Date: December 8, 1995

To: Distribution

From: Mission Operations and Systems Development Division (MOSDD) Configuration Management Office (CMO)

Subject: LANDSAT 7 Processing System (LPS) Critical Design Review (CDR)

The LPS CDR was held on November 29, 1995 at the Goddard Space Flight Center (GSFC), in the building 3 auditorium at 0830.

NOTE

LPS CDR Review Item Dispositions (RID's) are to be forwarded to Mr. P. Province/Code 517.7/GSFC no later than December 8, 1995.

Reviews	**Date Held**
System Requirements Review	September 1994
SDR/SSR	March 1995

Documentation Deliveries	**Schedule Date**
LPS/IAS ICD	1/13/96

Software Release	**Schedule Date**
Release 1	11/96
Release 2	3/97

The following is the current status of RIDs submitted for the LPS SRR and PDR:

All LPS SRR and PDR RIDs were approved and are closed.

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P. Province/MOSDD CMO

Attendance:

Technical Review Team

L. Kidd/510.1/Bldg. 3 (Chair)
J. Henegar/514.1/Bldg. 23 (ATR)
J. Andary/430/Bldg. 16W
S. Covington/430/Bldg. 16W
M. Butler/504/ Bldg. 12
T. Ackerson/505/Bldg. 32
W. Potter/511.1/Bldg. 3
T. Bialas/514.2/Bldg. 23
A. Caroglanian/531.2/Bldg. 12
J. Irons/923/Bldg. 22
J. Ellickson/NOAA
M. Mignogno/NOAA

Other Attendees

W. Daku/300.1/ Bldg. 16W
R. OBrien/300.1/Bldg. 25
B. Mack/301/Bldg. 6
R. Calvo/303/Bldg. 12
K. Dolan/430/Bldg. 16W
L. Gonzales/430/Bldg. 16W
S. Jurczyk/430/Bldg. 16W
M. Jurotich/430/Bldg. 16W
H. Mittelman/430/Bldg. 16W
F. Stone/430/Bldg. 16W
D. Knapp/501/Bldg. 16W
D. Giblin/510/Bldg. 23
C. Coene/512.1/ Bldg. 3
E. Beard/514/Bldg. 23
C. Brambora/514.3/Bldg. 23
M. Dowdy/514.3/Bldg. 23
J. Hosler/514.1/Bldg. 23
E. Lee/514.3/Bldg. 23
J. Schmidt/514.3/Bldg. 23
W. Gustafson/515.3/Bldg. 3
P. Spidaliere/704.1/Bldg. 16W
J. Wolfgang/704.2/Bldg. 5
J. Brophy/ATSC/Columbia
M. Bucko/ATSC/GCP
T. Cooke/ATSC/GCP
R. Gray/ATSC/510 CMO/Bldg. 23
L. Herren/ATSC/GCP
P. Province/ATSC/510 CMO/Bldg. 23
H. Kim/Century Computing
S. Addess/CSC/GreenTec IV
T. Aslam/CSC/GreenTec IV
C. Bauer/CSC/Laurel
S. Chou/CSC/GreenTec IV
D. Denzler/CSC/GreenTec IV
D. Ferry/CSC/GreenTec IV
S. Gottsagen/CSC/GreenTec IV
L. Gupta/CSC/GreenTec IV
C. Ho/CSC/GreenTec IV
N. Ho/CSC/GreenTec IV
M. Huang/CSC/GreenTec IV
R. Kieckhefer/CSC/519.2
P. Liebrecht/CSC/Laurel
R. Rensvold/CSC/GreenTec IV
D. Riggs/CSC/GreenTec IV
E. Staples/CSC/GreenTec IV
R. Tingley/CSC/GreenTec IV
V. Trinh/CSC/GreenTec IV
J. Williams/CSC/GreenTec IV
M. Wong/CSC/GreenTec IV
I. Wu/CSC/GreenTec IV
K. Allender/EDC
S. Marthaler/EDC
T. Mittan/EDC
J. Brown/EOS
G. Henely/Intermetrics/505
M. Ainloo/J&T/430

R. Kutz/J&T/430
R. Rhoades/J&T/430
G. Theodorakos/J&T/430
T. Arvidson/LMC/430
R. Forsht/LMC/430
M. Barbour/LORAL/ GreenTec IV
D. Crehan/LORAL/ GreenTec IV
E. Harsch/LORAL/ GreenTec IV
V. Kern/LORAL/ GreenTec IV
D. Studenick/MDA/430
G. Burdett/RDC
W. Hembree/SCASS
B. Gambuir/SSAI/923
R. Irish/SSAI/923
S. Johnson/SSAI/923
J. Donley/SWALE/430/Bldg. 16W
H. Wong/SWALE/430/Bldg. 16W

LANDSAT 7 PROCESSING SYSTEM (LPS) TECHNICAL REVIEW TEAM (TRT)
MEETING NOVEMBER 29, 1995 TO CONDUCT THE CRITICAL DESIGN REVIEW (CDR)

Pertinent questions/answers and comments that transpired during the LPS TRT meeting to conduct the LPS CDR are contained herein.

Introduction - J. Henegar/514.1

(No significant questions or comments.)

Design Overview - R. Schweiss/514.3

1. Question: What is the objective of the Moving Window Display?
Answer: It gives the operator confidence that the scene is what is expected. (R. Schweiss)

Comment: This provides the capability to look at a display before it goes to the DAAC. This meets all LPS requirements. There is no requirement for the LPS to provide real-time quality and accounting. There is no real-time commanding occurring during X-band downlinks therefore it is sufficient for the Landsat 7 Ground System to provide quality and accounting statistics post pass. (J. Henegar)

2. Question: Do Radiometric Corrections on the data need to be performed before cloud cover computations? (J. Andary)

Answer: Yes. (R. Schweiss)

Question: Is this a timing problem for performing cloud cover? (J. Andary)
Answer: No. (R. Schweiss)

3. Question: Will browse image be Radiometric corrected?
Answer: Yes. (J. Henegar)

4. Comment: We are still looking at partial scene processing.

5. Question: Do scene corners include overlap?
Answer: I am not sure. I will check on this. (R. Schweiss)

Comment: It does include overlap. (R. Irish)

6. Question: Have you looked into automation for coordinating times so scenes will not be lost?
Answer: Yes, this is being handled. (R. Schweiss)

7. Question: When does clock drop occur? (W. Mack)
Answer: We always have clock from LGS between AOS and LOS. We can handle any bad data that is received, due to clock drop problems. (C. Brambora)

Comment: The LPS is slaved to the LGS's clock-- in other words, when the LGS has bit sync. lock it gives the LPS clock and data for immediate recording. If the LGS chooses to drop the clock during data drop-outs then the LPS will stop recording data until clock returns. The only caveat is that the LPS must be in a "data capture mode" waiting for data. (R. Schweiss)

LPS Output File Formats - T. Aslam/CSC

8. Question: What does the “X” define in the file name?
Answer: It identifies the X-band frequency; 1, 2, or 3. (T. Aslam)

9. Question: Will the file name go to the customer?
Answer: Yes, this is an option when subinterval files are ordered, i.e. the same files as received from LPS.

However, if a scene product is ordered, a new name will be assigned. (B. Harsch)

10. Question: How do you search through the Medadata for a scene?
Answer: There are various parameters to choose from.

Question: How does file name identify a scene for the user?
Answer: It doesn't, the LPS file name is designed to support data transfer from the LPS to the LP DAAC. (B. Harsch)

Comment: This issue will be explained during the presentation on Medadata. (J. Henegar)

11. Question: What if a scene is arbitrarily split by the LPS, due to file size limits?
Answer: It is only a physical break, not a logical break. (J. Henegar)

12. Comment: We are reprocessing on a contact period basis. (T. Aslam)

Comment: Reprocessed data is not linked to the original data in the archive. The metadata for both original and reprocessed subintervals should provide the relationship. (B. Harsch)

13. Comment: All band files are separate files. (T. Aslam)

Comment: Detector offsets are applied to Band Data Files. (T. Aslam)

14. Question: How critical is the 14 minute limit on Subinterval Duration? (J. Schmidt)
Answer: It is the maximum we have calculated that can occur. It would be no significant problem if it were more than 14 minutes. (T. Aslam)

15. Question: Are you adding the overlap after a scene is framed?
Answer: No. (T. Aslam)

Comment: Then you seem to have the Band Data File sized too large.

16. Question: Are you expecting updates for orbit data during the mission?
Answer: We do a simple orbit calculation. (T. Aslam)

Comment: We need to coordinate to make sure that the same orbit algorithm is being used as is being used in the MOC.

17. Comment: If there are any problems with these output formats, RIDs should be written. (J. Henegar)

18. Comment: The use of fill data in a PCD frame at the beginning and end of the PCD subinterval is an added feature of the LPS since the last review. (J. Henegar)

19. Question: Should calibration data be in a separate file?
Answer: No, we are trying to cut down on the number of files required. (R. Irish)

20. Question: Can you use a finer resolution on cloud cover?
Answer: We are currently using four quadrants. (T. Aslam)

Comment: LPS has met their requirement. We can discuss this issue further if required. (J. Andary)

21. Comment: We are computing the nominal corners for a scene. (J. Henegar)

Comment: The scene center is calculated using UTC corrections.

22. Comment: There was much discussion on aperture flags in the Metadata File with reference to day/night, etc. No changes were identified.

23. Comment: There was much discussion on computing the scene center from the ephemeris data. A RID will be written.

24. Question: How does “JPEG Compression of 60%” impact visual quality?

Answer: This is an unknown at this time; it is a TBD. (R. Schweiss)

LPS Hardware Architecture - C. Brambora/514.3

25. Question: Is there any security protection? (B. Harsch)
Answer: There will be fire wall protection which is to be addressed. (C. Brambora)
26. Question: How about putting LPS output data on tape for backup ? (J. Andary)
Answer: Data could be off loaded at any time on the system, even though it is not a LPS requirement.

Comment: The DLT would be used for providing data for the user sites. (C. Brambora)

27. Comment: The 8mm tape capability will be added to the system. (R. Schweiss)

28. Question: Is there a commercial card equivalent to the NASA card?
Answer: Yes, one is currently available. (C. Brambora)

Note: After the meeting, it was determined that the answer should have been that there is no commercial substitute for the NASA card. (The substitute is for the DSP card.)

29. Comment: The file transfer rates will be prototyped in Building 23. (J. Henegar)

30. Question: Is there a problem when data is received form the alternate site?
Answer: We expect the total volume of data to stay the same so there is no problem. (J. Henegar)

LPS Operational Scenarios - R. Schweiss/514.3

31. Question: Are you loading DLT'S and processing data at the same time? (R. Forsht)

Answer: We are not showing that in our scenarios. If we did, our time line would improve so it is not an issue. (R. Schweiss)

32. Question: Does the LPS operator have to switch from one terminal to another? (J. Andary)

Answer: We envision the operator to work on two X-Terms, but it could possibly be done on one. (R. Schweiss)

Comment: This seems like a lot of data for one operator to handle. (J. Andary)

33. Question: How does the operator monitor data capture during "Receive Data from LGS-Automatic"?

Answer: The number scrolls on the screen. (R. Schweiss)

34. Comment: LPS may need to specify different parameters during reprocessing and not just IAS parameters. (T. Arvidson)

35. Question: Have these scenarios been reviewed with EDC?

Answer: They have been discussed in detail. One more review is planned. (R. Schweiss)

Comment: EDC feels that the LPS is too operator intensive.

36. Question: Is there anything to prevent the operator from processing more than 250 scenes? (T. Arvidson)

Answer: No, the operator must take care so to not generate too much data to be ingested by the LP DAAC. (R. Schweiss)

Comment: We will address the issue of duplicate data when the 255 scenes per day is exceeded. (R. Schweiss)

SWCI Detailed Design

Overview - J. Hosler/514.1

37. Question: What happens to the PCD correction when the clock is updating?
Answer: It is in the data stream. (J. Hosler)

System Startup/Shutdown - D. Crehan/LORAL

(No significant questions or comments.)

Operations Interface - D. Crehan/LORAL

38. Question: Who sets the criteria for the filtering of status/error reporting; the operator or facility management? (J. Schmidt)
Answer: It is the operator. (D. Crehan)

39. Question: Has there been coordination on operator human factors between the LGS and LPS?
Answer: No, to date there has been no coordination of this type. This is a great idea. (D. Crehan)

40. Question: Is there consideration of a "tiered" approach for operator access to LPS parameters?
Answer: No. (D. Crehan)

Comment: A RID will be prepared.

41. Question: Does the operator need a screen for each string?
Answer: Yes, but all four could be on one terminal. (D. Crehan)

Question: How about the moving window displays?
Answer: That should be on two Indy terminals (for four strings). (R. Schweiss)

42. Question: If a bit error rate is exceeded, is there a way to determine what the threshold rate was?
Answer: No. (D. Crehan)

43. Comment: The severity of the error messages is hard coded; the thresholds can be changed at runtime by the operators. (D. Crehan)

Automatic Data Capture - D. Crehan/LORAL

(No significant questions or comments.)

Raw Data Capture - J. Hosler/514.1

44. Question: What statistics does the Raw Data Capture Main Driver store?
Answer: It stores the amount of data received, approximate number of scenes, and the parameters used. (J. Hosler)

45. Question: Are file space availability checks made in time for the operator to respond?
Answer: Yes, the parameters will be set at compile time. (J. Hosler)

46. Question: In case of a failure, could a DLT be cross strapped to another string?
Answer: Not directly, but it is possible through the network. We hope to have two DLTs per string if funding is available. (C. Brambora)

Level 0R Processing - J. Hosler/514.1

47. Question: Can multiple Level 0R processing be performed?
Answer: Yes, but it may saturate the LP DAAC. (J. Hosler)

48. Comment: Subintervals less than a scene will not be sent to the LP DAAC. (J. Henegar)

Comment: An agreement was made that at least one scene would be in a subinterval.
(B. Harsch)

49. Comment: The VCDU counter does not have any error detection correction, so it should not be depended upon too much when determining subinterval breaks.

Comment: The VCDU counter does have the CRC. (J. Henegar)

50. Question: How much PCD data is needed per scene?

Answer: We need six points (32 seconds) of data to compute the scene center. (J. Hosler)

Comment: We are expecting a RID on this algorithm. (J. Henegar)

51. Question: Do you need any other parameters to process the PCD data?
Answer: Probably not. (D. Crehan)

52. Question: Is the exit from ACCA processing for Format 2 data hard coded?
Answer: Yes. (J. Hosler)

53. Question: Are you doing radiometric correction for the browse function?
Answer: No. (J. Hosler)

Comment: Radiometric correction is not in the design at this time, once we get the ACCA algorithm from the project science we will incorporate radiometric correction for the ACCA and most likely the browse.

Manage Output File Transfer - D. Crehan/LORAL

54. Question: Can multiple DANs be sent in a single session? (B. Harsch)
Answer: Yes. (D. Crehan)

LPS Database - D. Crehan/LORAL

55. Question: Is there any coordination between databases for different strings?
Answer: No. D. Crehan

System Testing - J. Henegar/514.1

56. Question: Will CCRs be tested again after corrections are made?
Answer: Yes. (J. Henegar)

57. Question: Is there a change control board?
Answer: There is a Change Review Board (CRB) for the developers. There is a Project Configuration

Management Board (PCMB) at the LPS level. Also, there is a Landsat Ground System CCB for changes in requirements. (J. Henegar)

58. Question: Are the System Test Tools deliverables?
Answer: They don't map to any of the requirements, so they will not meet the rigors of our required deliverables. (J. Henegar)

LPS Acceptance Testing - T. Mittan/EDC

59. Question: Is EDC going to provide the test criteria?
Answer: Yes. (T. Mittan)

Question: Is this for both the FAT and the Site AT?
Answer: Yes, we are developing the criteria in conjunction with the LPS. (T. Mittan)

Question: Will acceptance criteria be submitted to the project for concurrence? (J. Andary)
Answer: Yes, it will be submitted to J. Martin. (J. Henegar)

60. Question: Who will run the end-to-end tests?
Answer: I don't have the details on this yet. (T. Mittan)

61. Question: Will the Hardware delivery be part of the acceptance criteria?
Answer: Yes. (T. Mittan)

EROS Data Center Facilities Information - K. Allender/EDC

62. Comment: LGS and ECS installation dates need to be reviewed. (B. Harsch)

63. Question: Will the operators be located on the computer floor? (J. Henegar)
Answer: We are looking into moving the operators into a separate office. (K. Allender)

64. Comment: The matrix switch should be moved to minimize cable lengths. (C. Brambora)

65. Question: Could the IAS and LPS share printers?

Answer: Yes.

Conclusion: J. Henegar/514.1

66. Question: When will the software be transitioned to the EDC?
Answer: It will be 90 days after launch (approximately the end of fiscal year 1998). (J. Henegar)

67. Comment: RIDs are due December 8, 1995. (J. Henegar)

68. Comment: This was an excellent design review. We will discuss changes, but only those within the current budget will be considered. We plan to move forward with this design. (J. Andary)