

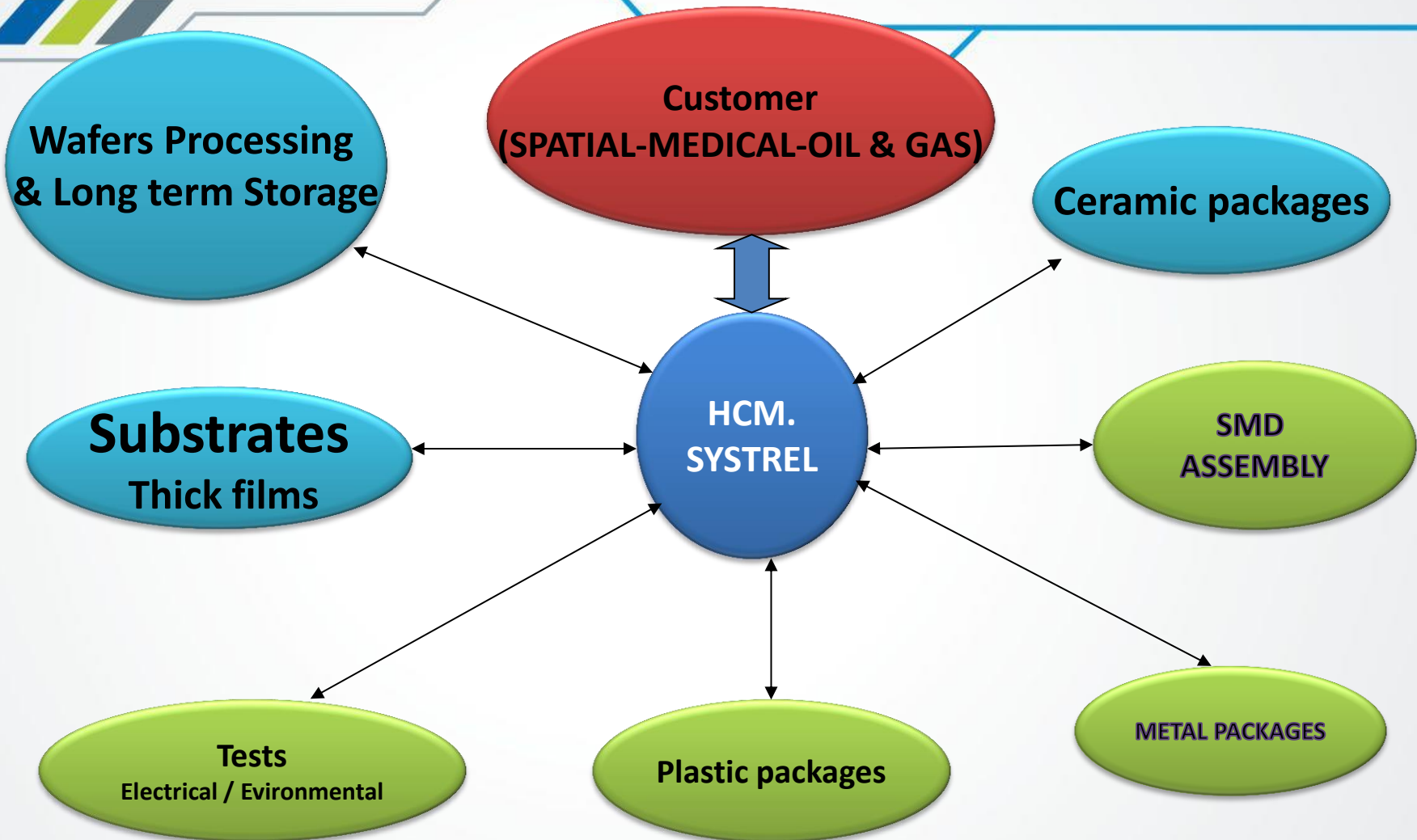


HCM.SYSTREL
Serma Group

ITAR FREE COLUMN ATTACH
ESA Contract No:107948/13/NL/Cbi
CONTRACTOR : ATMEL

AUTHOR : W.AKLAMAVO.







AEROSPACE INDUSTRY REQUIREMENTS FOR SATELLITE APPLICATIONS

- INCREASED ELECTRONIC SYSTEM PERFORMANCE
- HARSH SIZES & WEIGHT

needs

HIGH PIN COUNTS COMPONENTS & ADVANCED PACKAGING

BALL REPLACEMENT BY REINFORCED COPPER COLUMN ON CGA → **HIGHER PACKAGE RELIABILITY DUE TO :**

- **HIGHER STAND-OFF AND STRUCTURAL FLEXIBILITY**
- **AVOIDANCE OF CTE MISMATCHES WITH PCBs**

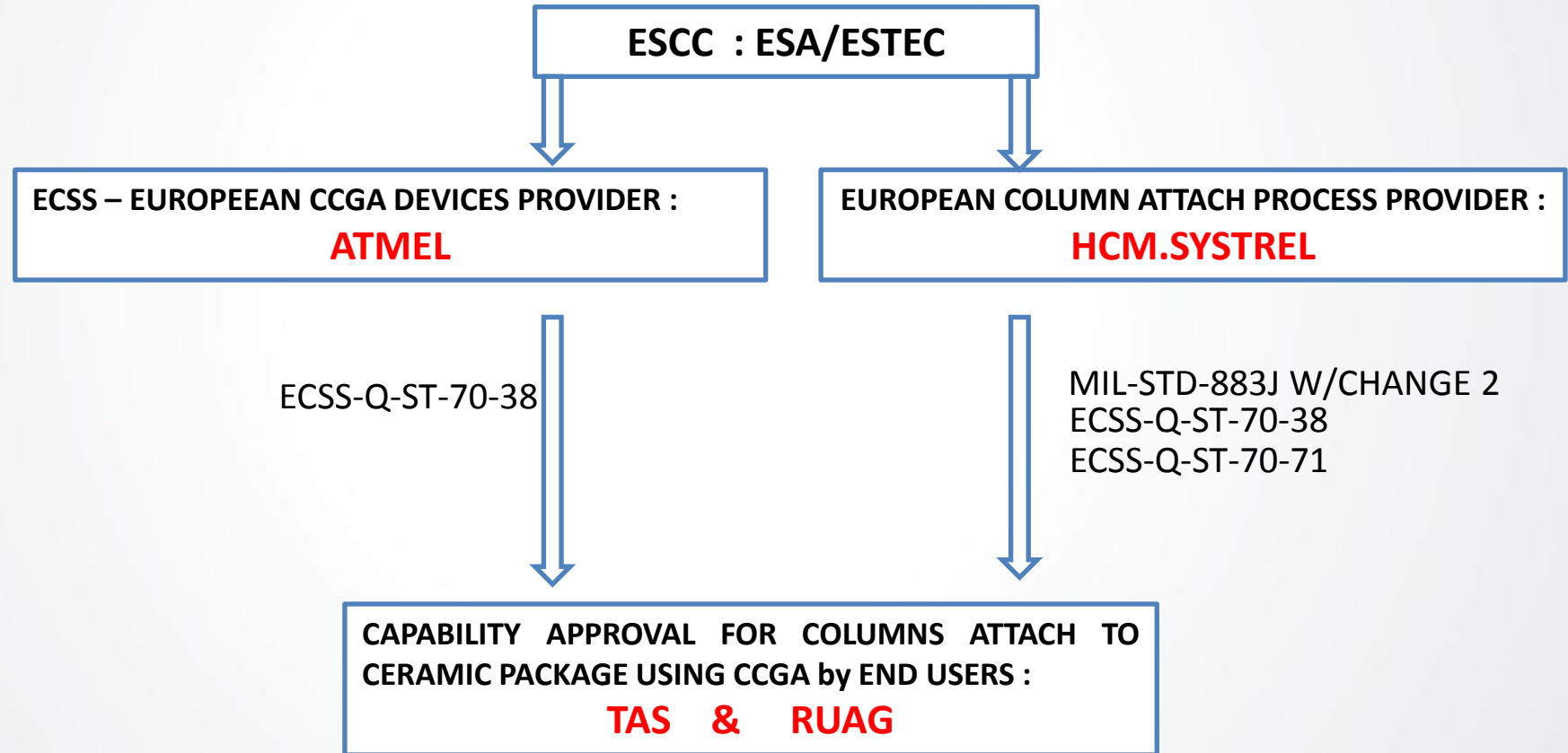
BACKGROUND II

NON-EXISTENCE OF EUROPEAN ITAR-FREE
SOURCE FOR COLUMN ATTACH

NTK MCGA TECHNOLOGY END OF LIFE

- SCHEDULE ISSUES
- HIGH PROBABILITY OF REWORK DUE TO IMPROPER HANDLING
- COST IMPACT DUE TO REWORK ISSUES
- POTENTIAL ITAR ISSUES

ESTABLISHMENT OF A EUROPEAN COLUMN TECHNOLOGY SUPPLY AND ASSEMBLY CHAIN
(ESA Contract No:107948/13/NL/Cbi)





OUR COLUMN TYPE COVERAGE :

- TYPICAL BODY SIZES : A RANGE from 14mm² to 52.5mm²
- TYPICAL PIN COUNTS : from 256 to 1752 (and more)
- PIN PITCHES : from 0.80 mm to 1.00mm & 1.27mm

REINFORCED COLUMNS MAIN MATERIALS :

- CORE MATERIAL : 85Pb15Sn WITH TINNED COPPER WRAPPED ALL AROUND
- COLUMN DIAMETER : 0.381mm
- COLUMN LENGTH : 2.21mm.

HCM.SYSTREL & PARTNERS FACED TWO MAIN CHALLENGES :

- **COLUMNS BUILDING** → NEW EQUIPMENT (ATMEL property) DESIGNED & COMPLETELY BUILT-UP WITH SOGETI HIGH TECH (HCM.SYSTREL HISTORICAL PARTNER), A CAP GEMINI DIVISION.
- **COLUMNS ATTACH ON CCGA** → HCM.SYSTREL INTERNAL NEW PROCESS FLOW.

BUILDING OF COLUMNS ACHIEVEMENT → CONSTRUCTION OF A NEW PROTOTYPE
(ATMEL property) : AN “IN-LINE” & AUTOMATIC EQUIPMENT WHICH IS UNDER
QUALIFICATION IN HCM.SYSTREL PLANT (La Rochelle) : **FULLY OPERATIONAL BY
BEGINNING OF Q3.**

COMBINATION OF THE EQUIPMENT IS :

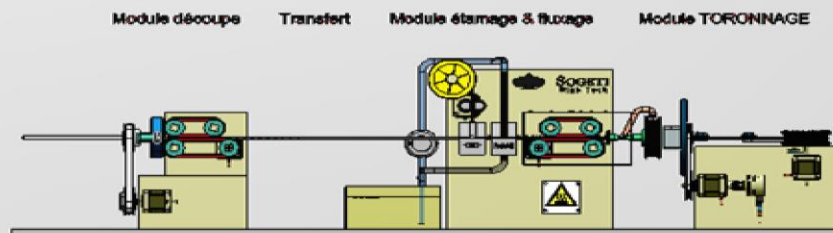
- **LINEAR WINDING MODULE** USING COPPER RIBBON AND Pb85Sn15 CORE WIRE
(comply with ECSS-Q-ST70-71)
- **LINEAR WIRE TINNING MODULE** USING ROLO FLUX.
- **INDEPENDENT FINAL COLUMNS CUTTING MODULE** ENSURING REGULAR CUT WITH
NO BURRS.

PROCESS CONTROL ON FINAL COLUMNS:

- NO BURRS
- COLUMN DIAMETER
- VOIDS QUANTITY
- CROSS-SECTION VERIFICATION
- WINDING PITCH VERIFICATION

PLEASE FIND HEREAFTER A SHORT VIDEO OF THE EQUIPMENT COMBINING THE 3 MODULES :

TORONNEUSE DE COLONNES RENFORCEES



COLUMN ATTACH PROCESS ON ATMEL's CCGA IS HCM.SYSTREL PROPERTY AND **COMPLY WITH MIL STD 883J CHANGE 1.** IT HAD BEEN DEVELOPPED ON LGA1752.

MAIN ADVANTAGES :

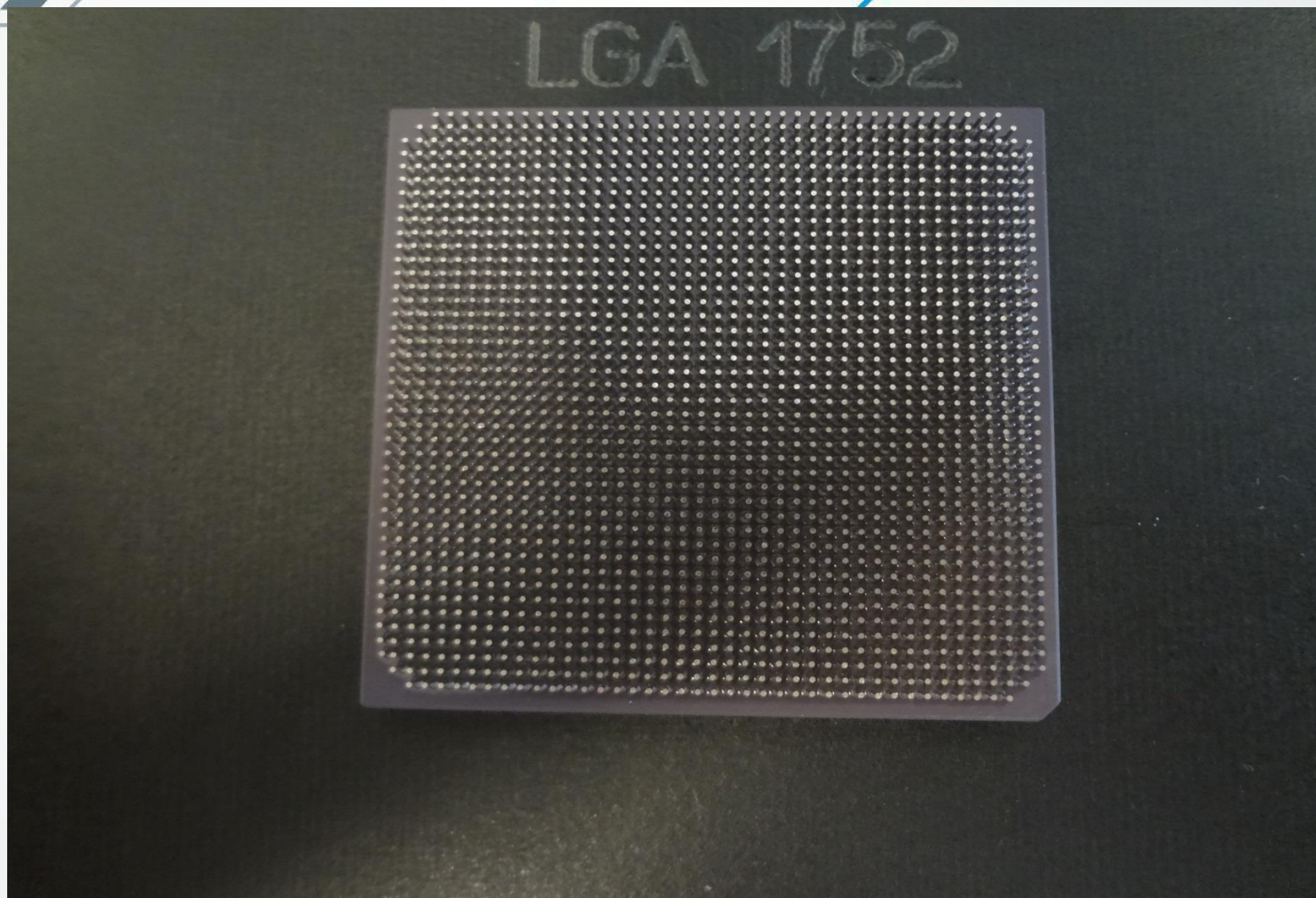
- MINIMIZE THE THERMAL PROFILES APPLIED TO THE COLUMNS,
- PRESERVE COLUMNS INTEGRITY WITH MINIMAL RISK OF HAZARDOUS BENDINGS

MAINS CHALLENGES :

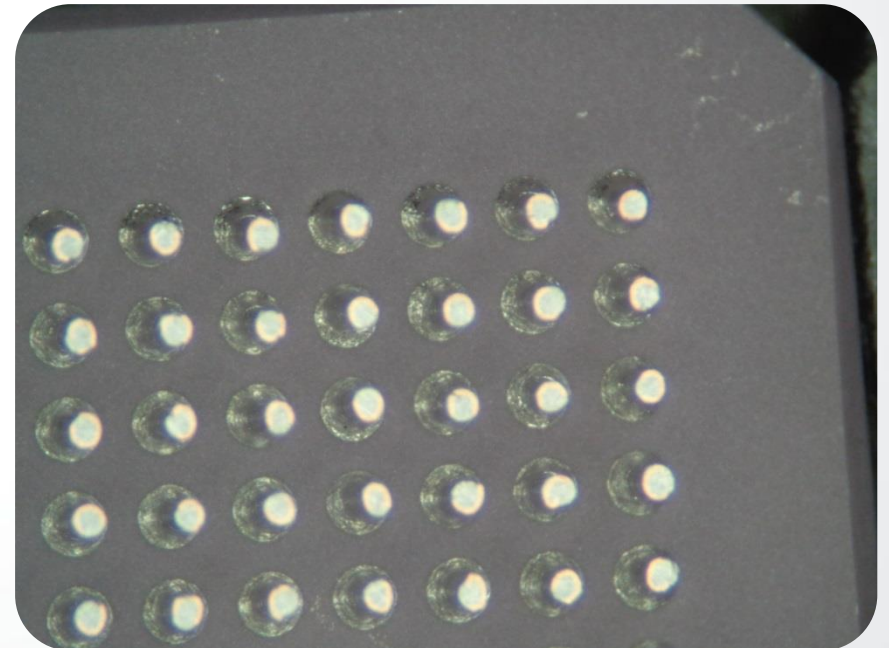
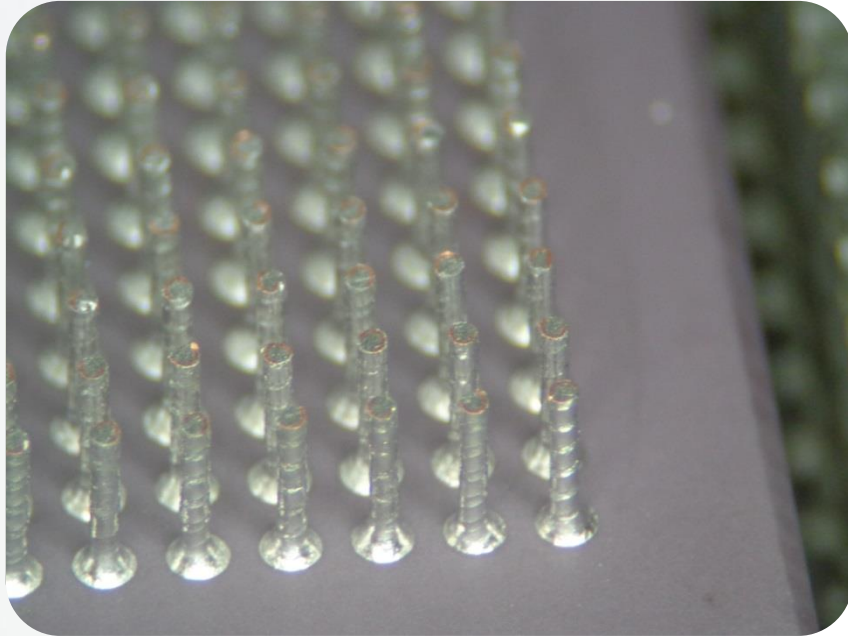
- TO BE ABLE TO ASSEMBLE COLUMNS ON CCGA WITH SPECIFIC CARE FOR COLUMNS HOLD DURING REFLOW.
- AVOIDANCE OF COLUMNS BENDING AT ANY STEP OF THE PROCESS.
- COMPATIBILITY OF THE PRODUCED COLUMNS WITH FINAL USER REFLOW PROCESS.
- COMPATIBILITY WITH SPACE APPLICATIONS.

SOLUTION : USE OF A “ALL-IN-ONE” TOOL WITH SPECIFIC MATERIAL FOR THE WHOLE PROCESS.

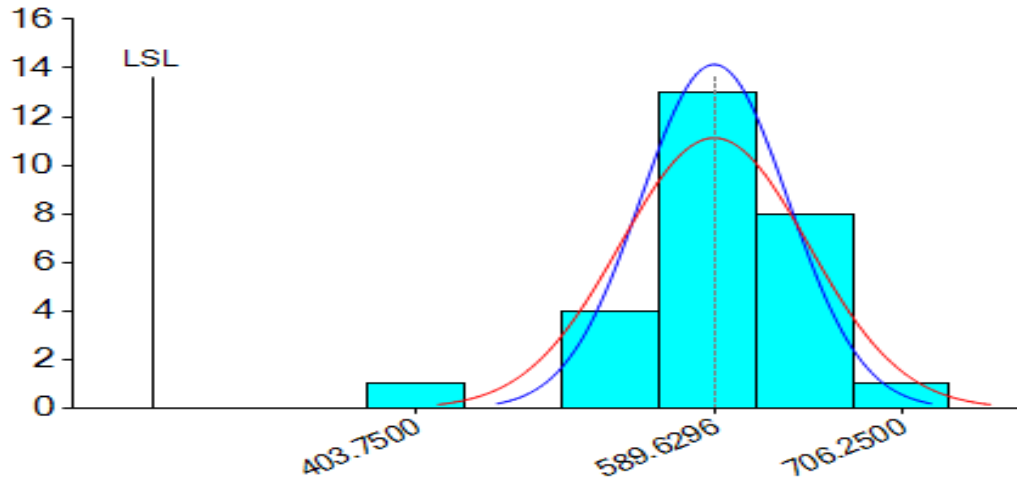
LGA1752 PICTURES



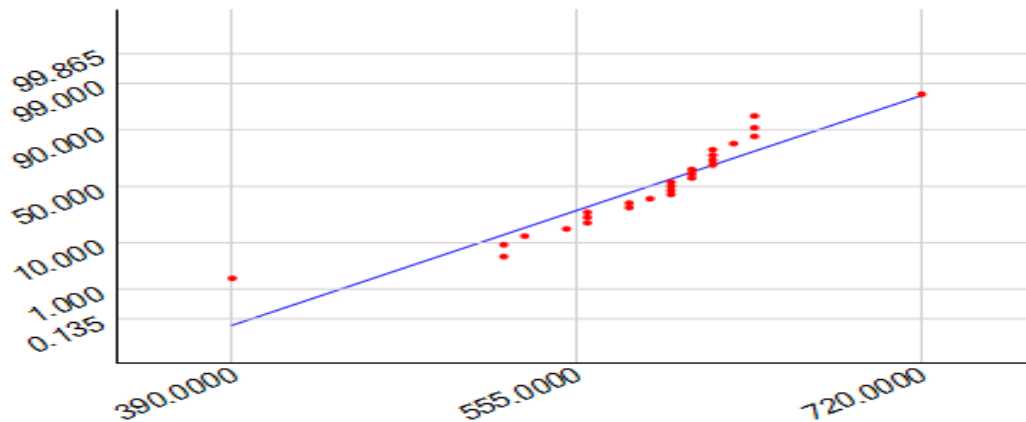
COLUMNS PICTURES



LGA1752 PULL-TEST RESULTS @ T0



**HCM.SYSTREL COLUMNS
COMPLY WITH MIL STD 883J
CHANGE 1 METHOD 2038
WHICH STATES THAT COLUMN
PULL-TEST MINIMUM SHALL
BE 240g F**



Readings	100
St. Dev.	46.03
LSL	240 g
CpK	2.53
X-Bar	589.62
Min	390
Max	720

TILT & LENGTH CONTROL MEAN : PROGRAMMABLE NIKON HEIGHT CONTROLLER FOR SAMPLING OR FULL COLUMN MATRIX MEASUREMENT WITH AN UNCERTAINTY OF 7µm .

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Q3 2014 :

- SOLDERABILITY TEST
- “COLUMNED SUBSTRATES” REWORK QUALIFICATION
- COPLANARITY PROCESS.

Q3-Q4 2014 :

- ATMEL , TAS & RUAG PROTOTYPES DELIVERY & MACHINE QUALIFICATION

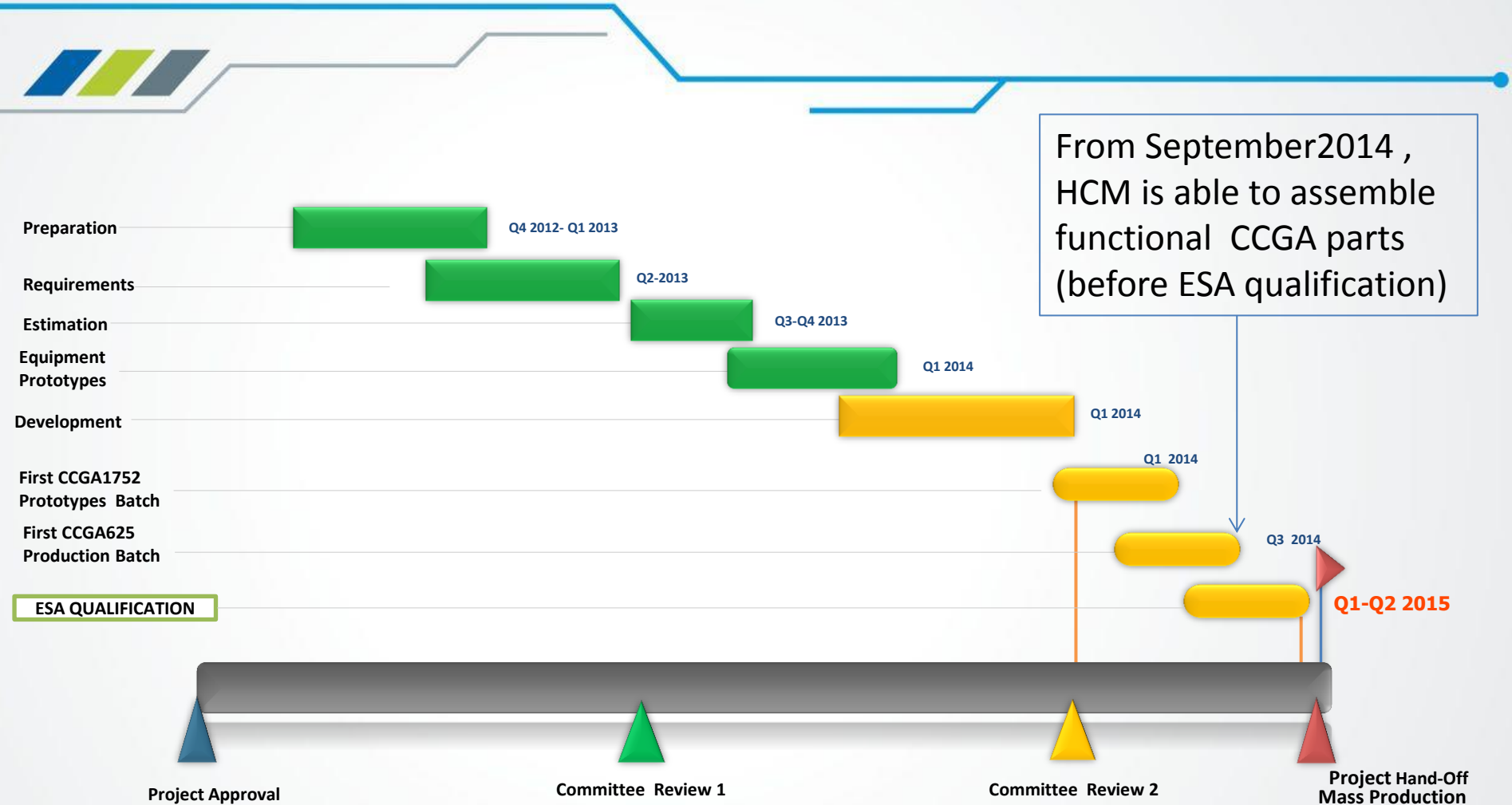
Q1 2015:

- ESA QUALIFICATION EXPECTED

GENERIC TOOL AVAILABLE FOR ALL HCM.SYSTREL's CUSTOMER.

IF SUBSTRATE EXTERNAL DESIGN APPEARS TO BE SPECIFIC, DEDICATED TOOLS CAN BE BUILD UP.

COLUMN ATTACH TIMELINE





THANK YOU FOR YOUR ATTENTION