

Supplementary Materials: Robust Spacecraft Component Detection in Point Clouds

Quanmao Wei ^{1,2}, Zhiguo Jiang ^{1,2*} and Haopeng Zhang ^{1,2*}

¹ This is the supplementary for article *Robust Spacecraft Component Detection in Point Clouds* submitted to *Sensors*.

³ This supplementary contains component detection results of robustness analysis of the proposed
⁴ detection scheme, details of which can be referred to the text of the article. Results for different point
⁵ distribution density (**20K**, **10K** and **05K**), position noise (**01U**, **02U** and **04U**) and direction noise (**05D**,
⁶ **10D** and **15D**) of all the 8 spacecraft (**cube**, **DSP**, **GPS**, **Helios**, **minisat**, **Radarsat**, **SCISAT** and **SPOT**)
⁷ with intermediate detection results are displayed in this supplementary. Definitions of notations for
⁸ distribution density and noise level, e.g., 50K, 04U and 15D, can be referred to text of the article.

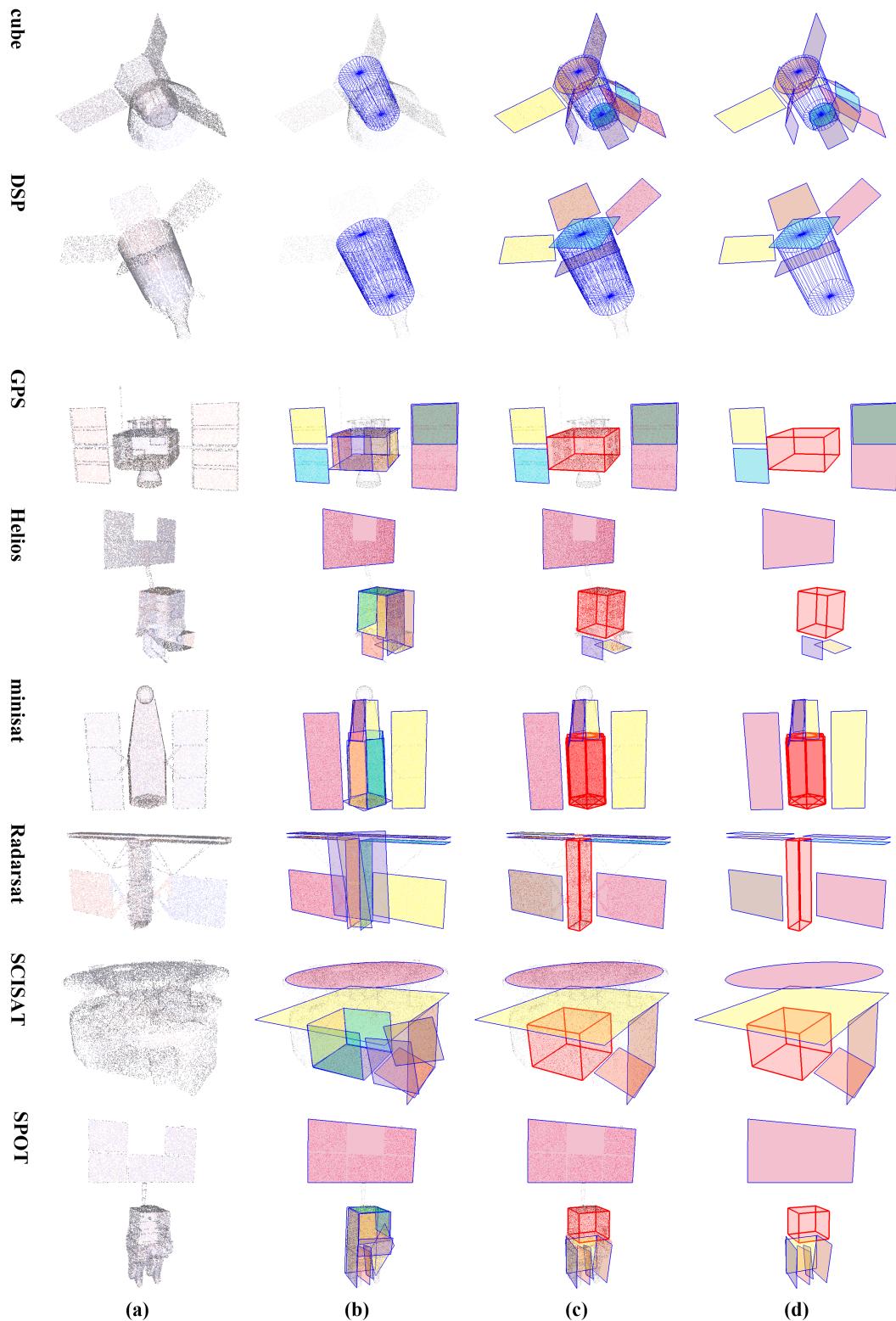


Figure S1. Detection results of the synthesized point cloud data 20K_00U_00D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.

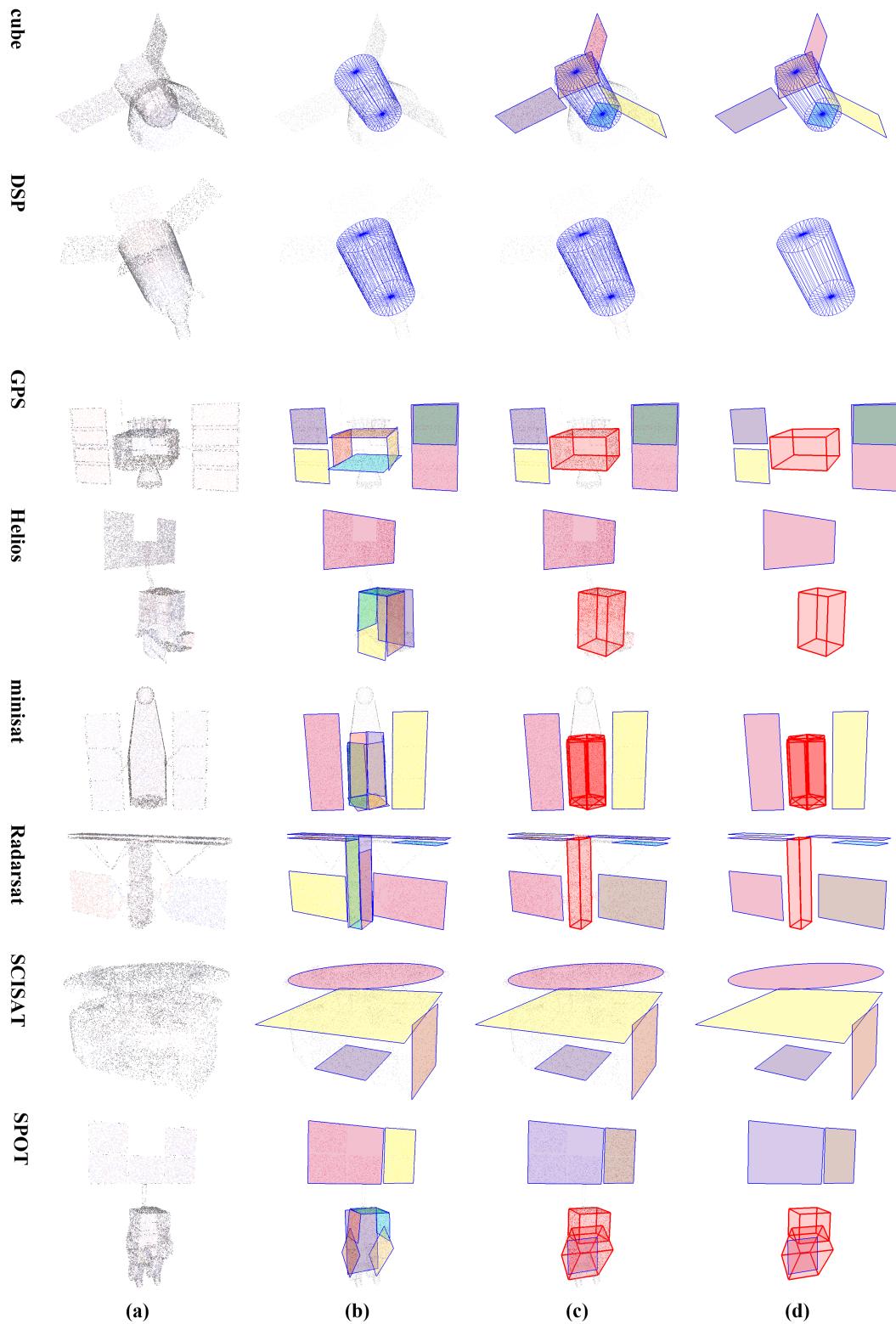


Figure S2. Detection results of the synthesized point cloud data 10K_00U_00D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.

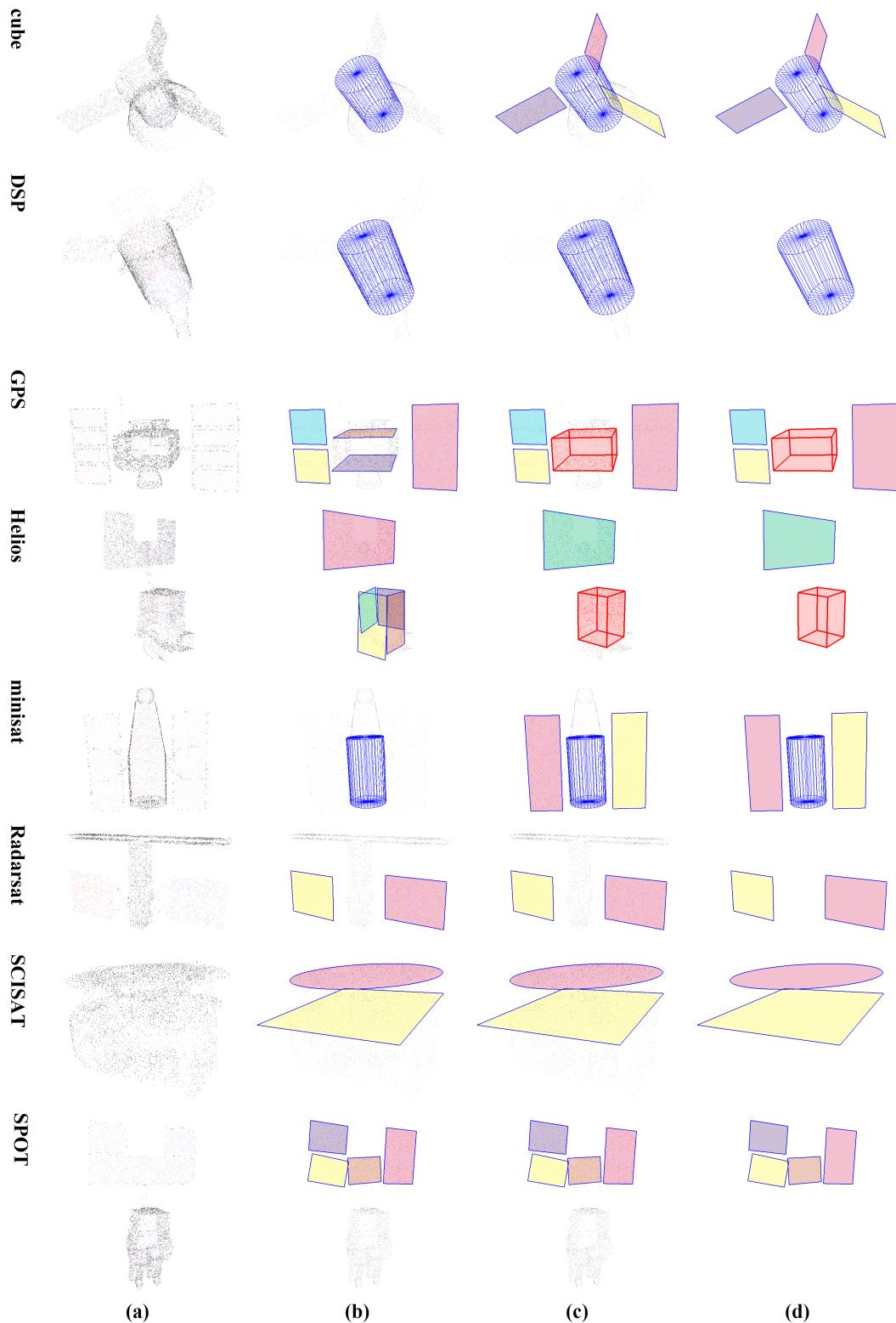


Figure S3. Detection results of the synthesized point cloud data 05K_00U_00D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.

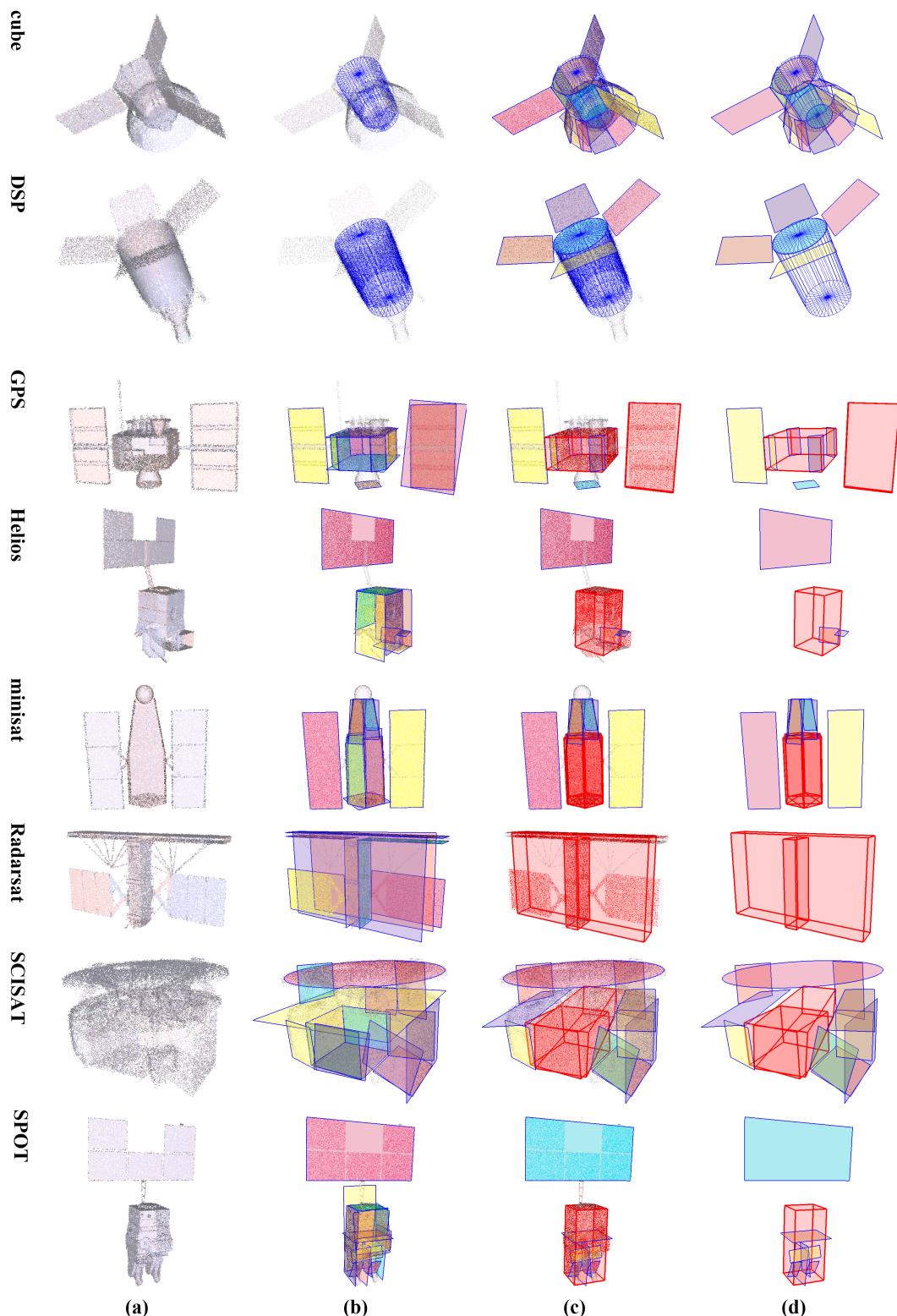


Figure S4. Detection results of the synthesized point cloud data 50K_01U_00D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.

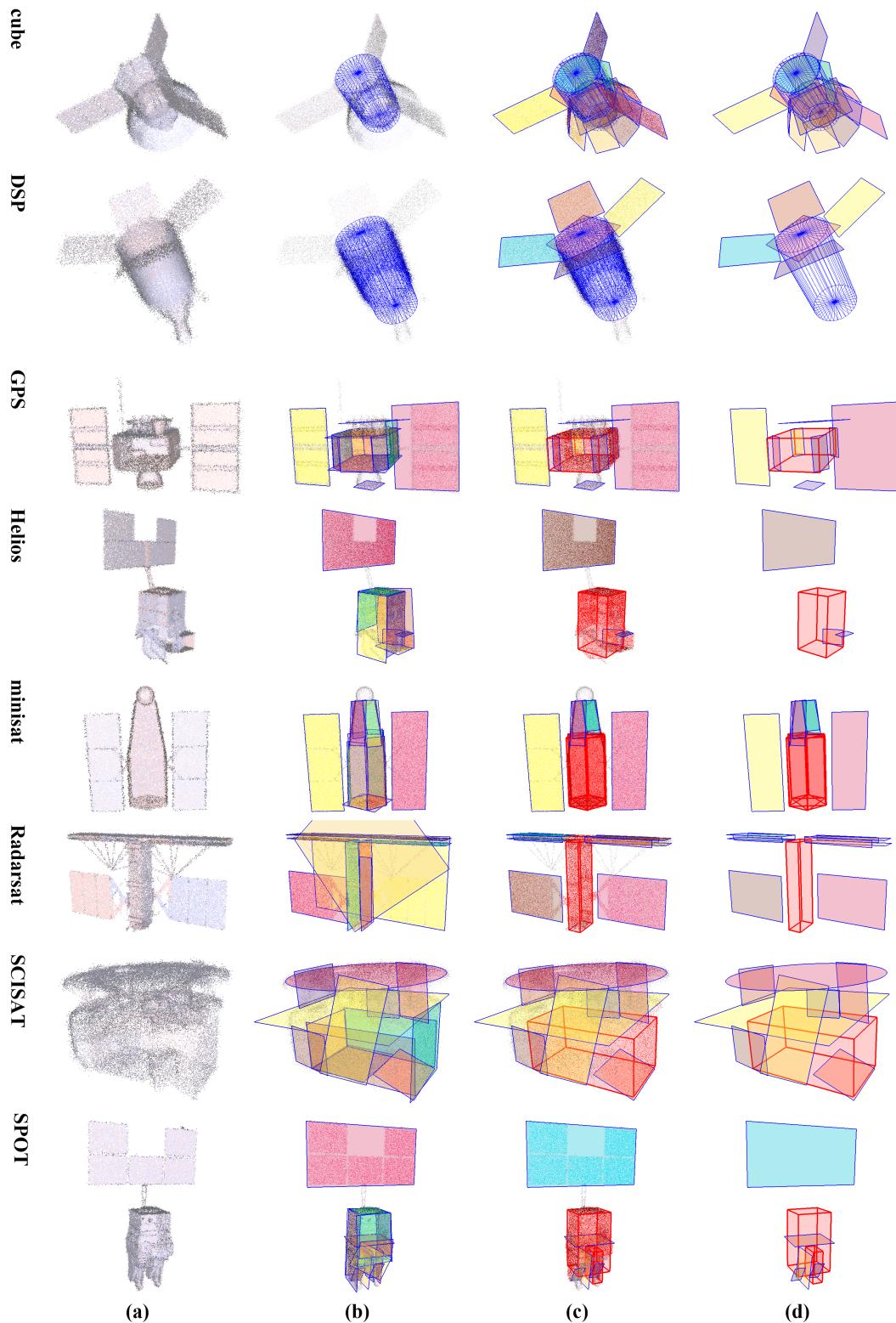


Figure S5. Detection results of the synthesized point cloud data 50K_02U_00D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.

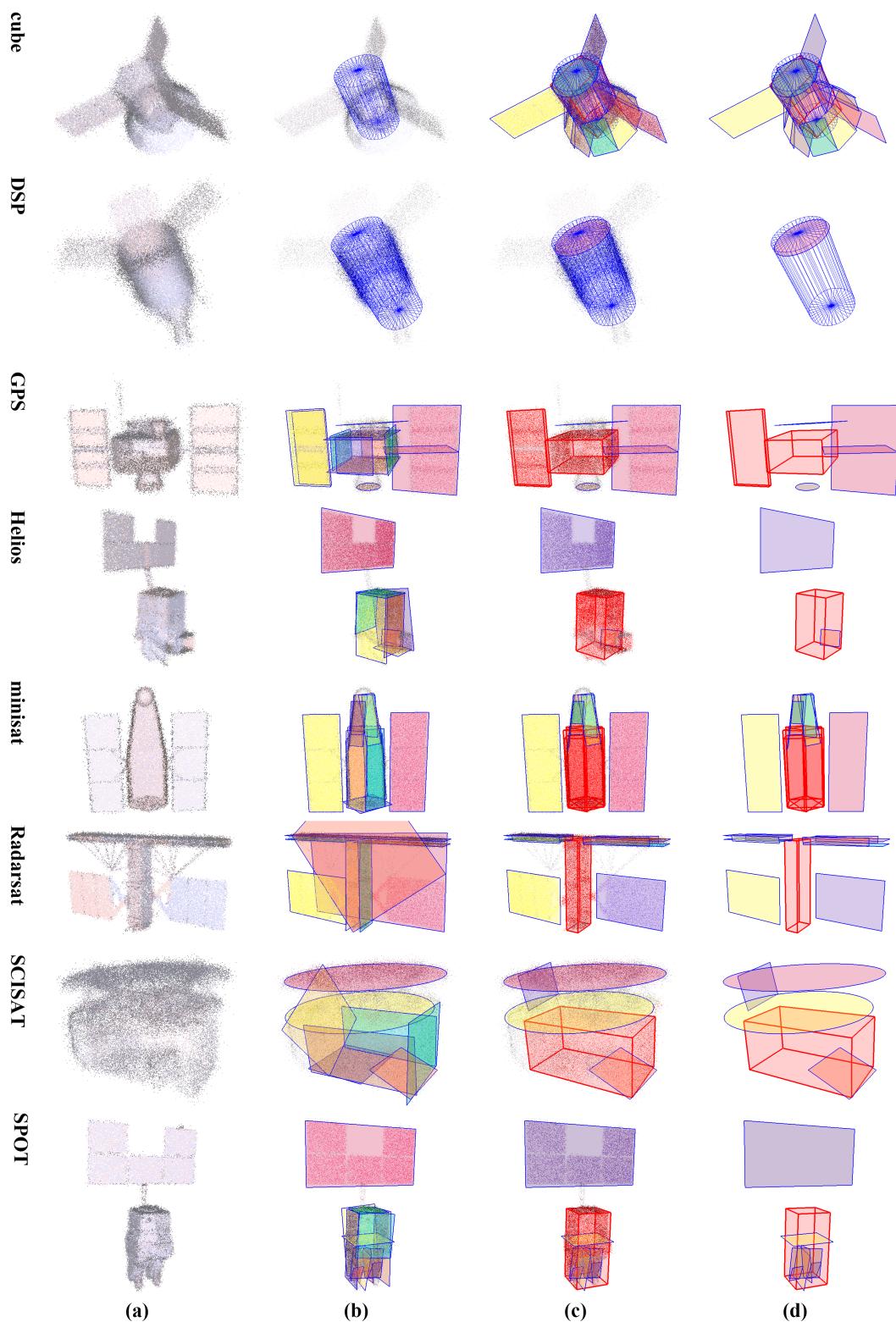


Figure S6. Detection results of the synthesized point cloud data 50K_04U_00D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.

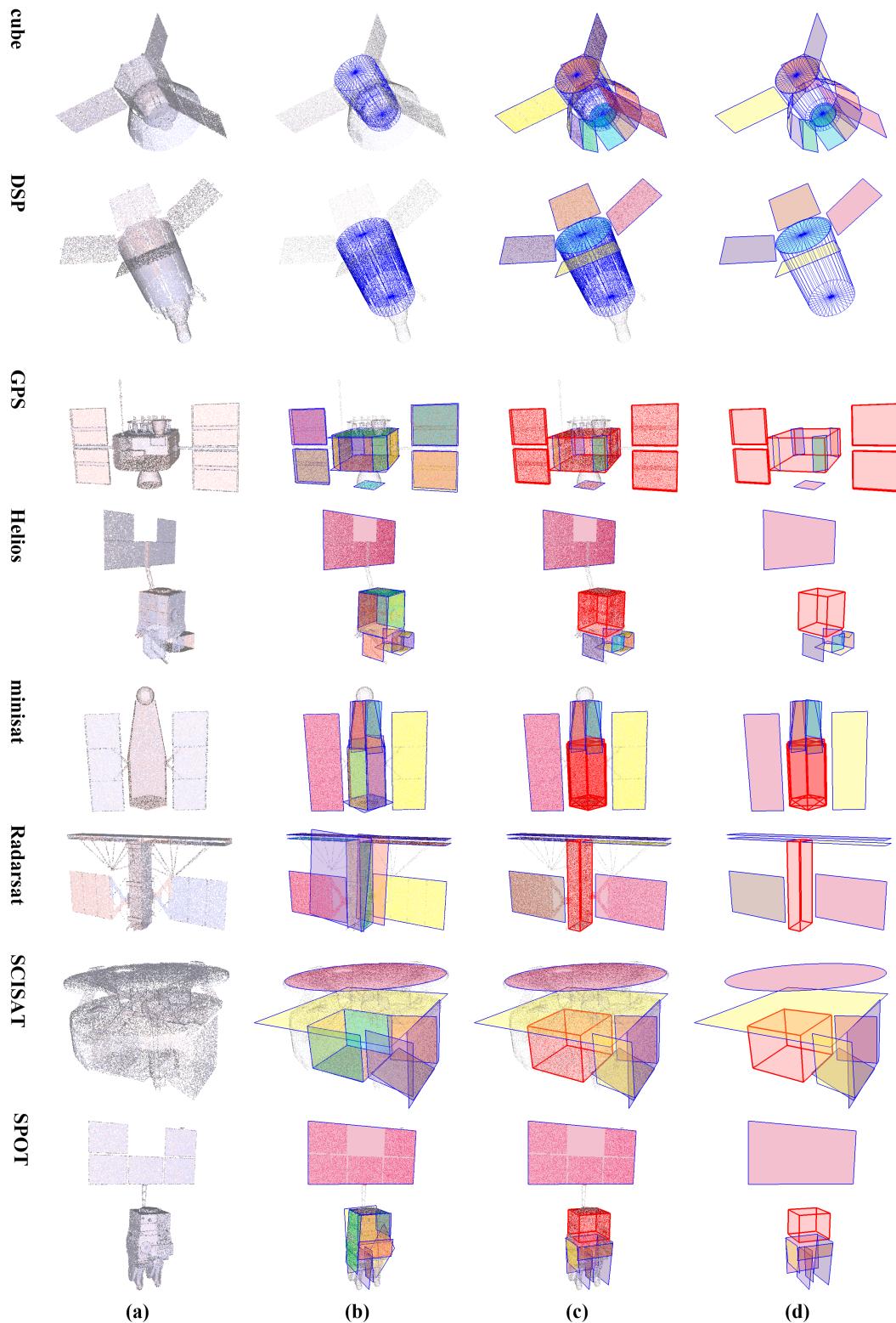


Figure S7. Detection results of the synthesized point cloud data 50K_00U_05D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.

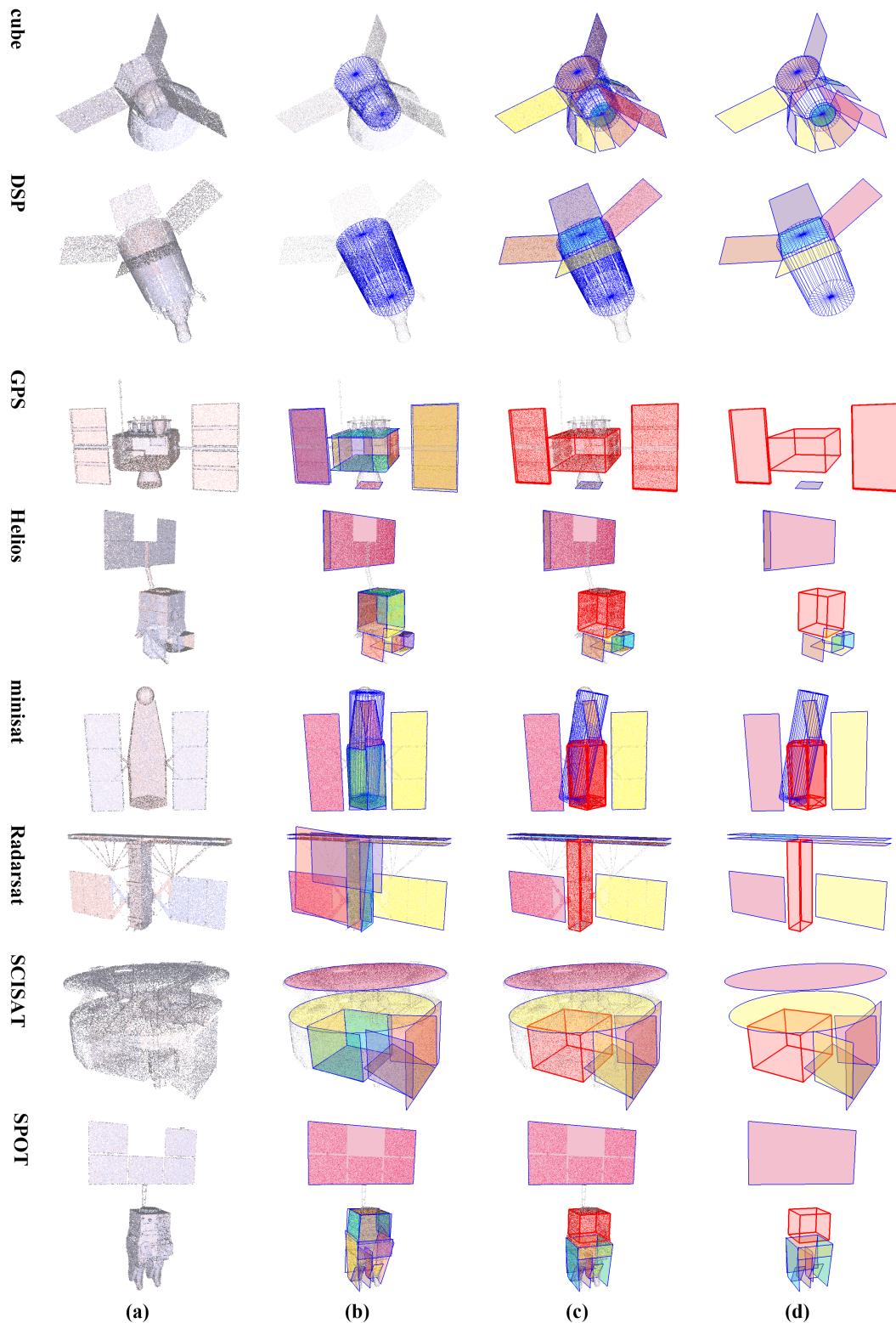


Figure S8. Detection results of the synthesized point cloud data 50K_00U_10D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.

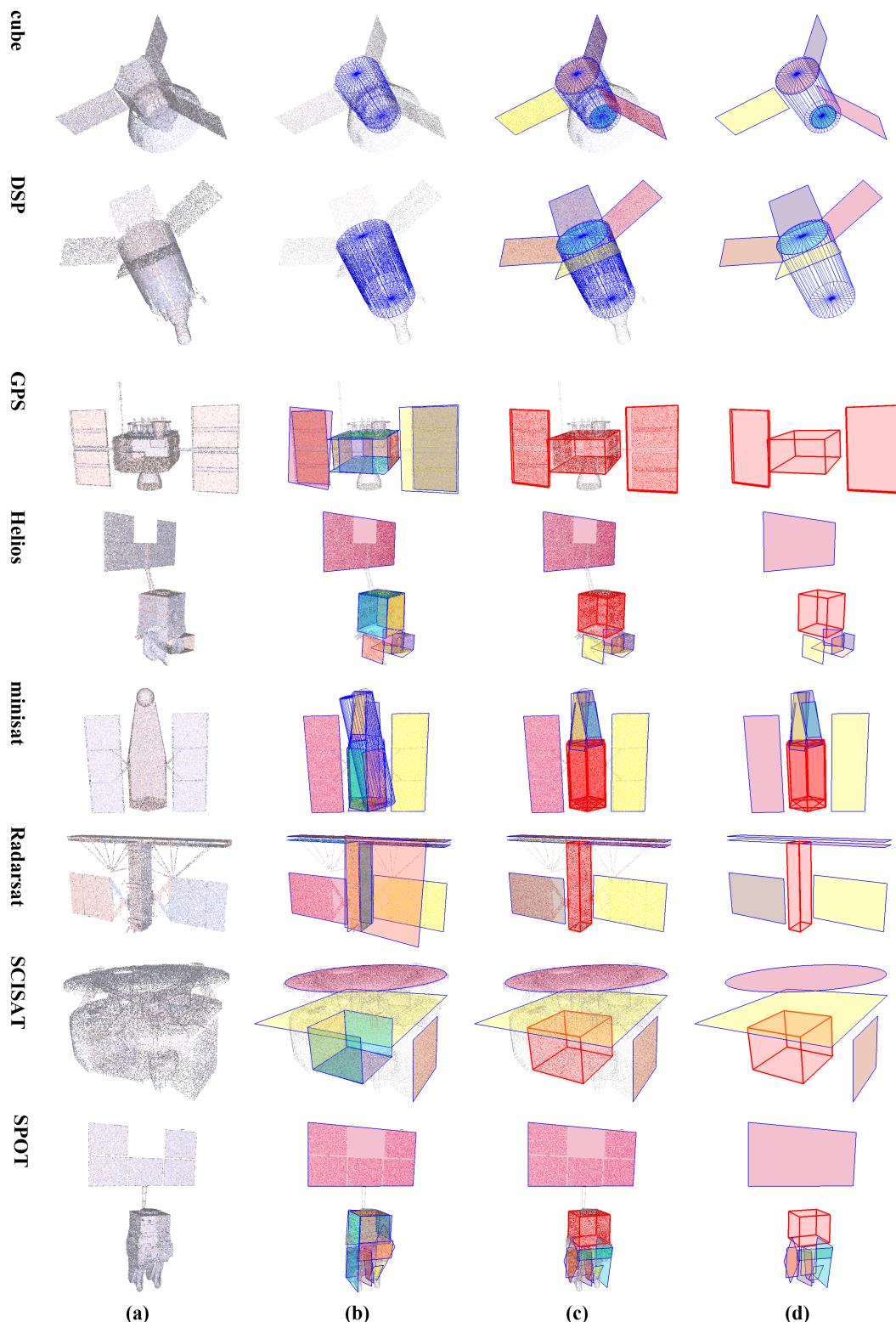


Figure S9. Detection results of the synthesized point cloud data 50K_00U_15D. From left to right: (a) the origin input point clouds; (b) results of cylinder detection or patch detection after detection of cylinders (the cylinders are rendered in blue, and patches are rendered in different colors.); (c) final results (the detected cuboids are rendered as red boxes.); (d) a clear view of the detected components.