

- [1] R. H. Triharjanto and R. Andiarti, “Perencanaan Implementasi Program Pengembangan Satelit Indonesia pada Tahap Kedua dan Ketiga Rencana Induk Keantariksaan,” *J. KKPA (Kajia Kebijakan. Penerbangan dan Antariksa)*, vol. 1, p. 2, 2020, doi: 10.30536/jkkpa.v1n2.1.
- [2] PDSI Pusdatinkom BNPB, “Buku Data Bencana Indonesia tahun 2023,” BNPB, Indonesia, 2023. [Online]. Available: <https://bnpb.go.id/buku/buku-data-bencana-indonesia-tahun-2023>
- [3] R. H. Triharjanto, W. Hasbi, A. Widipaminto, M. Mukhayadi, and U. Renner, “LAPAN-TUBSAT: Micro-satellite platform for surveillance & remote sensing,” in *European Space Agency, (Special Publication) ESA SP*, 2004, pp. 277–283.
- [4] A. Wahyudiono and R. Madina, “Pemanfaatan Muatan Kamera Digital Pada Satelit Lapan a2 Untuk Pemantauan Pembangunan Ruas Jalan Tol Di Pulau Jawa ...,” *Semin. Nas. Iptek Penerbangan dan Antariksa XXI-2017*, pp. 242–249, 2017.
- [5] J. T. Nugroho, Zylshal, G. A. Chulafak, and D. Kushardono, “Performance of LAPAN-A2 satellite data to classify land cover/land use in Semarang, Central Java,” in *IOP Conference Series: Earth and Environmental Science*, 2017. doi: 10.1088/1755-1315/54/1/012098.
- [6] M. Mukhayadi, A. Karim, W. Hasbi, and R. Permala, “Designing a constellation for ais mission based on data acquisition of lapan-a2 and lapan-a3 satellites,” *Telkonnika (Telecommunication Comput. Electron. Control.)*, vol. 17, no. 4, pp. 1774–1784, 2019, doi: 10.12928/telkonnika.v17i4.12048.
- [7] W. Hasbi, “LAPAN-A2 (IO-86) satellite roles in natural disaster in Indonesia,” in *Proceedings of the International Astronautical Congress, IAC*, 2019.
- [8] E. A. Anggari *et al.*, “Assessing the Accuracy of Land Use Classification Using Multi-spectral Camera From LAPAN-A3, Landsat-8 and Sentinel-2 Satellite: A Case Study in Probolinggo-East Java,” *Int. J. Adv. Sci. Eng. Inf. Technol.*, vol. 13, no. 5, pp. 1622–1627, Oct. 2023, doi: 10.18517/ijaseit.13.5.18570.
- [9] Z. Zylshal, R. Wirawan, and D. Kushardono, “Assessing the Potential of LAPAN-A3 Data for Landuse/landcover Mapping,” *Indones. J. Geogr.*, vol. 50, no. 2, pp. 184–196, 2019, doi: 10.22146/ijg.31449.
- [10] R. Hartono, P. R. Hakim, A. H. Syafrudin, M. D. N. Dawami, and W. Hasbi, “Performance of thermal imager on LAPAN-A3/IPB satellite compare with thermal band Landsat imager,” in *IOP Conference Series: Earth and Environmental Science*, 2019. doi: 10.1088/1755-1315/284/1/012043.
- [11] S. Utama *et al.*, “Earth Magnetic Fields Observation Using LAPAN-A3 Small Satellite,” *IEEE Geosci. Remote Sens. Lett.*, vol. 21, pp. 1–4, 2024, doi: 10.1109/LGRS.2023.3340410.
- [12] W. Hasbi and Kamirul, “Tracking capability and detection probability assessment of space-based automatic identification system (AIS) from equatorial and polar orbiting satellites constellation,” *IEEE Access*, vol. 8, 2020, doi: 10.1109/ACCESS.2020.3029093.
- [13] M. A. Saifudin, A. Karim, and Mujtahid, “LAPAN-A4 Concept and Design for

- Earth Observation and Maritime Monitoring Missions,” in *ICARES 2018 - Proceedings of the 2018 IEEE International Conference on Aerospace Electronics and Remote Sensing Technology*, 2018, pp. 44–48. doi: 10.1109/ICARES.2018.8547143.
- [14] R. Hartono, A. H. Syafrudin, W. Hasbi, and R. Yatim, “Implementation Of CAN Bus Communication To UART In LAPAN-A4 Satellite,” in *2018 IEEE International Conference on Aerospace Electronics and Remote Sensing Technology (ICARES)*, IEEE, Sep. 2018, pp. 1–7. doi: 10.1109/ICARES.2018.8547149.
- [15] R. Hartono, D. Ardianto, S. Salaswati, R. Yatim, and A. Hadi Syafrudin, “Design Requirement of LWIR Optical Filter for LAPAN-A4 Satellite,” in *Proceedings of the 2019 IEEE International Conference on Aerospace Electronics and Remote Sensing Technology, ICARES 2019*, 2019. doi: 10.1109/ICARES.2019.8914354.
- [16] S. Salaswati, R. Hartono, D. Ardianto, and A. H. Syafrudin, “Radiometric characterization for short wave infrared (SWIR) camera of LAPAN-A4 satellite,” in *AIP Conference Proceedings*, 2020. doi: 10.1063/5.0003785.
- [17] A. Da *et al.*, “Commissioning of the NigeriaSat-2 High Resolution Imaging Mission,” *Small Satell. Conf.*, no. 1, 2012, [Online]. Available: [https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1092&context=small\\_sat](https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1092&context=small_sat)
- [18] I. Ikpaya, S. Onuh, C. Achem, and F. Madalla, “Quest of Nigeria into Space for Sustainable Development,” in *SpaceOps 2016 Conference*, Reston, Virginia: American Institute of Aeronautics and Astronautics, May 2016. doi: 10.2514/6.2016-2345.
- [19] M. Cutter, P. Davies, A. Baker, and M. Sweeting, “A high performance EO small satellite platform & optical sensor suite,” *Int. Geosci. Remote Sens. Symp.*, no. July, pp. 3851–3854, 2007, doi: 10.1109/IGARSS.2007.4423684.
- [20] H. Wang, Z. Weng, and Y. Li, “Design of high-speed image acquisition system based on FPGA,” in *2018 Chinese Control And Decision Conference (CCDC)*, IEEE, Jun. 2018, pp. 2682–2686. doi: 10.1109/CCDC.2018.8407580.
- [21] Y. He, P. Sun, Q. Liu, H. Zhang, and D. Zhao, “FPGA-Based High-Speed Remote Sensing Satellite Image Data Transmission System,” in *Lecture Notes in Electrical Engineering*, vol. 996 LNEE, 2023, pp. 460–470. doi: 10.1007/978-981-19-9968-0\_56.
- [22] Z. Qu, Y. Wang, X. Zhang, and Y. Shi, “Design of Ultra High Speed Data Transmission Interface for Remote Sensing Satellite Based on Fiber Optic Interface,” in *Lecture Notes in Electrical Engineering*, vol. 1187 LNEE, 2024, pp. 66–75. doi: 10.1007/978-981-97-2120-7\_9.
- [23] Q. Meng *et al.*, “High Resolution Imaging Camera (HiRIC) on China’s First Mars Exploration Tianwen-1 Mission,” *Space Sci. Rev.*, vol. 217, no. 3, p. 42, Apr. 2021, doi: 10.1007/s11214-021-00823-w.
- [24] J. Li *et al.*, “A design of LVDS high-speed data transmission system based on FPGA,” in *5th International Conference on Computer Information Science and Application Technology (CISAT 2022)*, F. Zhao, Ed., SPIE, Oct. 2022, p. 59. doi:

- [25] L. Crocetti, E. Pagani, M. Bertolucci, and L. Fanucci, “Scalable Hardware-Efficient Architecture for Frame Synchronization in High-Data-Rate Satellite Receivers †,” *Electron.*, vol. 13, no. 3, Feb. 2024, doi: 10.3390/electronics13030668.
- [26] S. Choi, H. Yang, Y. Noh, G. Kim, E. Kwon, and H. Yoo, “FPGA-Based Multi-Channel Real-Time Data Acquisition System,” *Electron.*, vol. 13, no. 15, 2024, doi: 10.3390/electronics13152950.
- [27] Z. Huixin, H. Qi, L. Suhua, and Y. Haiguang, “The design for LVDS high-speed data acquisition and transmission system based on FPGA,” in *2011 IEEE 3rd International Conference on Communication Software and Networks*, IEEE, May 2011, pp. 383–386. doi: 10.1109/ICCSN.2011.6014590.
- [28] Q. Wu, G. Wang, and X. W. Li, “Design and Implementation of a High-Speed LVDS Data Acquisition System Based on Virtex-5 FPGA,” *Appl. Mech. Mater.*, vol. 568–570, pp. 193–197, Jun. 2014, doi: <https://doi.org/10.4028/www.scientific.net/AMM.568-570.193>.
- [29] A. S. Nasution *et al.*, “Development of the NOAA-19 Satellite Data Receiver Ingest System based on FPGA,” in *2022 International Conference on Radar, Antenna, Microwave, Electronics, and Telecommunications (ICRAMET)*, IEEE, Dec. 2022, pp. 132–137. doi: 10.1109/ICRAMET56917.2022.9991236.
- [30] F. H. Rasyidy *et al.*, “Development of FPGA-Based Ingest System with Multi-Output Interface for Receiving Low Resolution Remote Sensing Satellite Data,” in *2023 IEEE 7th International Conference on Information Technology, Information Systems and Electrical Engineering (ICITISEE)*, IEEE, Nov. 2023, pp. 174–179. doi: 10.1109/ICITISEE58992.2023.10404889.
- [31] S. Shukla, J. P. Chaudhari, R. J. Nayak, and H. K. Mewada, “Design of High-Speed LVDS Data Communication Link Using FPGA,” 2018, pp. 1–9. doi: 10.1007/978-3-319-63645-0\_1.
- [32] U. Hudomalj, C. Mandla, and M. Plattner, “FPGA Implementations for Real-Time Processing of High-Frame-Rate and High-Resolution Image Streams,” in *2020 International Conference on Computing, Electronics & Communications Engineering (iCCECE)*, IEEE, Aug. 2020, pp. 211–216. doi: 10.1109/iCCECE49321.2020.9231119.
- [33] Q. Meng *et al.*, “High Resolution Imaging Camera (HiRIC) on China’s First Mars Exploration Tianwen-1 Mission,” *Space Sci. Rev.*, vol. 217, no. 3, p. 42, 2021, doi: 10.1007/s11214-021-00823-w.
- [34] E. N. Nasser, Suhermanto, and W. Hasbi, “Design, implementation and test of Payload Data Handling LAPAN-A3/IPB satellite,” in *34th Asian Conference on Remote Sensing 2013, ACRS 2013*, 2013, pp. 446–453.
- [35] A. Guzman Cabrera *et al.*, “The Payload Data Handling Unit (PDHU) on-board the HERMES-TP and HERMES-SP CubeSat Missions,” in *Space Telescopes and Instrumentation 2020: Ultraviolet to Gamma Ray*, J.-W. A. den Herder, K. Nakazawa, and S. Nikzad, Eds., SPIE, Dec. 2020, p. 254. doi: 10.1117/12.2562325.

- [36] S. Brown and Z. Vranesic, *Fundamentals of digital logic with VHDL design*. 2005. [Online]. Available: [http://courses.ee.sun.ac.za/Digital\\_Systems\\_144/SS144Ch1+2.pdf](http://courses.ee.sun.ac.za/Digital_Systems_144/SS144Ch1+2.pdf)
- [37] C. M. Maxfield, *The Design Warrior's Guide to FPGAs: Devices, Tools and Flows*. Elsevier, 2004. doi: 10.1016/B978-0-7506-7604-5.X5000-4.
- [38] A. Pang and P. Membrey, "What Is an FPGA and What Can It Do?," in *Beginning FPGA: Programming Metal*, Berkeley, CA: Apress, 2017, pp. 3–12. doi: 10.1007/978-1-4302-6248-0\_1.
- [39] Ti, "LVDS Application and Data Handbook High-Performance Linear Products," in *White Paper*, no. November, 2002, p. 158. [Online]. Available: <https://www.ti.com/lit/ug/slld009/slld009.pdf>
- [40] H. Johnson and M. Graham, *High-speed digital design: a handbook of black magic*. Englewood Cliffs, N.J.: Prentice Hall, 1993. [Online]. Available: [http://ieeexplore.ieee.org/xpls/abs\\_all.jsp?arnumber=793170%5Cnhttp://www.lavoisier.fr/livre/notice.asp?id=OR2W26AAL3KOWI](http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=793170%5Cnhttp://www.lavoisier.fr/livre/notice.asp?id=OR2W26AAL3KOWI)
- [41] National Semiconductor's, "Manual, LVDS Owner's," 2008. [Online]. Available: [https://web.pa.msu.edu/hep/atlas/l1calo/hub/hardware/components/clocks/national\\_lvds\\_owners\\_manual\\_4th\\_edition.pdf](https://web.pa.msu.edu/hep/atlas/l1calo/hub/hardware/components/clocks/national_lvds_owners_manual_4th_edition.pdf)
- [42] P. Fortescue, G. G. Swinerd, and J. Stark, *Spacecraft Systems Engineering, Fourth Edition*. Wiley, 2011. doi: 10.1002/9781119971009.
- [43] J. R. Wertz, D. F. Everett, and J. J. Puschell, *Space Mission Engineering: The New SMAD*. in Space technology library. Microcosm Press, 2011. [Online]. Available: [https://books.google.fr/books/about/Space\\_Mission\\_Engineering.html?id=alFNM AEACAAJ&pgis=1](https://books.google.fr/books/about/Space_Mission_Engineering.html?id=alFNM AEACAAJ&pgis=1)
- [44] C. T. Judianto and E. N. Nasser, "The Analysis of LAPAN-A3/IPB Satellite Image Data Simulation Using High Data Rate Modem," *Procedia Environ. Sci.*, vol. 24, pp. 285–296, 2015, doi: 10.1016/j.proenv.2015.03.037.
- [45] J. R. Wertz and W. J. Larson, Eds., *Space Mission Analysis and Design*. Dordrecht: Springer Netherlands, 1991. doi: 10.1007/978-94-011-3794-2.
- [46] D. J. Jwo, A. Biswal, and I. A. Mir, "Artificial Neural Networks for Navigation Systems: A Review of Recent Research," *Appl. Sci.*, vol. 13, no. 7, 2023, doi: 10.3390/app13074475.
- [47] Y. Zeng *et al.*, "Irreversible synthesis of an ultrastrong two-dimensional polymeric material," *Nature*, vol. 602, no. 7895, pp. 91–95, Feb. 2022, doi: 10.1038/s41586-021-04296-3.
- [48] Musyarofah, D. N. S. Sirin, and A. Maryanto, "Pengembangan Relasi Matematik Sensor Pushbroom untuk Koreksi Geometrik Sistem Data Citra Satelit LAPAN A3," *Pros. SIPTEKGAN XV-2011 Semin. Nas. IPTEK Dirgant. XV Tahun 2011*, pp. 577–588, 2011, [Online]. Available: <http://repositori.lapan.go.id/442/>
- [49] Musyarofah *et al.*, "A proposed method of systematic geometric correction for LAPAN-A4 satellite data," in *AIP Conference Proceedings*, 2023, p. 030034. doi: 10.1063/5.0181438.
- [50] C. Voute, "Remote sensing," *ITC J.*, vol. 1982–1, pp. 37–44, 1982, doi: 10.1175/amsmonographs-d-16-0015.1.

- [51] Y. Sun, P. Rao, and T. Hu, "Parameter design and performance evaluation of a large-swath and high-resolution space camera," *Sensors*, vol. 21, no. 12, pp. 1–13, 2021, doi: 10.3390/s21124106.
- [52] P. Fortescue, G. G. Swinerd, and J. Stark, "Spacecraft Systems Engineering, Fourth Edition," in *Spacecraft Systems Engineering, Fourth Edition*, Wiley Professional, Reference & Trade, 2011, pp. 1–691. doi: 10.1002/9781119971009.
- [53] J. A. Richards and X. Jia, *Remote Sensing Digital Image Analysis*. Berlin, Heidelberg: Springer Berlin Heidelberg, 2006. doi: 10.1007/3-540-29711-1.
- [54] F. Zhang, "High-Speed Data Transfer Based on SERDES," in *High-speed Serial Buses in Embedded Systems*, Singapore: Springer Singapore, 2020, pp. 41–84. doi: 10.1007/978-981-15-1868-3\_2.
- [55] C. S. Dscr, "DS90CR287 / DS90CR288A + 3 . 3V Rising Edge Data Strobe LVDS 28-Bit Channel Link - 85MHz," no. March, 2013.
- [56] Altera Corporation, "Cyclone III Device Handbook, Volume 1," vol. 1, no. July, pp. 1–14, 2009, [Online]. Available: [https://www.altera.com/en\\_US/pdfs/literature/hb/cyc3/cyc3\\_ciii51001.pdf](https://www.altera.com/en_US/pdfs/literature/hb/cyc3/cyc3_ciii51001.pdf)
- [57] G. Description and O. Code, "3 . 3V LVDS High Speed Differential Driver / Receiver Ordering Code ;," no. April, 2001.
- [58] P. K. Garg, *Remote Sensing: Theory and Applications*. De Gruyter, 2024. doi: 10.1515/9781501522840.
- [59] P. J. Ashenden, *The designer's Guide to VHDL*. Elsevier, 2008. doi: 10.1016/B978-0-12-088785-9.X0001-9.
- [60] Robert A. Schowengerdt, *Remote Sensing*. Elsevier, 2007. doi: 10.1016/B978-0-12-369407-2.X5000-1.
- [61] A. E. Frazier and B. L. Hemingway, "A Technical Review of Planet Smallsat Data: Practical Considerations for Processing and Using PlanetScope Imagery," *Remote Sens.*, vol. 13, no. 19, p. 3930, Sep. 2021, doi: 10.3390/rs13193930.
- [62] S. A. Huang *et al.*, "A New Age of SAR: How Can Commercial Smallsat Constellations Contribute to NASA's Surface Deformation and Change Mission?," *Earth Sp. Sci.*, vol. 12, no. 1, Jan. 2025, doi: 10.1029/2024EA003832.