionnaires can be returned in the attached envelope. No stamp is required.

If you require more information on this research, please contact either myself or Dr. Helen Muir at the Applied Psychology Unit. The address and phone number are given above. In addition, a summary report, outlining the rationale of the research and its findings, will be available from GAPAN, when the research is completed.

Thank you for your co-operation.

John Harris (Research Organiser)
FLIGHT CREW CO-ORDINATION QUESTIONNAIRE

FORM I  For completion by Captains  Ref QUESTC:3

SECTION 1
Career to date

Fill in the following details. (Use the boxes provided)

Age  [ ] 1.2
Years on current aircraft type  [ ] 3.4
Years since promotion to Captain  [ ] 5.6
Total years flying in civil aviation  [ ] 7.8

SECTION 2
This next set of items concerns differences in the ways people think about those with whom they work. This may be important in working with others.

Throughout your life you will have worked in many groups with a wide variety of different people - on your job, in social groups, in church organisations, in volunteer groups, on athletic teams, and in many other situations. Some of your co-workers may have been very easy to work with in attaining the group's goals, while others were less so.

Think of all the people with whom you have ever worked, and then think of the person with whom you could work least well. He or she may be someone with whom you work now, or with whom you have worked in the past. This does not have to be the person you liked least well, but should be the person with whom you had the most difficulty getting the job done. the one individual with whom you could work least well

Describe this person on the scale which follows by placing an "X" in the appropriate space. The scale consists of pairs of words which are opposite in meaning, such as "Very Neat" and "Very Untidy". Between each pair of words are eight spaces to form a scale like this:

Very Neat  8 7 6 5 4 3 2 1  Very Untidy
Thus, if you ordinarily think of the person with whom you work least well as being "Quite Neat", you would mark an "X" in the space marked 7, like this:

Very Neat: ______:______:______:______:______:______:______:______:______:
Very Untidy

8 7 6 5 4 3 2 1

If you ordinarily think of this person as only being "Slightly Neat", you would put your "X" in space 5.

Look at the words at both ends of the line before you mark your "X". There are no right or wrong answers. Work rapidly; your first answer is likely to be best. Please do not omit any items, and mark each item only once.

Now, describe the person with whom you can work least well on the scales below.

Pleasant: ______:______:______:______:______:______:______:______:______:______:
Unpleasant

Friendly: ______:______:______:______:______:______:______:______:______:______:
Unfriendly

Rejecting: ______:______:______:______:______:______:______:______:______:______:
Accepting

Helpful: ______:______:______:______:______:______:______:______:______:______:
Frustrating

Unenthusiastic: ______:______:______:______:______:______:______:______:______:
Enthusiastic

Tense: ______:______:______:______:______:______:______:______:______:
Relaxed

Distant: ______:______:______:______:______:______:______:______:
Close

Cold: ______:______:______:______:______:______:
Warm

Cooperative: ______:______:______:______:______:______:______:
Uncooperative

Supportive: ______:______:______:______:______:
Hostile

Boring: ______:______:______:______:
Interesting

Quarrelsome: ______:______:______:
Harmonious

Self-assured: ______:______:
Hesitant

Efficient: ______:______:
Inefficient

Gloomy: ______:
Cheerful

Open: ______:
Guarded
SECTION 3

Previous research has shown that effective management of work groups is dependent on many factors. We are interested in descriptions of flight crews where management of the crew by the command pilot helped to promote good crew co-ordination.

From your experiences on the flight deck, in command of a commercial flight during the last year, think of an occasion on which you feel that your management helped to increase the level of co-ordination amongst crew members, i.e. the degree to which crew members were working as an integrated team.

Please describe the "atmosphere" on the flight deck during that flight, by checking the following items. Use the same procedure as in Section 2.

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</tr>
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<td>Productive</td>
<td>Nonproductive</td>
</tr>
<tr>
<td>Warm</td>
<td>Cold</td>
</tr>
<tr>
<td>Cooperative</td>
<td>Uncooperative</td>
</tr>
<tr>
<td>Supportive</td>
<td>Hostile</td>
</tr>
<tr>
<td>Interesting</td>
<td>Boring</td>
</tr>
<tr>
<td>Successful</td>
<td>Unsuccessful</td>
</tr>
</tbody>
</table>

On the occasion you have just described, please give the following details of the other crew members.

Rank of other pilot

Estimated years of experience of other pilot in Commercial Aviation.

Were you operating a three man crew

(Tick appropriate box)

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>42</td>
</tr>
</tbody>
</table>
Rank of third crew member

Estimated years of experience of third crew member in Commercial Aviation

SECTION 4
Research has shown that leaders of work groups differ in the style of leadership which they "typically" adopt, ranging from extreme "task orientation" to extreme "relationship orientation". Both styles have been shown to be effective, in terms of promoting good group performance.

Task oriented leaders are strongly motivated to accomplish successfully any task to which they have committed themselves. Thus, their primary concern is to ensure adherence to standardised work procedures, whilst the state of relations between themselves and their co-workers is considered to be of secondary importance. In contrast, Relationship oriented leaders primarily concern themselves with establishing good relations between themselves and their crew, on the assumption that this will result in efficient teamwork and thus effective task completion.

On the basis of these definitions, please rate your leadership style on the scale below.

Task Oriented

Relationship Oriented

THAT COMPLETES THE QUESTIONNAIRE
THANK YOU FOR PARTICIPATING IN THIS SURVEY