Such hybrids are applied in various TESAT space equipment like linearizers, channel amplifiers, frequency converters, low noise amplifiers, SSPAs, modulators, data link electronics, DC-controllers and optical communication systems (likely the hermetic variants) but also in commercial terrestrial applications (non-hermetic variants). The frequency range reaches up to V-band.

TESAT hybrids are suited for radar applications (T/R-modules, TRX-modules for satellite constellations or high throughput satellites) or SSPA building blocks for beam-forming antennas.

TESAT's microwave hybrid manufacturing services are offered in-house and also externally (http://tesat.de/en/services/microwave-hybrid-manufacturing).

All space modules are screened according to ECSS-Q-ST-60-05C including burn-in and life test monitoring.

5.4 AIRBUS DEFENCE & SPACE

The Process Capability Approval (PCA) of the Hybrid Line of Airbus Defence & Space in Elancourt, France, has been certified by ESA in accordance with the requirements of ESCC Basic specification No. 2566000.

The associated PID includes Airbus' manufacturing, assembly and test operations which have been approved for the supply of Hermetic Hybrid products for use in ESA space systems as a Category1, Option 1 Manufacturer, in accordance with ECSS-Q-ST-60-05C Rev.1

5.4.1 Contact Information

Address	ESCC Chief Inspector
Airbus Defence & Space 1, Boulevard Jean Moulin ZAC de la Clef Saint Pierre 78990 Elancourt, France	Mr. Dominique Mahasoro dominique.mahasoro@airbus.com

5.4.2 Process Capability Approval

Current PCA Certificate No.	Certified since:	Type Designation
345	Dec. 2016	Thick Film Hermetic Hybrid Integrated Circuits and HTCC Hermetic Hybrid Integrated Circuits

5.4.3 Capability Abstract

5.4.3.1 Capability Abstract Thick Film Hybrids

The PCA associated to the PID GM.HYBR.NT.220.V.MMS Ed.18 Rev.00 covers the ADS-Elancourt activities on manufacturing, testing, inspection and Quality Assurance of Thick Film Hermetic Hybrid microcircuits used for Space application (internal ADS equipment and external customers). Electronic functions performed by thick film hybrids are digital, analog, 1553 Bus (couplers, transceivers), low frequency and low power.

ADS-Elancourt is category 1 hybrid manufacturer and applies Lot Acceptance Tests Option1 Production lot control according to the PID and as defined in ECSS-Q-ST-60-05C Rev.1.

Active and passive chips (ASICs, Integrated circuits, Transistors, Diodes, Capacitors and Resistors) are adhesive attached on screen printed thick film alumina.
Interconnections between dice and substrate are performed by ultrasonic wire bonding.
Substrate is adhesive attached onto metal-based package.
Interconnections between substrate and package are performed by thermosonic wire bonding.
Metallic Flat Package (up to 40mm x 51mm) is hermetically sealed with lid under inert gas atmosphere.
The repair provisions (element replacement, wire re-bonding, delidding-relidding) are given in the PID.
Hybrid microcircuits are screened, according to the PID in conformance to the generic procurement specification ECSS-Q-ST-60-05C Rev.1.
Manufacturing and screening operations are performed according to procedures listed in the PID.
The procurement of passive and active parts, materials and piece parts are performed according to procurement specifications and incoming procedures, as detailed in PID.

5.4.3.2 Capability Approval HTTC MCM

The PCA associated to the PID GM.HYBR.NT.879.V.ASTR Ed.07 Rev.01 covers the ADS-Elancourt activities on manufacturing, testing, inspection and Quality Assurance of HTCC Hermetic Hybrid microcircuits used for Space application (internal ADS equipment and external customers). Electronic functions performed by HTCC hybrid microcircuits are digital, analog, 1553 Bus (couplers, transceivers), low frequency and low power.

ADS-Elancourt is a Category 1 hybrids manufacturer and applies Screening tests and Lot acceptance Tests Option1 Production lot control according to the PID and as defined in ECSS-Q-ST-60-05C Rev.1.

Active and passive chips (ASICs, Integrated circuits, Transistors, Diodes, Capacitors and Resistors) are adhesive attached onto Multilayer HTCC Aluminium Nitride package.
Interconnections between dice and HTCC package are performed by ultrasonic wire bonding.
Ceramic Flat package (up to 43mm x 30 mm) is hermetically sealed with lid under inert gas atmosphere.
Then hybrid microcircuits are screened, according to the PID in conformance to the generic procurement specification ECSS-Q-ST-60-05C Rev.1.
Manufacturing and screening operations are performed according to procedures listed in the PID.
The repair provisions (element replacement, wire re-bonding, delidding-relidding) are given in the PID.
The procurement of passive and active parts, materials and piece parts are performed according to procurement specifications and incoming procedures, as detailed in PID.