Aerospace optomechanical assembly reference plan

aerospace-assembly

SHANGHAI MICROCRE OPTICS-MECH TECH CO.,LTD

Telephone: 400-812-7833 | 021-58391850

Address: 1478 Nanfeng Road, Fengcheng Town, Fengxian District, Shanghai, China | Postal code: 201411

Contact email: shanghai@yr17.net

Service email: rockwei@yr17.net

Application template; not a claim of a completed customer project.

Scope

For geometric checks of payload mounting references, precision fixtures and long guiding structures. This plan is not an airworthiness or structural certification.

Equipment and configuration guidance

• Angular system suited to the actual optical path

• Confirmed mounting datums, target mirrors and transfer optics

• Stable supports and thermal/vibration records

Principle and calculation

Express directions in one coordinate system. Budget reference transfer, mirror mounting and long-path disturbances. Do not infer flight performance from geometry alone.

On-site checklist

• Defined datum chain

• Repositioning repeatability checked

• Temperature and path disturbances recorded

Suggested records

• Datum chain and setup

• Critical direction readings

• Adjustment history and limitations

Limitations

The responsible project team must approve uncertainty budgets and acceptance values. This does not replace payload, environmental, structural or airworthiness verification.

Detailed teaching example

Teaching plan for transferring an optomechanical payload direction between stations

Scenario and task

Teaching demonstration, not a real customer project. All data are constructed examples. Two mounting positions cannot be observed from one setup, so one angular component is transferred through the same reference reflector. Preserve reference readings, signs and mounting state; do not infer flight performance from geometry.

Workflow overview

Define datum chain → Station 1 reference and target → Station 2 reference → Common-direction difference → Closure and locked verification

Preparation and measurement steps

01. Map the functional axis, mounting face and test mirror into a datum chain from the assembly drawing; define the single angular component and verify both station sign conventions.

02. At station 1 read common reference R, then mounting position A, then R again; record temperature, supports, reference-mirror state and reading times.

03. After moving to station 2 read the same R and then B; do not assume the independently set instrument zeros define the same spatial direction.

04. Compute A−R and B−R separately, check consistent application of reference and mirror-mount corrections, then calculate the mounting-direction difference.

05. Return to the common reference or an independent check direction for closure, remeasure after locking, and retain raw readings and corrections; agree acceptance limits and uncertainty separately.

Teaching example readings

• Station 1: R=+0.2″ and A=+0.9″, giving A relative to R of +0.7″.

• Station 2: R=−0.1″ and B=+0.3″, giving B relative to R of +0.4″.

• Example repeat of station-1 reference: +0.22″; its +0.02″ change must be recorded and analysed rather than hidden by zeroing.

Calculation procedure

For the same component, B−A=(0.3−(−0.1))−(0.9−0.2)=0.4−0.7=−0.3″. These constructed readings are not drift-corrected; the reference change remains an input to uncertainty and remeasurement analysis.

Example result and interpretation

Under the agreed common sign convention, B is 0.3″ below A. This is one directional component in the reference chain, with no acceptance limit supplied. It establishes neither overall assembly acceptance nor airworthiness, structural or payload performance.

Example verification checklist

• Use the same reproducible reference direction and separately check mount looseness and mirror-normal relation to the functional axis.

• A reversed station coordinate can reverse the sign; verify direction with an identifiable controlled small adjustment.

• Repeat readings, closure, long-path air effects and target-mount reproducibility require explicit analysis; subtraction does not automatically cancel them.

Document generated: 2026-11-16