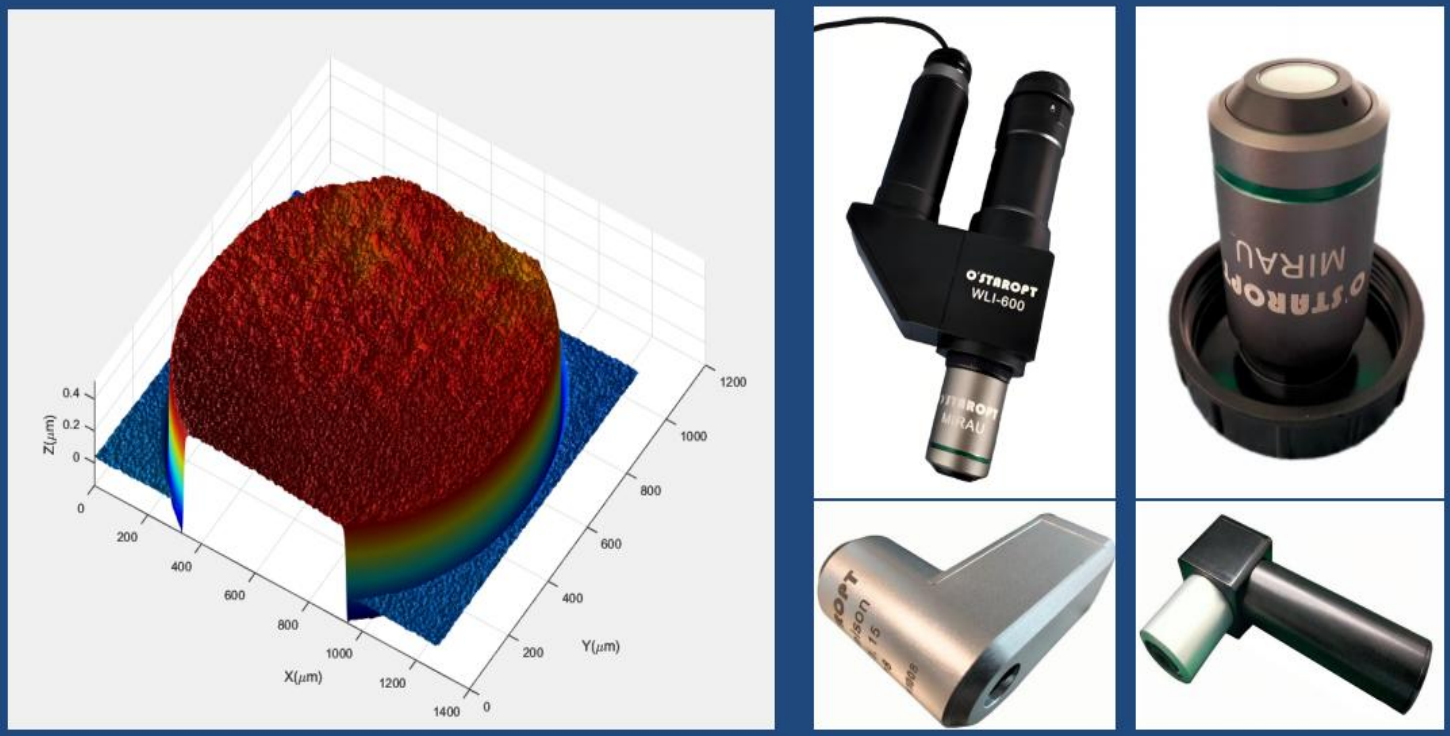
O'STAROPT



西安恩科微纳光电科技有限公司

Xi'an Encore Micro-Nano Optoelectronics Technology Co., Ltd.

www.ostaropt.cn

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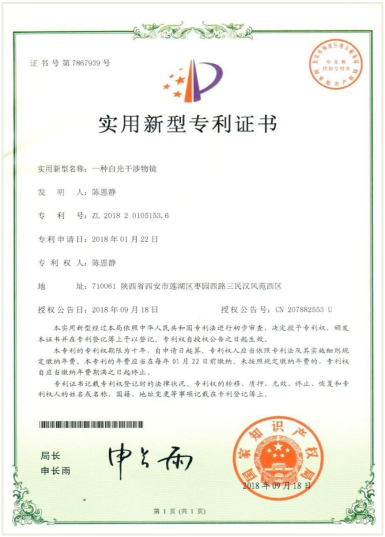
Company Profile

Xi’ an Enke Micronano Opto-Electronic Technology Co., Ltd. was established in 2018 and is based in Xi’ an, Shaanxi Province. The company focuses on the design and development of white-light interference objectives and a variety of optical-interferometry-based instruments.

Since its founding, the company has independently developed more than ten types of interference objectives. These products are now in use at dozens of universities and research institutes across China, and we also serve a large number of high-end manufacturing enterprises. Several of our lens products have successfully replaced imported equivalents in white-light interferometric inspection applications.

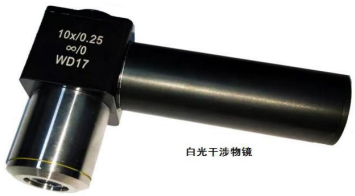
“Make the product right” is our core philosophy. To date, the company has secured two utility-model patents, two software copyrights, and one registered trademark.



Product Series

Mirau Objective

2X Michelson Objective



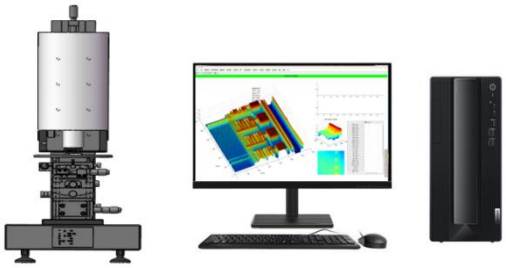
Linnik Objective

5X Michelson Objective

WLI imaging optical path

WLI Experimental Setup

Micro-/Nano-Profile Inspection System



WLI System

WLI objective

What is a WLI objective?

The interference objective is a key component of a WLI. Compared with laser interferometry, WLI offers higher measurement accuracy.

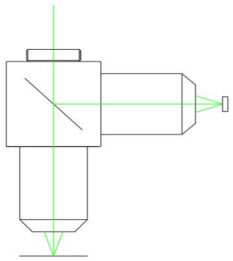
WLI objectives are typically used to characterize high-precision 3-D surface topographies—for example, on wafers, optical elements, MEMS , laser-processed parts, photovoltaic components, and precision aerospace or micro-electronic coatings.

By interpreting the interference fringes or using dedicated software, users can extract the relevant 3-D surface-topography parameters.

Classification of White-Light Interference Objectives

All interference objectives currently employed in WLI fall into three main categories.

Type 1: Linnik-type interference objective, whose schematic is shown below. Its core requirement is two identical microscope objectives with perfectly matched optical paths.

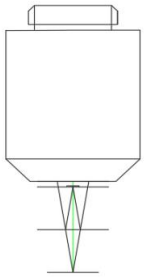


Linnik objective

Linnik objective

Website

Type 2: Mirau Objective. In a Mirau objective, the reference mirror and beam-splitting unit of the interferometer are integrated into the front end of the microscope objective. The reference mirror occupies the central portion of the field of view and is coated with a highly reflective film, while the beam-splitter plate is positioned at the very front. The distance from the reference mirror to the beam-splitter plate is exactly equal to the distance from the beam-splitter plate to the surface under test.

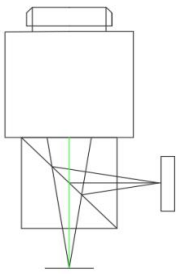


Mirau Objective

Mirau Objective

Website

Type 3: Michelson interference objective (Michelson objective). A beam-splitter is placed in front of a long-working-distance microscope objective, while the reference mirror is moved to the side of the objective. This configuration is typically used in white-light interferometric applications at 5× magnification or lower.



Michelson objective

Michelson objective

Website

Mirau objective

Name: **Mirau objective**

Applications:

WLI objectives are primarily employed for three-dimensional surface topography measurement and are among the most critical components of a WLI They can also be mounted on metallographic microscopes to evaluate the irregularity of a sample' s surface. By interpreting the interference fringes or using dedicated software, users can derive the relevant parameters of the 3-D surface topography.

(Website)

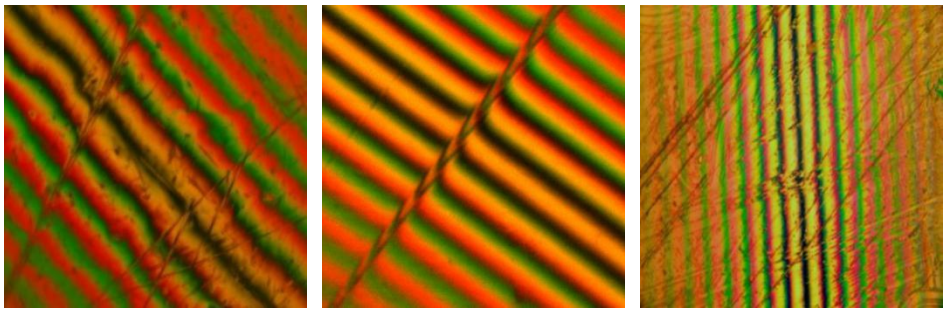
Features

1. Indigenous WLI objective built on proprietary core technology
2. Compact design with high-contrast interference fringes
3. Compatible with all infinity-corrected metallurgical microscopes
4. Accommodates surface reflectivity as low as 0.5 %

Product Specifications:

Magnification	10X	10X	20X	50X
NA	0.25	0.3	0.4	0.55
Parfocal Distance(mm)	45	45	45	45
WD(mm)	7.4	7.4	3.5	1.7
Focal(mm)	20	20	10	4
DoF(μm)	10	10	3.5	1.4
Resolution (μm)	1.34	1.34	0.8	0.61
Field Number(mm)	Φ25	Φ25	Φ25	Φ25
1/2' CCD+F200	0.65x0.45 (φ0.8)	0.65x0.45 (φ0.8)	0.33x0.23 (φ0.4)	0.13x0.09 (φ0.16)
1/2' CCD+F200+0.5X	1.3X0.9 (φ1.6)	1.3X0.9 (φ1.6)	0.65X0.45 (φ0.8)	0.26X0.18 (φ0.32)
Outer Diameter (mm)	28	30	28	27.6
Weight(g)	85	114	102	110
Thread Type/Mount	4/5X1/35' (M20.32X0.705)			

WLI image:



Wechat:

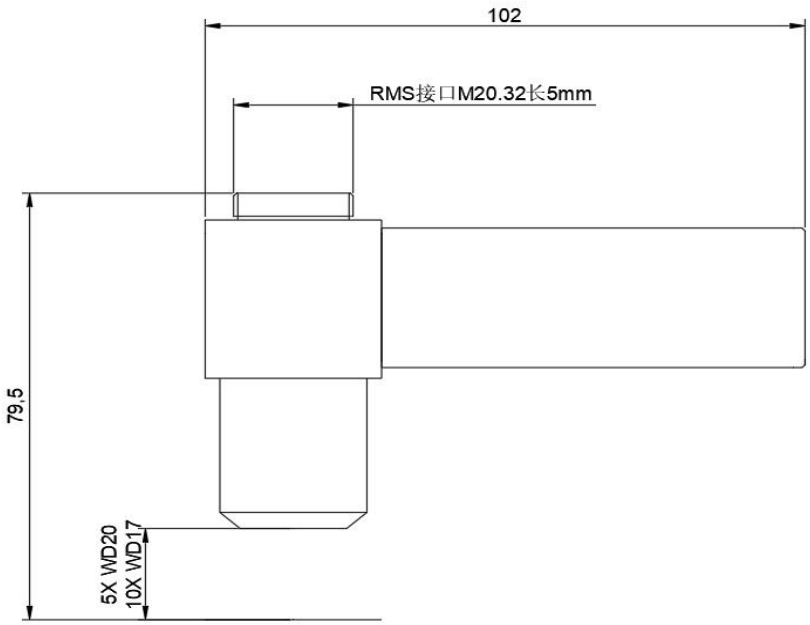
Linnik objective

Name：**Linnik objective**

Product Features

1. Fully domestic white-light interference objective.
2. Linnik architecture.
3. Novel white-light interference design that preserves the clarity of the sample' s surface image even while observing interference fringes.
4. Compatible with infinity-corrected metallurgical microscopes or custom-built optical paths.
5. Long working distance design.
6. Minimum detectable sample reflectivity: 0.5 %.

Drawing:



Website

Product Specifications:

Magnification	5X	10X
NA	0.12	0.25
WD（mm）	17	17
Field Number(mm)	Φ25	Φ25
1/2' CCD+F200	1.3x0.9（φ1.6）	0.65x0.45（φ0.8）
1/2' CCD+F200+0.5X	2.6X1.8（φ3.2）	1.3X0.9（φ1.6）
Thread Type/Mount	4/5' X1/36'	


实用新型专利证书

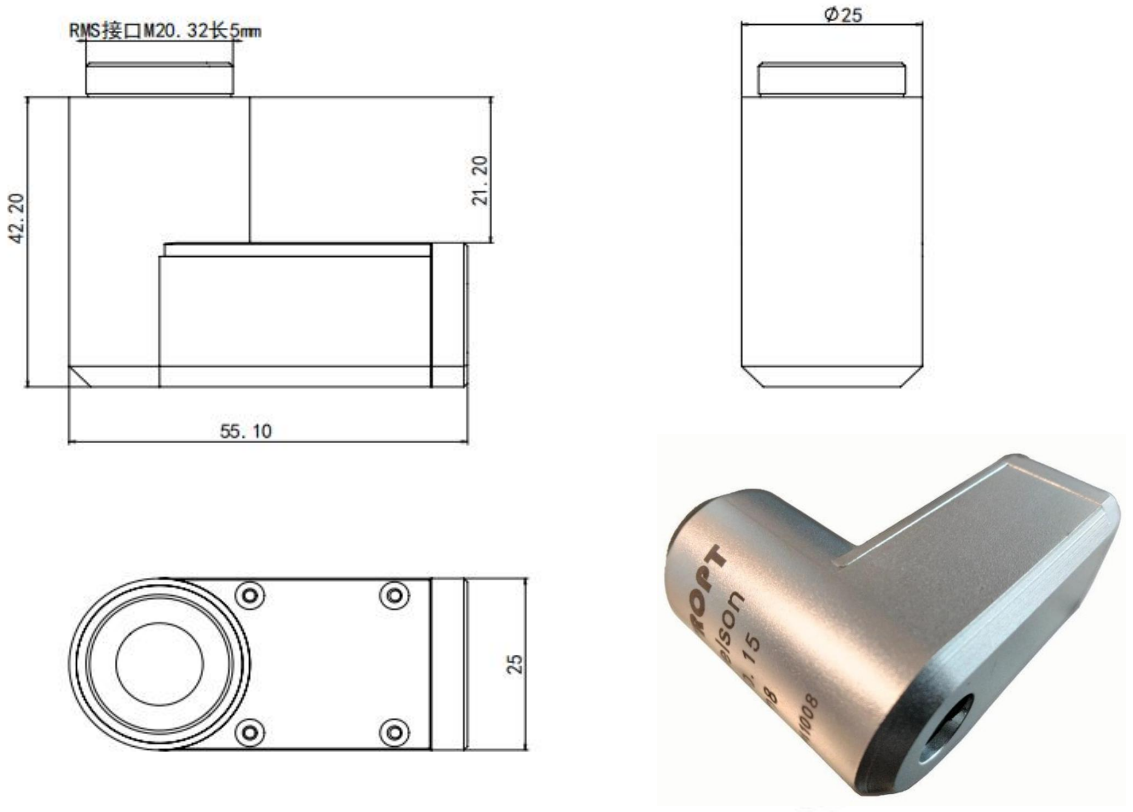
5X Michelson objective

Name：5X Michelson objective

Features:

1. Domestic white-light interference objective with proprietary core technology
2. Compact design delivering high-contrast interference fringes
3. Compatible with all infinity-corrected metallurgical microscopes
4. Measurable surface reflectivity down to 0.5 %

Drawing：



Product Specifications:

Magnification	5X
NA	0.15
WD(mm)	9
Focal(mm)	40
DoF(μm)	43
Resolution (μm)	2.8
Field Number(mm)	25
1/2’ CCD+F200	1.3x0.9（φ1.6）
1/2’ CCD+F200+0.5X	2.6X1.8（φ3.2）
Weight（g）	100
Thread Type/Mount	4/5X1/35’ (M20.32X0.705)

Website

WLI imaging optical path

Name：**WLI imaging optical path**

Applications

The white-light interferometric optical path comprises the light source, imaging tube, and interference objective. When combined with a fixture and camera, it allows a white-light interferometry setup to be assembled quickly and easily, eliminating the need for optical-path alignment.

Features

1. Complete, turnkey white-light interferometry optical path
2. Compact, space-saving layout
3. Ready for direct integration into open fixtures
4. Detectable sample reflectivity as low as 0.5 %

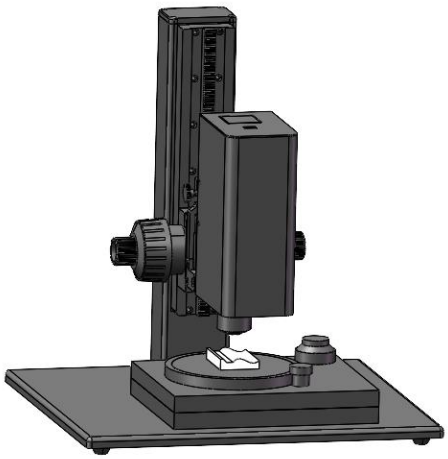
Website

Product Specifications:

Optical Design	Large-field infinity-corrected imaging
Clear Aperture（mm）	22
Focal Length(mm)	200+0.5X
Compatible CCD	Up to 2/3" sensor
Field of View (FOV)(mm)	Varies with objective lens
Operating Wavelength(nm)	400~700nm
Sample Reflectivity	≥0.5%
Mount Thread	M20.32 × 0.706 mm (T-mount)
Mechanical Interface	C-mount
Extended Function	PZT module can be added for nanometric axial translation of the interference objective
Dimensions	40 × 93 × 139 mm (lens excluded)

Application Cases

WLI Experimental Setup



Name：WLI Experimental Setup

Model：WLI-TILT

Instrument Overview：

The WLI-TILT white-light interferometry system is designed for measuring surface roughness, micro-steps, and surface flatness in research, education, and industrial production. It can also be used to determine film thickness, detect surface damage, and perform defect analysis.

Instrument Features

1. Compact, highly integrated design with minimal footprint
2. Equipped with domestically produced interference objectives
3. Extended vertical travel range accommodates larger samples
4. Interferometer head with adjustable tilt capability
5. Capable of measuring roughness, micro-/nano-scale scratch depth, and film thickness
6. Software provides 3-D profile simulation of the inspection area
7. Phase shifter can be easily added for white-light interferometric detection

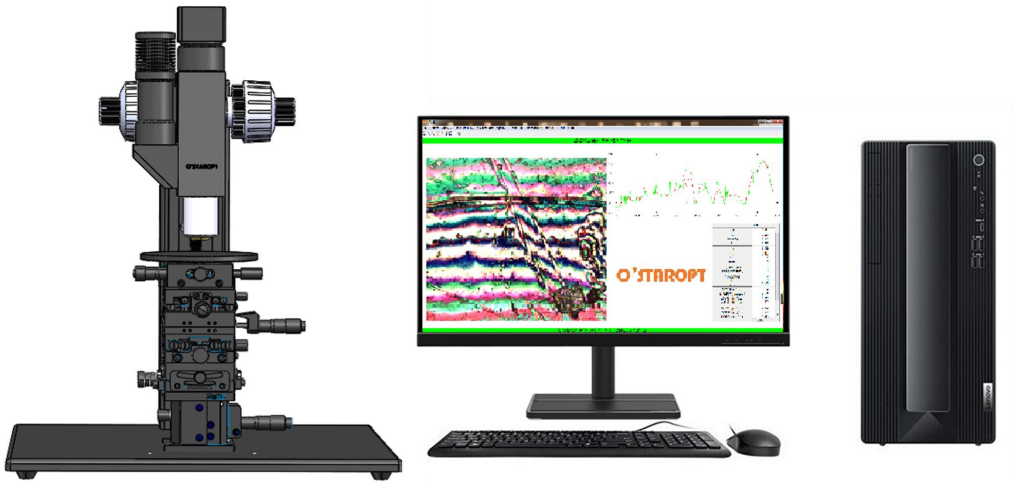
(Website)

Instrument Specifications

1. Objective: 10× Mirau interference objective
2. Light source: Adjustable-brightness LED white-light source, 560 nm center wavelength
3. Focusing stage: Coaxial dual-speed focusing, 50 mm travel
4. Work stage: 180 mm × 155 mm platform, X-travel 75 mm, Y-travel 55 mm, 360° continuous rotation
5. Head adjustment: ±5° left–right swing, 0–5° vertical tilt
6. Camera: Color or monochrome camera (user-selectable)
7. Software: CRWLI micro-/nano-profile inspection software

Software details: see "CRWLI Micro-/Nano-Profile Inspection Software"

O'STAROPT Micro-/Nano-Profile Inspection System



Name: Micro-/Nano-Profile Inspection System

Model: CRWLI

Instrument Overview:

The CRWLI series micro-/nano-profile inspection system is designed for research, education, and industrial production. It measures surface roughness, micro-steps, and surface flatness, and can also determine film thickness, detect surface damage, and perform defect analysis.

Instrument Features

1	Compact and space-saving	6	Capable of measuring micro-/nano-scale scratch depth on surfaces
2	User-friendly and easy to learn and operate	7	Measures both physical and optical thickness of transparent films.
3	Employs domestically produced interference objectives; measurement accuracy error < 10 nm	8	Capable of measuring surface roughness on steel balls.
4	Capable of measuring roughness parameters: Ra, Rz, Rp, Rv, PV, Rms	9	Built-in refractive-index database for common coating materials, easily accessible.
5	Able to measure maximum, minimum, and average profile height.	10	Generates a 3-D contour simulation of the inspected area.

Instrument Specifications

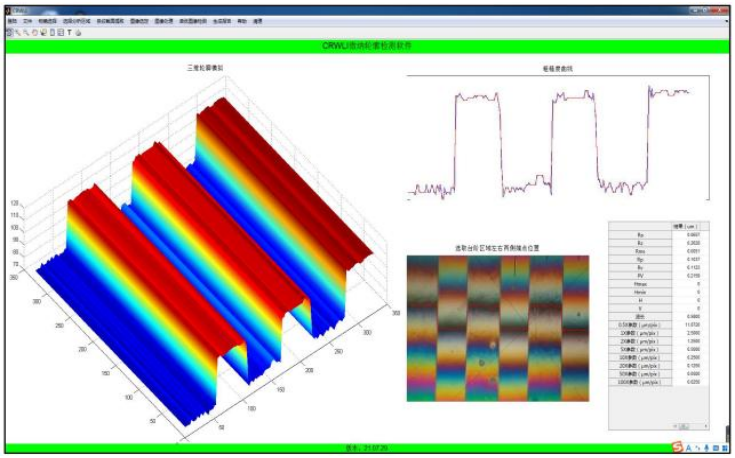
1. Objective: 10× Mirau interference objective
2. Light source: Adjustable-brightness LED white-light, center wavelength 600 nm
3. Focusing stage: Coaxial dual-speed focus, 50 mm travel
4. Work stage: X-travel ±7.5 mm, Y-travel ±7.5 mm
5. Camera: 3-megapixel sensor
6. Software: CRWLI micro-/nano-profile inspection software

Inspection Capabilities:

Refer to the CRWLI Micro-/Nano-Profile Inspection Software.

(Website)

CRWLI Software



CRWLI Software is a micro-/nano-scale surface profile analysis tool, also known as an interference microscopy analysis package. Import a single white-light interference fringe pattern, follow the built-in workflow, and obtain quantitative parameters together with a simulated 3-D surface profile. Compared with full 3-D topography by white-light interferometry, CRWLI offers a low-cost yet effective solution for cross-sectional profile analysis at a single surface location.

Software Applications

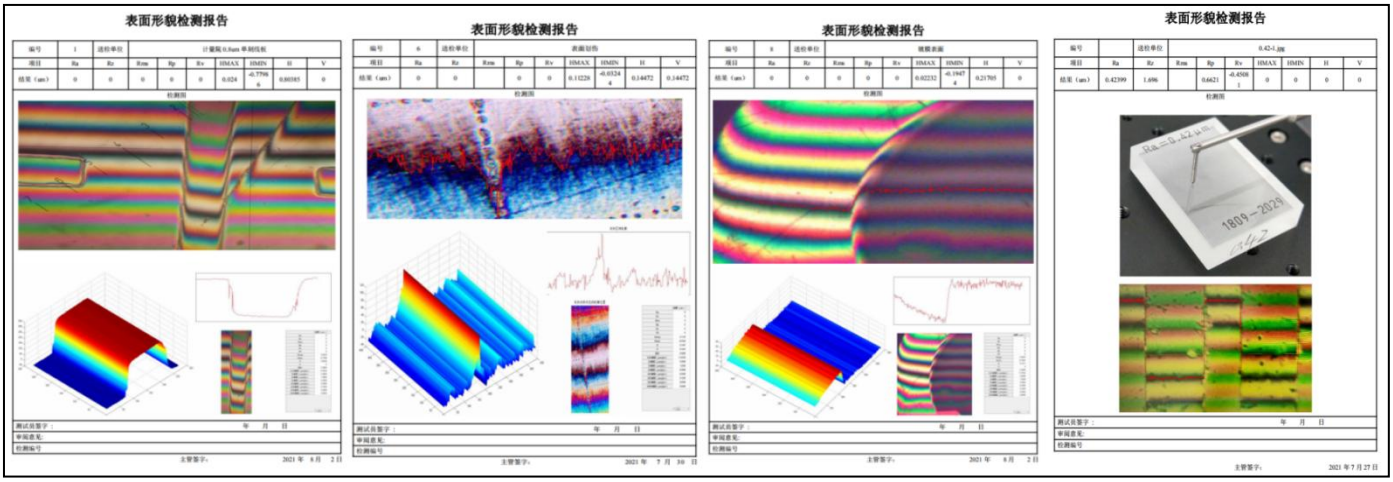
1. Micro-/nano-scale surface damage depth measurement
2. Micro-/nano-step detection on surfaces
3. Roughness, groove profile, and depth measurement of multi-line calibration standards
4. Micro-/nano-surface roughness evaluation: Ra, Rz, Rp, Rv, PV, Rms
5. Coating/film profile inspection
6. Surface roughness measurement of steel balls

(Website)

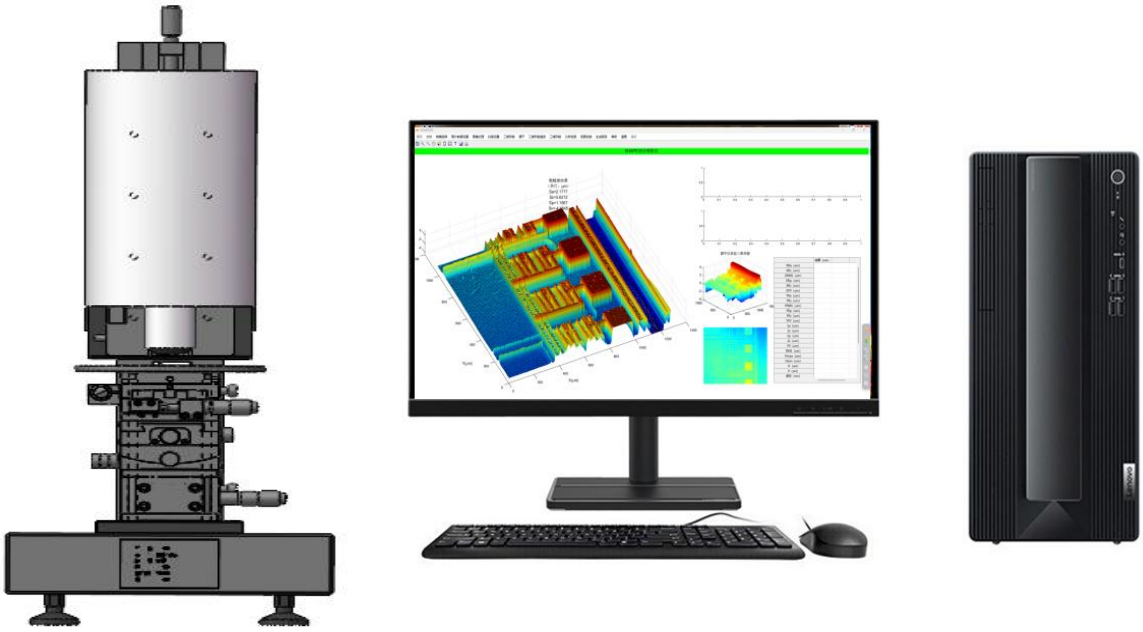
Software Features

1. Proprietary algorithms deliver higher-accuracy surface-profile recognition.
2. Only a single white-light interference-fringe image is needed to extract surface-profile parameters.
3. Simultaneously measures surface-roughness indices, micro-/nano-steps, and damage depth.
4. Generates a 3-D topography simulation of the measured profile for intuitive analysis.
5. Automatic or manual 0.5 λ calculation modes.
6. Measurement accuracy better than 10 nm.
7. Inspection reports exported as Word documents.
8. Handles samples with roughness Ra < 2 μm and step/scratch depths ≤ 4 μm.

Application Examples



WLI System



Name：Complete White-Light Interferometry Experimental System

Model：SHAPE3D

Instrument Overview

SHAPE3D is a streamlined, turnkey white-light interferometry system designed for research, education, and industrial applications. It quickly measures surface roughness, micro-steps, and overall surface flatness on manufactured parts.

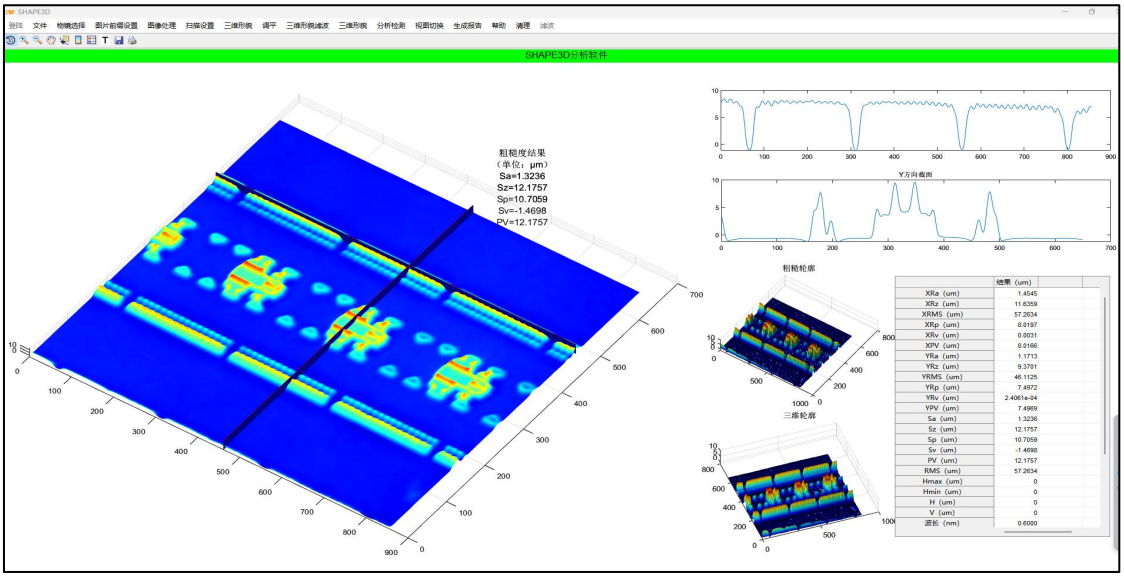
Instrument Specifications

1. Objective: 10× Mirau interference objective
2. Light source: LED white light, center wavelength 600 nm
3. Camera: 1.3-megapixel industrial camera
4. Optical-axis travel: 100 mm (up/down)
5. Workstage lift: 10 mm
6. XY translation stage: ±5 mm
7. XY tilt: ±5°
8. Sample stage: Ø110 mm, 360° continuous rotation

Inspection Capabilities:

Refer to SHAPE3D Optical 3D Profiling Software

(Website)



Software Overview

SHAPE3D Optical 3D Profile Inspection Software is an auxiliary teaching package we developed for white-light interferometry. It guides users through every major step of the measurement process and exports 3-D topography data for deeper scientific research. Ideal for setting up white-light interferometry projects, classroom instruction, research, and experimental simulation.

Functions & Features

1. Accepts both grayscale and color images.
2. Enables full-image or user-defined ROI analysis.
3. Allows custom prefix naming for captured image sequences, supporting multiple naming conventions.
4. User-selectable magnification, filter size, and phase-shift value.
5. Algorithms: phase-shifting and center-of-gravity scanning.
6. Global leveling or ROI-based leveling options.
7. 3σ Gaussian filter with adjustable filter size.
8. Configurable center wavelength.
9. Adjustable step size or default step size.
10. Generates 3-D profile and 3-D roughness maps; results obtained via manual selection.
11. Inspection reports exported in Word format.
12. Measurable parameters: XRa, YRa, XRMS, YRMS, XRz, YRz, XPV, YPV, Sa, Sz, Sp, Sv, PV, RMS, etc.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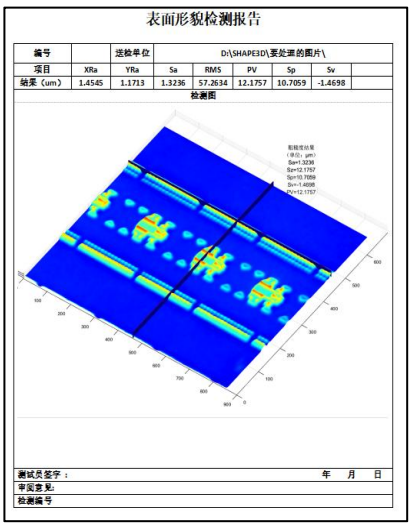
表面形貌检测报告

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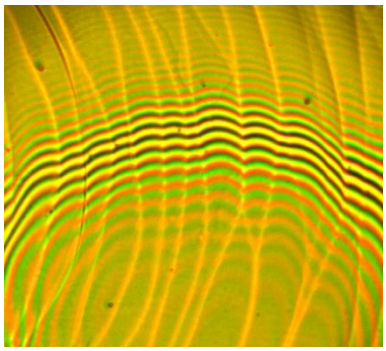
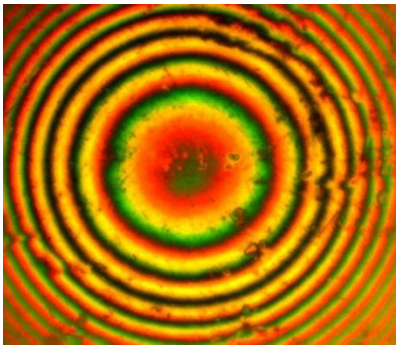
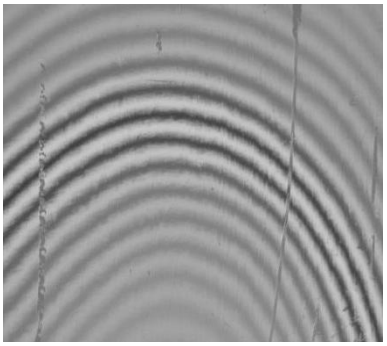
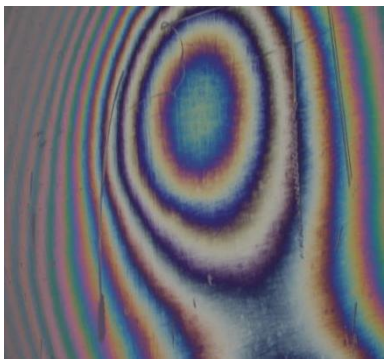
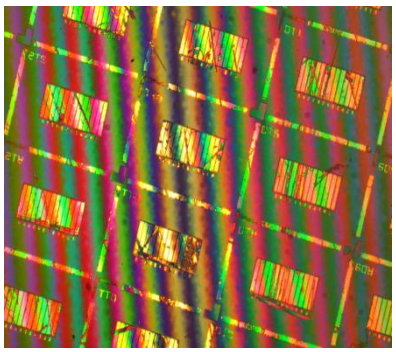
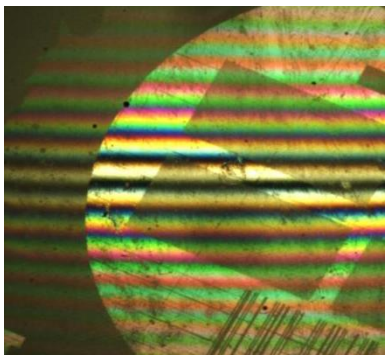
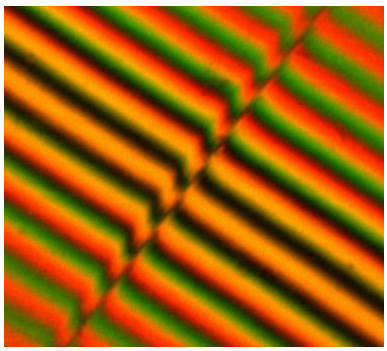
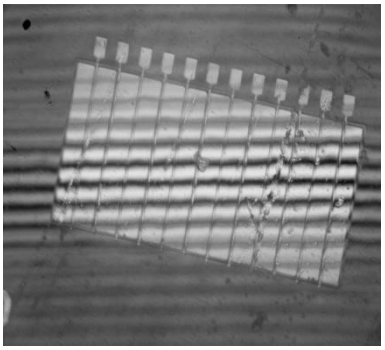
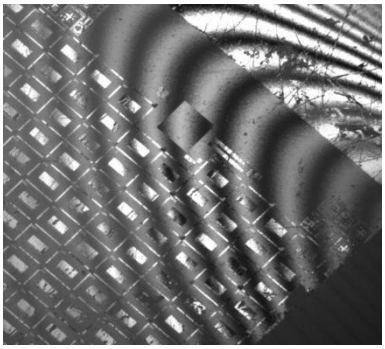
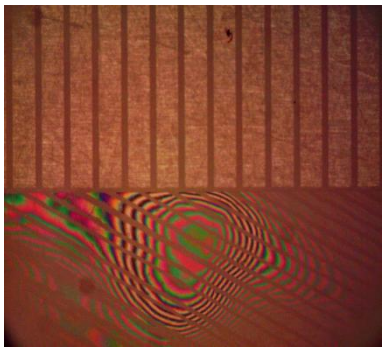
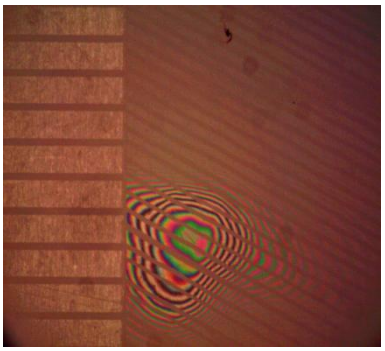
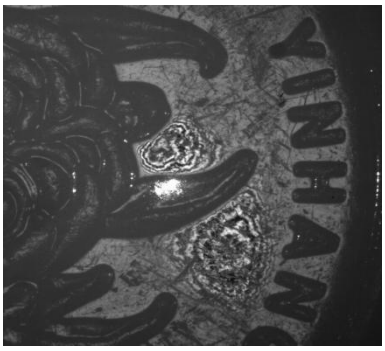
检测图

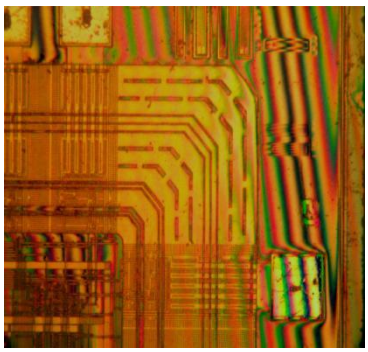
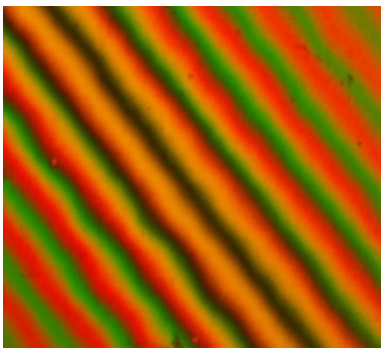
测试员签字： 年 月 日

审核意见：

检测编号：

Interference Fringe Examples

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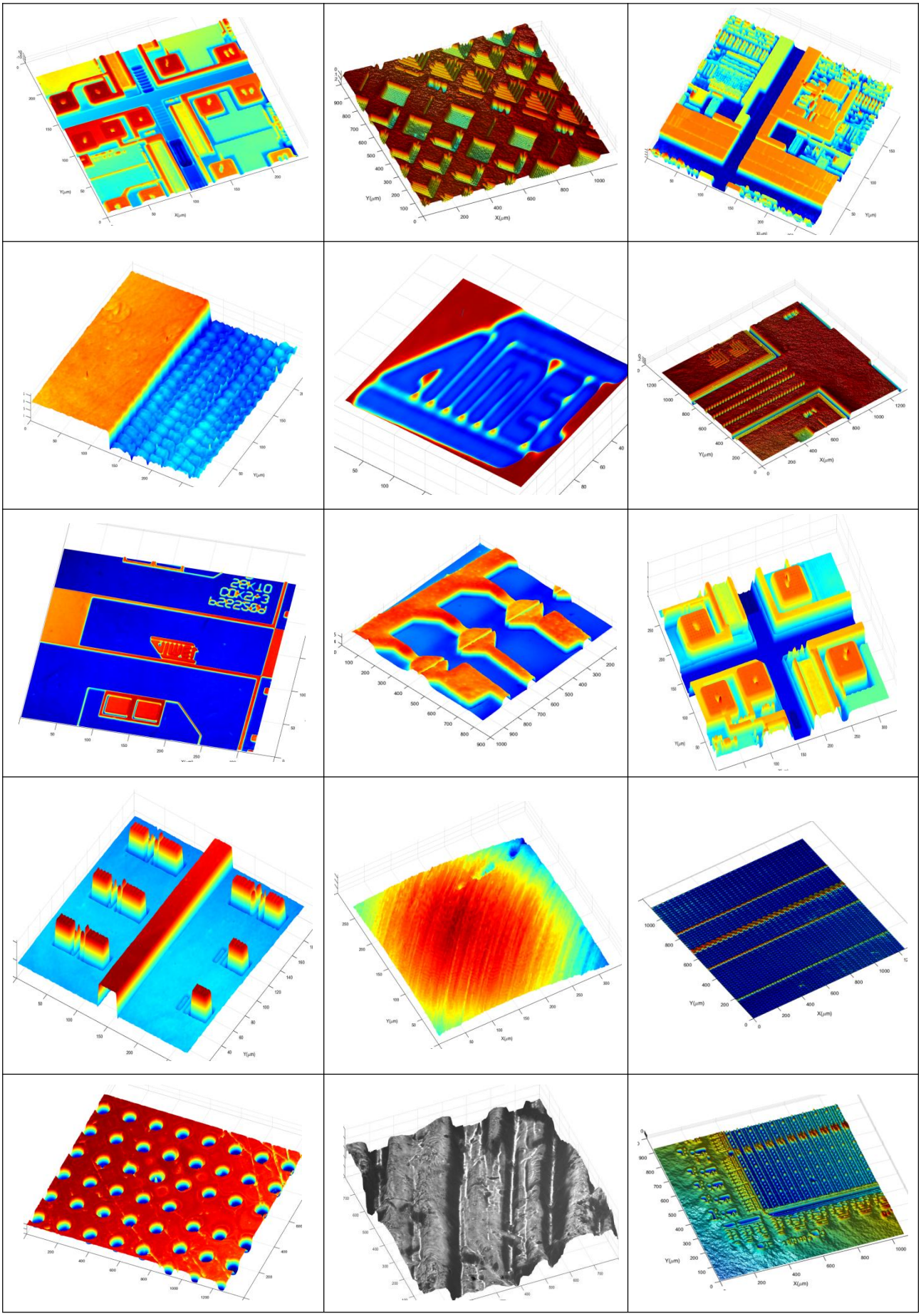

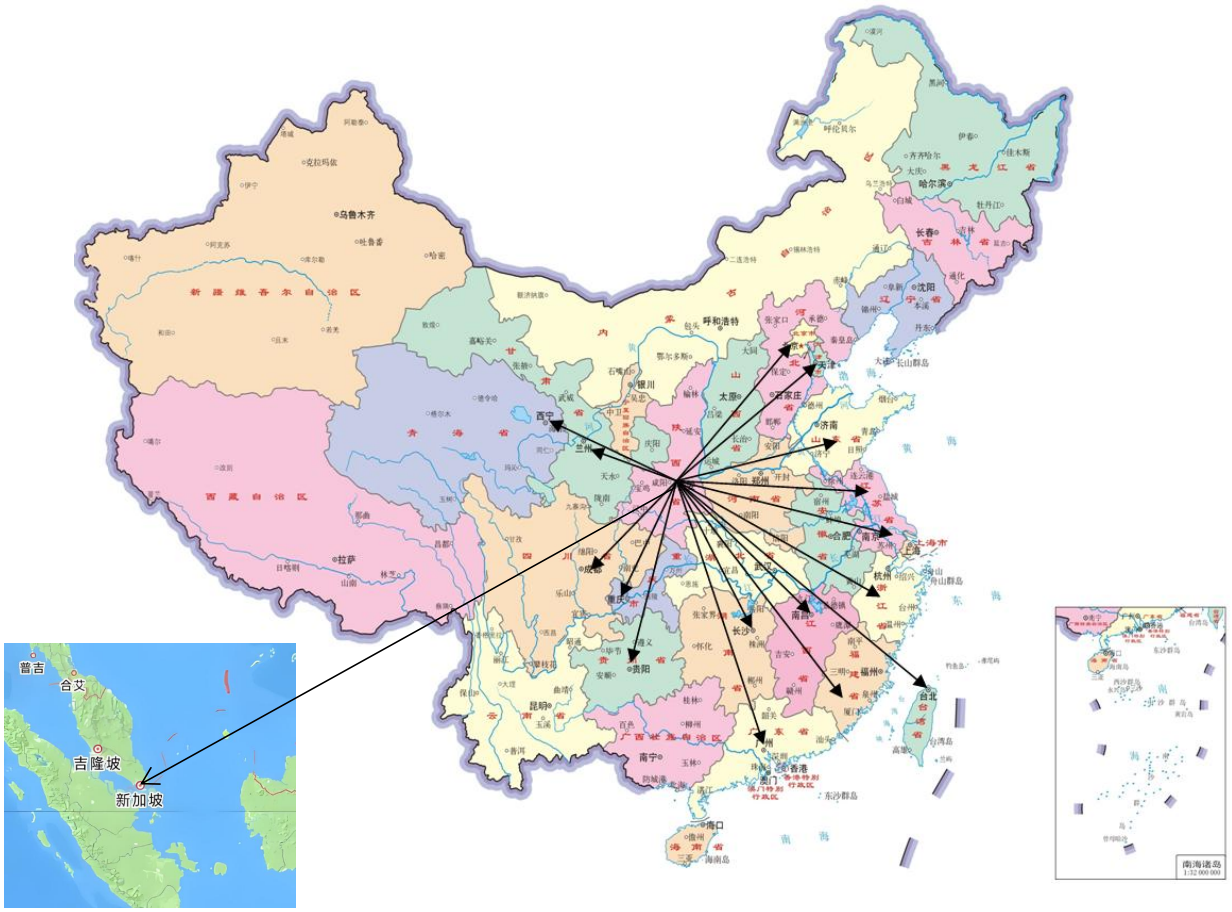

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