ADVANCED NAVIGATION & POSITIONING CORPORATION

ANPC

instrument landing system

model 1254

The Instrument Landing System is a state-of-the-art solution with unprecedented flexibility to serve a variety of terminal ATC applications.

[introducing ILS]

ANPC's patented transponder tracking technology provides high-precision aircraft positioning in real-time for fixed or tactical surveillance and all-weather access to airports and landing areas worldwide.

With a number of off-the-shelf and customizable deployment options available, the ILS can be configured to meet your specific ATC requirements.

The ILS supports current aircraft and Mode 3/A and Mode S (ADS-B) transponders to provide virtually any aircraft a precision approach with minimal deployment and training costs.

[ILS applications]

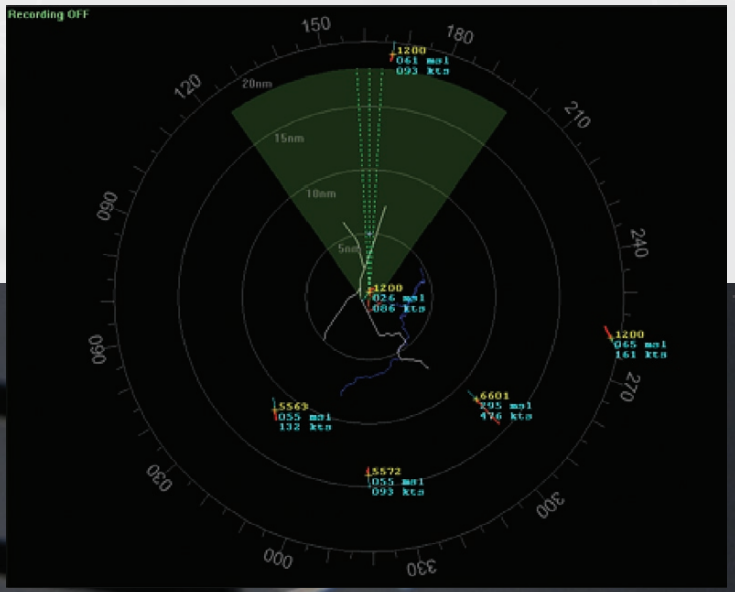
Precision approach for terrain-challenged airports

Temporary CAT II solution during primary ILS system outages

Tactical ATC solution for expeditionary forces

GCA capability without the need for expensive PAR

Disaster recovery and emergency services

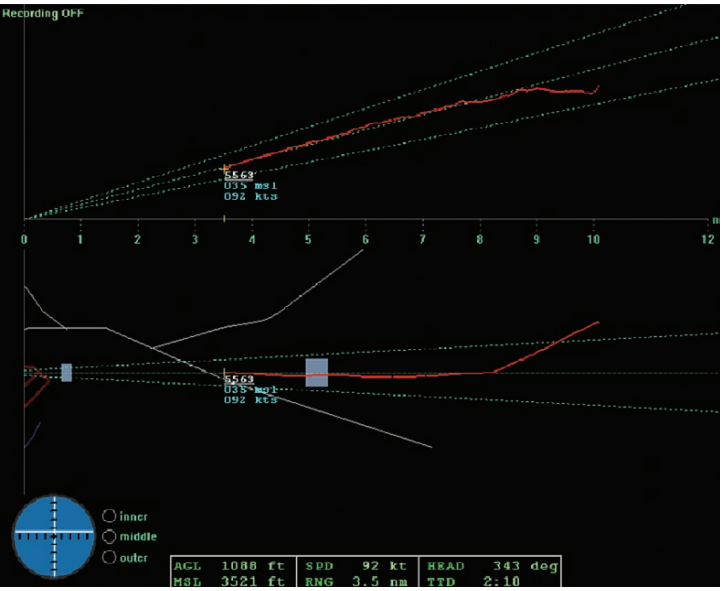


[ILS product overview]

The ILS is a precision approach guidance and surveillance system designed to provide all-weather airfield access and situational awareness for a number of challenging applications. The ILS provides the capabilities of a CAT II ILS where traditional ILS equipment cannot be sited due to rugged terrain or limited real estate, or where an existing ILS is out of service. In a transportable configuration, the Transportable ILS (TILS) is a highly mobile, rugged, and quickly deployable ATC solution for expeditionary forces during contingency operations. The ILS provides both approach guidance and terminal area surveillance in any environment.

Both training and airborne equipment required for ILS approaches are identical to that for traditional ILS or PAR guidance systems. Any aircraft—fixed or rotary-wing—equipped with an ILS localizer and glide slope receiver, Horizontal Situation Indicator (HSI) or Course Deviation Indicator (CDI), and a Mode 3/A or Mode S compatible transponder can fly an ILS approach. The guidance is presented to the pilot just as it would be for an ILS approach, but with less needle error for an even smoother approach.

For Ground Controlled Approach (GCA) operations, the ILS provides controllers with PAR-like displays for up to four aircraft. All ILS glide slope and localizer signal parameters comply with ICAO Annex 10 standards for Category II ILS, including accuracy, integrity, displacement sensitivity, clearance, alignment, modulation and frequency. The fixed-based ILS has been approved by the FAA for use in the National Airspace System.



[FEATURES]

Transportable and permanent configurations

ILS and PAR guidance to support all aircraft

Configurable approach paths, curved and segmented

Meets ICAO CAT II ILS specifications

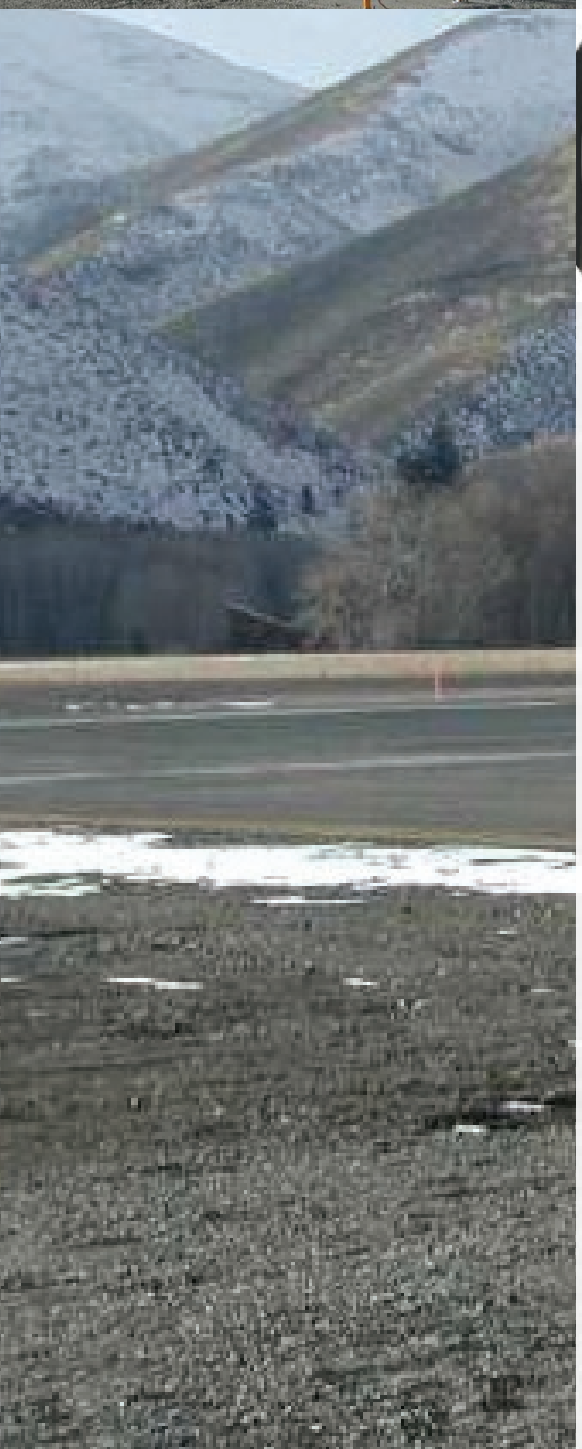
Superior update rate and positioning accuracy

[BENEFITS]

Precision approach guidance

Terminal area surveillance

Uses standard IFR avionics - no aircraft modifications required



[How the ILS works]

The ILS uses ground-based sensors to determine the aircraft's position in space from signals emitted by the aircraft's transponder. Localizer and glide slope corrections are transmitted to the aircraft to guide the pilot to the desired approach course and glide path. The pilot can then fly a precision approach to Category II minimum decision heights, just like flying an ILS.

The ILS monitors the position of all aircraft within operable range that have an active transponder. When the inbound aircraft transponder replies, typically from within 300 feet radial distance of the designated Initial Approach Fix (IAF) and within 200 feet altitude of the IAF intercept height, the ILS broadcasts guidance and Morse identification. Though the system is actively tracking all aircraft, ILS localizer and glide slope guidance signals are intended only for one aircraft at a time.

ILS operations are very simple. Upon request to fly the ILS approach, the controller inputs the transponder code of the aircraft into the ILS Remote Status and Control Unit. Within approximately 15 seconds the ILS will acquire the entered code, determine its position, and begin providing guidance to the pilot.

By measuring the angle-and time-of-arrival of aircraft transponder replies, the ILS is able to obtain significantly more accurate positioning information than other multilateration systems. For short-range surveillance applications, the ILS' 10Hz update rate provides a real-time positioning of all transponder-equipped aircraft in the defined service volume for situational awareness superior to conventional surveillance radar systems.

The minimum decision height and visibility for a given approach procedure are determined using TERPS/PAN-OPS analysis and must be in accordance with the available runway markings and approach lighting.

[TRANSPORTABLE SETUP AND OPERATION]

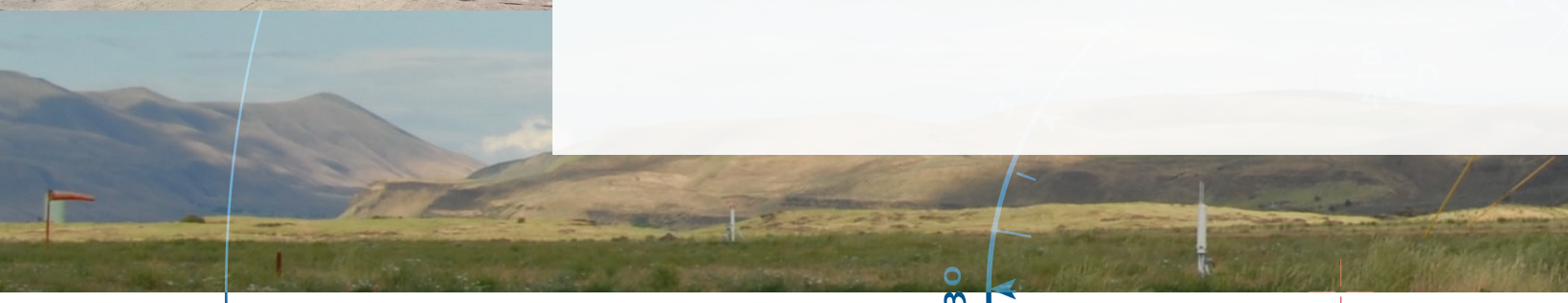
The Transportable ILS (TILS) can be deployed and made operational in less than 6 hours with 3 trained personnel. The system's configuration is flexible and is easily customized to siting or mission requirements. Components can be placed entirely on one side of or astride a runway/helipad. Once deployed and configured to Standby Mode, the ILS is ready to support flight operations.

For long term deployments monthly maintenance is prescribed in the Technical Instruction manual.

TILS can be uninstalled and packed for shipment in less than 2 hours by 3 personnel.

[Mobile ILS]

TILS mobility is applicable to humanitarian missions following natural disasters for air traffic control and as a landing aid for aircraft supporting disaster recovery. It is also applicable for early restoration of commercial operations at airfields where infrastructure has been heavily damaged. TILS humanitarian missions have both domestic and international applicability.



[REGULATORY COMPLIANCE]

Approach design is in accordance with 8260.3 CHG 19.

ILS frequency assignment principles also apply. Application for license is addressed to the FCC at www.fcc.org

[TRAINING]

A 20 day training course is required for ILS operators. The training course includes:

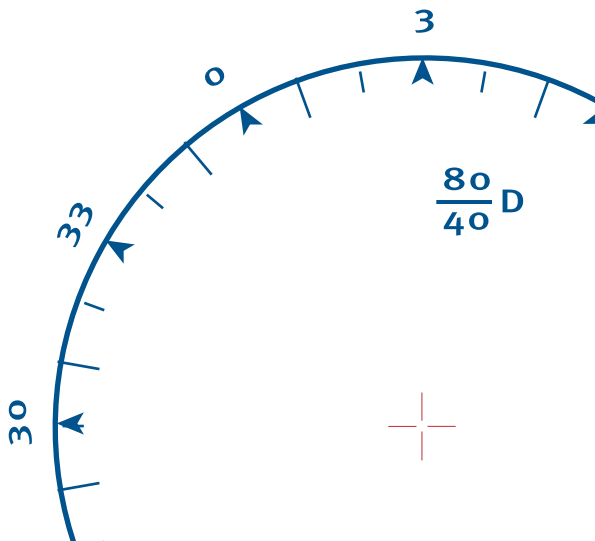
- Equipment siting and installation
- Configuring the monitor
- Calibration
- Maintenance
- Fault diagnoses and unit replacement

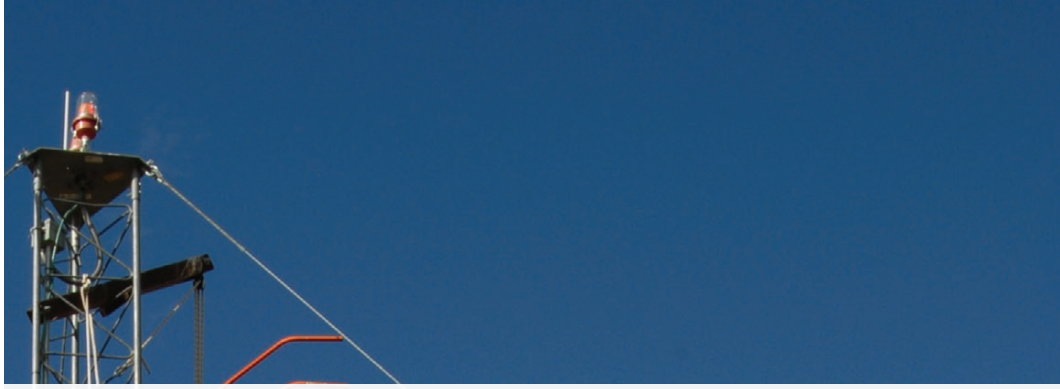
Pilot training is limited to a briefing on approach fixes land details noted on the approach plate, and Ground Operator communications where applicable.

[ILS components]

The ILS is comprised of the following equipment:

- Base Station Electronics Rack
- Elevation Sensor Assembly (ESA)
- Azimuth Sensor Assembly (ASA)
- Built-in-Test Equipment (BITE) Assembly
- Remote Control and Status Unit
- Ethernet network fiber-optic cabling
- Interrogation antenna and ILS guidance antenna
- Compact antenna support structures
- VHF Communication Radios to suit mission needs
- Option for TILS–3KVA Quiet Military Generator





[KEY PRODUCT FEATURES]

- Reliable and dependable
- Quickly deployable and operational
- ILS guidance and up to four simultaneous PAR displays
- Provides area surveillance
- Supports offset and segmented approach profiles
- No new aircraft equipment (uses existing aircraft IFF transponder, ILS receiver)
- Uses standard ILS flight procedures for straight-in approaches
- Configurable marker tones on localizer audio (no marker beacons required)

[DEPLOYMENT CONFIGURATION OPTIONS]

[FIXED BASE]

- Environmentally controlled Base Station shelter
- Maintenance technician workstation and tool storage
- Remote Status and Control Unit with 2-mile range

[TRANSPORTABLE–TRAILER-BASED]

- All equipment, power, and infrastructure self-contained on vehicle-independent trailer
- Environmentally controlled operator and maintenance shelter provided on trailer
- Quickly deployable antenna structures
- Tool storage

[TACTICAL–HMWWV-BASED]

- Environmentally controlled operator/ maintenance shelter
- Infrastructure and power on self-contained trailer
- Transportable by single C-130 or equivalent, Chinook helicopter, or railcar

[TRANSPORTABLE–RUGGEDIZED]

- Fully rugged transit cases for all system components
- Base station electronics housed in NATO shelter (pictured) or trailer

[ILS MODEL 1254 TECHNICAL CHARACTERSTICS]

System		Localizer	Glide Slope
Coverage	• Course	25NM/±10º	10 NM/±8º azimuth
	• Clearance	17 NM/±35º	
Course width		2º to 6º adjustable	1.75θ to 0.45θ (adjustable)
Glide angle			2º to 4º adjustable
Course Stability		+/-1 meter (typical)	< 0.04 degree
Transmitter frequency	• Range	108 to 112MHz	328.6 to 335.4 MHz
	• Stability	< 0.002%	< 0.002%
	• Course / Clearance	5 kHz to 14 KHz	4 kHz to 32 KHz
Nominal CSB power output	• Course	15 W	5 W
	• Clearance	1 W	5 W
Modulation frequency		90Hz and 150Hz	90 Hz and 150 Hz
accuracy		±0.01%	±0.01%
SDM Stability		±0.3%	<±0.5%
DDM Stability		±0.002%	<±0.3%
Total harmonic distortion		<1%(max)	<1%(max)
Course/clearance phase lock		<0.5º	<10º

Monitoring		
Number of monitor systems	2	2
DDM measurement accuracy	±0.002 DDM	±0.003 DDM
SDM measurement accuracy	±1.0%	±2.0%
DC voltage, main power,	Alert/ Alarm	Alert / Alarm
Morse ident, alignment, displacement sensitivity	0.5 to10 sec adjustable	0.5 to10 sec adjustable

Environmental conditions		
Indoor		
	• Ambient temperature	-10ºC to 55ºC
	• Relative humidity	Max 95%
Outdoor	• Ambient temperature	-50ºC to +70ºC
	• Relative humidity	Max 100%
	• Wind	Operational up to 160km/h
		Survivability 200 km/h
	• Ice	U to 1.25 cm

Power Supply	
Input voltage	220 VAC, 50 Hz
Power consumption	3 kW
Battery voltage	72 V

Safety		
Mean time Between outage (MTBO)	30,000 hours	30,000 hours
Integrity	1.2×10^{-11}	1.2×10^{-11}
Continuity Of Service	2.5×10^{-7}	2.5×10^{-7}
Availability	99.99%	99.99%