

Procedura aperta, ai sensi dell'art. 71 del D.Lgs. 36/2023, per l'affidamento della "Fornitura e posa in opera di una Automated Fiber Placement (afp) Robotic Cell" - CIG B22F839D3E

Verbale della Commissione di Valutazione Tecnica

CHIUSURA FASE DI VALUTAZIONE DELLA DOCUMENTAZIONE TECNICA

Sono presenti :

- Ing. Federico De Filippis (Presidente)
- Ing. Paola Spena (Commissario)
- Dott.ssa Filomena Piscitelli (Commisario)

Il presente verbale contiene il resoconto dettagliato dei lavori della Commissione di Valutazione Tecnica e le conclusioni.

Il giorno 13 dicembre 2024, venerdì, alle ore 12.00, è stata tenuta la seduta, a seguito della quale la documentazione tecnica è stata resa disponibile alla Commissione Giudicatrice Tecnica. Durante tale seduta è stata verificata e confermata la presenza nella 'BUSTA TECNICA' di tutti documenti richiesti da disciplinare di gara.

Il 16 dicembre 2024, lunedì, la Commissione Giudicatrice Tecnica si è insediata (incontro telematico). I tre membri della Commissione Giudicatrice Tecnica (Ing. Federico De Filippis, Presidente; Dottorssa Filomena Piscitelli, Commissario; Ing. Paola Spena, Commissario) hanno concordato di partire con individuali letture del Capitolato, del Disciplinare e della Documentazione Tecnica ricevuta per affrontare i lavori con giusta cognizione; è stato deciso di riaggiornarsi ad immediatamente dopo le vacanze natalizie.

La Commissione Giudicatrice si è successivamente riunita il giorno 8 gennaio 2025 e ha avviato i lavori il cui sviluppo è nel seguito descritto.

Le proposte tecniche da analizzare sono risultate due:

1. una prima della **Società COMEC** ed
2. una seconda del **Gruppo ESEA**.

In accordo a quanto richiesto nel disciplinare di gara, entrambe le proposte

- sono state redatte in *lingua inglese*,
- non contengono assolutamente alcuna *indicazione di costi* o qualsiasi altra indicazione economica,
- contengono un elenco dei requisiti, di cui al punto 2.1 del Capitolato Tecnico, e ciascun requisito risulta successivamente sviluppato nel dettaglio,
- dall'indice, risultano contenere le seguenti sezioni:
 - a. Documenti Applicabili
 - b. Matrice di Conformità della proposta
 - c. Panoramica della Fornitura
 - d. Descrizione Tecnica della Fornitura
Req. 2-1.... Req. 3-2
 - e. Risultati e Relazioni Tecniche su esperienze precedenti.

Analisi da parte della Commissione della Sezione **a. Documenti Applicabili**

E' stato rilevato che:

- COMEC ha elencato n. 10 documenti: gli Standard Tecnici adottati (Norme UNI e norme CEI)
- Il Gruppo ESEA ha elencato n. 16 documenti in totale, tra cui parimenti n. 10 tra norme UNI e norme CEI. Inoltre ha specificato anche n. 3 direttive dell'Unione Europea, n. 2 Decreti Legislativi da cui sono scaturite norme tecniche e, mera completezza, il Capitolato Tecnico

Le norme UNI e CEI citate in entrambe le proposte sono risultate essere realmente quelle attese applicabili alla presente fornitura.

Analisi da parte della Commissione della Sezione **b. Matrice di Conformità della proposta**

Entrambe le proposte riportano la richiesta Matrice di Conformità concordemente a quanto richiesto nel disciplinare. In esse tabelle sono riportati i 58 requisiti richiesti dalla Specifica d'acquisito. Si segnala che tale Tabella è riportata da COMEC, senza la colonna con traduzione in Italiano, ma questa mancanza è ritenuta priva di sostanza ai fini della comprensione della proposta stessa per la Commissione Tecnica Giudicatrice.

COMEC ha indicato in tabella che la fornitura proposta rispetta tutti i requisiti e quindi contrassegna ognuno di esso come Conforme eccetto per:

- Req 2-35 'Possible quality monitoring system' contrassegnato come NC (Non Conforme)

Gruppo ESEA indica anch'essa che la fornitura proposta rispetta tutti i requisiti e quindi contrassegna ognuno di esso come Conforme eccetto per:

- Req. 2-13 'Possible tooling free maintenance' contrassegnato come PC (Parzialmente Conforme)
- Req. 2-15 'Roller Conformability' contrassegnato come PC (Parzialmente Conforme)
- Req. 2-24 'Cut and restart improvement' contrassegnato come NC (Non Conforme)
- Req. 2-29 'Accuracy and repeatability' contrassegnato come NC (Non Conforme)
- Req 2-35 'Possible quality monitoring system' contrassegnato come NC (Non Conforme)

Analisi da parte della Commissione della Sezione **c. Panoramica della Fornitura**

Entrambe le proposte presentano una sezione con la 'Panoramica della Fornitura (Supply Overview)' della lunghezza di circa due pagine corredata di figure. Il Gruppo ESEA ha mostrato anche fotografie della testa proposta montata su un robot Kuka (come da richiesta del disciplinare). COMEC riporta solo disegni 2D/3D dell'assembly Robot+testa+binario proposto.

Qualitativamente la sezione 'Panoramica della Fornitura' riportata da COMEC, ha contenuti che non forniscono valore aggiunto alla valutazione della proposta in quanto limitata a riportare genericamente le caratteristiche generali della fornitura così come richieste dal Capitolato. Laddove, la stessa sezione, come riportata dal Gruppo ESEA, espone con chiarezza le principali caratteristiche tecniche specifiche e le originalità del prodotto offerto, costituito da una macchina standardizzata e completa, già utilizzata in applicazioni per l'aerospazio.

Analisi da parte della Commissione della Sezione **d. Descrizione della Fornitura**

Nella sezione di 'Descrizione della Fornitura' i due offerenti, come richiesto, per ogni singolo requisito elencato in specifica, hanno presentato una descrizione utilizzando, ove possibile, dati numerici, immagini, disegni con quote numeriche, documenti di riferimento ed allegati e la conformità al requisito.

La Commissione Giudicatrice ha ispezionato i contenuti di tali descrizioni, requisito per requisito. Tale lavoro di analisi si è supportato di un foglio di calcolo Excel sul quale sono state tracciate via via le informazioni dedotte, tutto in formato idoneo a verificare il rispetto effettivo del requisito, gli elementi sulla qualità delle descrizioni e di quanto proposto, le possibili parametrizzazioni quantitative ed il confronto fra quanto nelle diverse offerte. In allegato al presente verbale la Commissione Tecnica Giudicatrice ha reso disponibile detto foglio Excel per eventuali necessità di verifica che possano insorgere nel futuro.

In prima istanza, l'analisi effettuata ha consentito alla Commissione di esprimersi circa la **Completezza** di ciascuna proposta tecnica, attenendosi a quanto richiesto dal disciplinare e cioè valutando gli aspetti seguenti:

A: Completezza	Completezza rispetto all'analisi di ciascun requisito e alla corrispondente descrizione dettagliata della soluzione proposta		
	Presenza nella proposta tecnica di: – paragrafi specifici per ciascuno e per tutti i requisiti elencati nel presente documento – dati numerici, immagini, disegni con citazioni, documenti di riferimento allegati – l'indicazione esplicita di conformità/non conformità – valore ottenibile per ciascun parametro prestazionale misurabile – adeguata implementazione di test specifici – mediante simulazione e/o mediante sperimentazione – come richiesto nelle fasi di pre-accettazione e accettazione	15	Criterio 1

Come riscontrabile dal Foglio Excel allegato, e come richiesto da disciplinare, l'analisi svolta ha consentito di effettuare una valutazione qualitativa tra le offerte in cinque livelli (molto basso. Basso, adeguato, buono, eccellente) convertito nei valori numerici (0, 0.25, 0.5, 0.75, 1) e poi questo numero è stato moltiplicato per 15.

La Commissione ha attribuito la seguente valutazione qualitativa alle due proposte:

- **Gruppo ESEA:** la proposta è risultata, rispetto alla richiesta di completezza ad un livello qualitativo **ECCELLENTE** (valore numerico associato **1**),
- **Società COMEC:** la proposta è risultata, rispetto alla richiesta di completezza ad un livello qualitativo **ADEGUATO** (valore numerico associato **0,5**)

Pertanto la Commissione Tecnica Giudicatrice, rispetto alla **COMPLETEZZA**, attribuisce i seguenti punteggi:

Gruppo ESEA **n. 15 punti**

Società COMEC **n. 7.5 punti**

La Commissione Tecnica Giudicatrice ha, in seconda istanza, preso visione per valutazione l'ulteriore documentazione prodotta dagli offerenti a supporto della proposta. Questa documentazione è espressamente richiesta, dalla Specifica Tecnica e dal Disciplinare di gara, relativamente ad alcuni specifici requisiti tra quelli della lista. L'analisi di tale documentazione di supporto è stata svolta dalla Commissione in concomitanza a quella sulla Completezza della proposta. Poiché le descrizioni in risposta ad ogni requisito sono state analizzate una per volta, laddove ci si è trovati di fronte ad uno di

quelli che ‘mandatory’ richiedeva tale documentazione aggiuntiva, questa è stata ispezionata e i rilievi emersi sono stati riportati sul foglio Excel, di cui si è detto in precedenza, allegato al presente verbale.

L’analisi effettuata ha consentito alla Commissione di esprimersi circa la qualità e quantità della documentazione di supporto di ciascuna proposta tecnica, attenendosi a quanto richiesto dal disciplinare e cioè valutando gli aspetti seguenti:

B-Qualità e quantità della documentazione riferita ai risultati delle esperienze pregresse	DOCUMENTAZIONE E DOCUMENTAZIONE		
	Presenza nella proposta tecnica di – riferimenti documentati a supporto della dichiarazione dei valori dei parametri ottenibili, sia per le prestazioni obbligatorie che per quelle con punteggio – risultati di test disponibili da precedenti esperienze con la stessa configurazione AFP (almeno robot antropomorfo+testa AFP), riferiti e allegati alla proposta sotto forma di relazioni tecniche specifiche.	10	Criterio 1

Come riscontrabile da Foglio Excel allegato, e come richiesto da disciplinare, l’analisi svolta ha consentito di effettuare una valutazione qualitativa tra le offerte in cinque livelli (molto basso, Basso, adeguato, buono, eccellente) convertito nei valori numerici (0, 0.25, 0.5, 0.75, 1) e poi questo numero è stato moltiplicato per 10.

La Commissione ha attribuito la seguente valutazione qualitativa alle due proposte:

- **Gruppo ESEA:** la proposta è risultata, rispetto alla richiesta di completezza ad un livello qualitativo **ECCELLENTE** (valore numerico associato **1,00**),
- **Società COMEC:** la proposta è risultata, rispetto alla richiesta di completezza ad un livello qualitativo **MOLTO BASSO** (valore numerico associato **0,00**)

Pertanto la Commissione Tecnica Giudicatrice, rispetto alla **DOCUMENTAZIONE DI SUPPORTO** attribuisce i seguenti punteggi:

Gruppo ESEA **n. 10 punti**

Società COMEC **n. 0 punti**

A riguardo dei punteggi assegnati dopo la valutazione della documentazione tecnica di supporto, la Commissione, oltre all’analisi dettagliata riportata nel foglio Excel allegato, ha effettuato una valutazione sintetica.

In particolare, ha considerato che la documentazione del Gruppo ESEA includeva test di accettazione realizzati mediante una configurazione AFP (robot + testa) identica a quella proposta nell’Offerta Tecnica. Inoltre, come valore aggiunto, questi report dimostrano il corretto funzionamento e le prestazioni di una fornitura già installata e utilizzata da clienti industriali e che ha già realizzato prodotti per l’aerospazio-

Al contrario, la documentazione tecnica di supporto fornita dalla società COMEC si riferisce a test effettuati con una testa di proprietà COMEC INNOVATION utilizzata nel dipartimento di ricerca e sviluppo della sede centrale di COMEC (come dichiarato dallo stesso fornitore nella sezione 5 della sua offerta tecnica). Inoltre, la Società COMEC non riferisce di installazioni pregresse o applicazioni industriali della configurazione AFP (robot + testa) proposta nell’offerta tecnica.

La Commissione ha quindi ritenuto significativa la differenza qualitativa tra la documentazione di un prodotto consolidato e già utilizzato e quella di un prodotto ancora prototipale (come si deduce dal materiale fornito dalla Società COMEC). Per questo motivo, ha giudicato **ECCELLENTE** il livello qualitativo della documentazione del Gruppo ESEA e **MOLTO BASSO** quello della Società COMEC.

La Commissione Giudicatrice a completamento della propria attività finalizzata all'attribuzione dei punteggi tecnici, ha infine assegnato i punti relativi ai così detti Requisiti a Punteggio, che, secondo disciplinare erano quelli qui di seguito elencati.

Componente funzionale aggiuntiva a punteggio	Req 2-5 Possibile guida prolungata	Possibile estensione della lunghezza delle rotaie per 6 metri, sia per l'unità a guida lineare che per la contropunta scorrevole (estensione della lunghezza del mandrino di riferimento da 8 a 14 metri). – la lunghezza complessiva delle rotaie sotto il robot e sotto la contropunta del posizionatore nella configurazione base e in quella estesa	8	Criterio 3
Componente funzionale aggiuntiva a punteggio	Req-2-6 Possibile Posizionatore a due assi	Posizionatore KUKA modello KP2-SV HW 5000 – controllato dal controller della cella robotizzata – programmazione del posizionatore a due assi perfettamente integrata nel pacchetto software della fornitura base	8	Criterio 3
Componente funzionale aggiuntiva a punteggio	Req 2-11 Possibile modularità delle dimensioni del roller di deposizione	Modularità della dimensione del rullo (larghezza, lungo il meridiano) in funzione di un'eventuale riduzione del numero di nastri	3	Criterio 3
Componente funzionale aggiuntiva a punteggio	Req 2-13 Possibile manutenzione senza attrezzi	Manutenzione senza attrezzi per operazioni ordinarie di – ispezione, – carico e scarico materiali, – sostituzione lama, – sostituzione rulli	1	Criterio 3
Requisito prestazionale a punteggio	Req 2-15 Conformabilità del rullo	Pressione uniforme su 8 nastri paralleli posti lungo un percorso meridiano su un cilindro di 300 mm di diametro La tolleranza prevista per la variazione di pressione tra i nastri nel caso di cui sopra, come dichiarato nella proposta.	3	Criterio 2
Componente funzionale aggiuntiva a punteggio	Req 2-23 Possibile taglio angolato	Un angolo di taglio della banda di nastri (almeno 4 nastri in parallelo), durante la deposizione, variabile da 90° a 10°, applicato all'intera banda	15	Criterio 3

Requisito prestazionale a punteggio	Req 2-24 Miglioramento del Taglio e riavvio	La lunghezza di deposizione minima raggiungibile per il nastro prepreg termoindurente, posizionato su una superficie piana alla velocità di 0,5 m/s	4	Criterio 2
		La distanza minima raggiungibile tra il taglio e il riavvio del nastro in fibra termoindurente alla velocità di 0,5 m/s	1	Criterio 2
Requisito prestazionale a punteggio	Req 2-26 Miglioramento della durata delle lame da taglio	Numero di tagli ottenibili prima della sostituzione delle lame (dichiarato)	1	Criterio 2
Requisito prestazionale a punteggio	Req 2-28 Miglioramento della velocità	Velocità di deposizione lineare (dichiarata nella proposta)	1	Criterio 2
Requisito prestazionale a punteggio	Req 2-30 Miglioramento della accuratezza e della ripetibilità	Ripetibilità di taglio e riavvio deposizione fibre a 25 cm/s per tutti i materiali depositi (dichiarata in proposta)	5	Criterio 2
		Precisione di taglio e riavvio deposizione fibre a 25 cm/s (dichiarata in proposta)		Criterio 2
		Tolleranza tra bande parallele deposte a 25 cm/s. (dichiarato nella proposta)		Criterio 2
Componente funzionale aggiuntiva a punteggio	Req 2-35 Possibile sistema per il monitoraggio della qualità di deposizione	Capacità del sistema di monitoraggio (hardware e software) di – collezionare – elaborare – mostrare – immagazzinare dati che descrivano spazialmente la qualità del layup deposto sulla superficie, strato per strato.	5	Criterio 3

L'attribuzione di questi punti è scaturita direttamente durante l'analisi che ha svolto la Commissione sullo specifico requisito. Rispetto alle considerazioni che hanno portato a decidere la possibilità di attribuire a ciascuna proposta tali punteggi e alla quantità di punti di volta in volta assegnati, si rimanda a quanto sul foglio Excel allegato.

Pertanto la Commissione Tecnica Giudicatrice, rispetto ai **REQUISITI A PUNTEGGIO** ha attribuito i seguenti punteggi:

Gruppo ESEA n. 36 punti

Società COMEC n. 31 punti

sommando quanto riportato nella tabella qui allegata.

TABELLA REQUISITI A PUNTEGGIO

C – requisiti a punteggio	Descrizione	Punteggio Massimo	ESEA	COMEC
Req 2-5 Possibile guida prolungata	Possibile estensione della lunghezza delle rotaie per 6 metri, sia per l'unità a guida lineare che per la contropunta scorrevole (estensione della lunghezza del mandrino di riferimento da 8 a 14 metri). – la lunghezza complessiva delle rotaie sotto il robot e sotto la contropunta del posizionatore nella configurazione base e in quella estesa	8	8	8
Req-2-6 Possibile Posizionatore a due assi	Posizionatore KUKA modello KP2-SV HW 5000 – controllato dal controller della cella robotizzata – programmazione del posizionatore a due assi perfettamente integrata nel pacchetto software della fornitura base	8	8	8
Req 2-11 Possibile modularità delle dimensioni del roller di deposizione	Modularità della dimensione del rullo (larghezza, lungo il meridiano) in funzione di un'eventuale riduzione del numero di nastri	3	3	3
Req 2-13 Possibile manutenzione senza attrezzi	Manutenzione senza attrezzi per operazioni ordinarie di – ispezione, – carico e scarico materiali, – sostituzione lama, – sostituzione rullo	1	1	1

Req 2-15 Conformabilità del rullo	Pressione uniforme su 8 nastri paralleli posti lungo un percorso meridiano su un cilindro di 300 mm di diametro La tolleranza prevista per la variazione di pressione tra i nastri nel caso di cui sopra, come dichiarato nella proposta.	3	0	3
Req 2-23 Possibile taglio angolato	Un angolo di taglio della banda di nastri (almeno 4 nastri in parallelo), durante la deposizione, variabile da 90° a 10°, applicato all'intera banda	15	15	0
Req 2-24 Miglioramento del Taglio e riavvio	La lunghezza di deposizione minima raggiungibile per il nastro prepreg termoindurente, posizionato su una superficie piana alla velocità di 0,5 m/s	4	0	4
	La distanza minima raggiungibile tra il taglio e il riavvio del nastro in fibra termoindurente alla velocità di 0,5 m/s	1	0	0
Req 2-26 Miglioramento della durata delle lame da taglio	Numero di tagli ottenibili prima della sostituzione delle lame (dichiarato)	1	1	0
Req 2-28 Miglioramento della velocità	Velocità di deposizione lineare (dichiarata nella proposta)	1	0	1
Req 2-30 Miglioramento della accuratezza e della ripetibilità	Ripetibilità di taglio e riavvio deposizione fibre a 25 cm/s per tutti i materiali depositi (dichiarata in proposta)	5	0	3
	Precisione di taglio e riavvio deposizione fibre a 25 cm/s (dichiarata in proposta)			
	Tolleranza tra bande parallele deposte a 25 cm/s. (dichiarato nella proposta)			
Req 2-35 Possibile sistema per il monitoraggio della qualità di deposizione	Capacità del sistema di monitoraggio (hardware e software) di – collezionare – elaborare – mostrare – immagazzinare dati che descrivano spazialmente la qualità del layup deposto sulla superficie, strato per strato.	5	0	0
TOTALE		55	36	31

In conclusione, sulla base di quanto esposto, sommando le tre voci costituenti, la Commissione Tecnica Giudicatrice ha concluso i propri lavori in data 20 gennaio 2025 e ha attribuito per gli aspetti tecnici i seguenti punteggi alle proposte esaminate:

n. 61,0 punti su 80 a GRUPPO ESEA

n. 38,5 punti su 80 a Società COMEC

sommando quanto riportato nella tabella qui allegata.

TABELLA DI VALUTAZIONE FINALE

Aspetti, requisiti e parametri valutati		Punteggio Massimo	ESEA	COMEC
A: Completezza	Completezza rispetto all'analisi di ciascun requisito e alla corrispondente descrizione dettagliata della soluzione proposta. Presenza nella proposta tecnica di: – paragrafi specifici per ciascuno e per tutti i requisiti elencati nel presente documento – dati numerici, immagini, disegni con citazioni, documenti di riferimento allegati – l'indicazione esplicita di conformità/non conformità – <i>valore ottenibile per ciascun parametro prestazionale misurabile</i> – adeguata implementazione di test specifici – mediante simulazione e/o mediante sperimentazione – come richiesto nelle fasi di pre-accettazione e accettazione	15	15,00	7,50
B-Qualità e quantità della documentazione riferita ai risultati delle esperienze pregresse	Presenza nella proposta tecnica di – riferimenti documentati a supporto della dichiarazione dei valori dei parametri ottenibili, sia per le prestazioni obbligatorie che per quelle con punteggio – risultati di test disponibili da precedenti esperienze con la stessa configurazione AFP (almeno robot antropomorfo+testa AFP), riferiti e allegati alla proposta sotto forma di relazioni tecniche specifiche.	10	10,00	0,00
C – requisiti a punteggio		55	36,00	31,00
PUNTEGGIO TOTALE		80	61,00	38,50

Federico De Flippis

Gilberto Ricelli

Roberto Z...

REQUISITI	ESEA	COMEC	TIPOLOGIA DI REQUISITO	NOTE ESEA	NOTE COMEC
Req 2-1 ROBOT	KUKA 600	KUKA 500	<i>mandatory, functional</i>		
Accuracy	This information is indeed not available from the KUKA 600 supplier	±0.08			
repeatability	0.04	(ISO 9283) ± 0.08 mm			
loading capacity	720	(mass and momentum)- 500 KG			
Req 2-1 LINEAR TRACK			<i>mandatory, functional</i>		
Accuracy	Absent	±0.05			
Repeatability	±0.02	±0.02			
linearity	Absent	±0.05/meter			
loading capacity (mass and momentum on the track unit)	Coupling capability with KUKA 600 proven	5000kg			
overall length of rail under the linear track unit	18000 mm	11.500 mm			
the net length of linear movement of the robot on the rail	16500 mm	4.000 mm			
the required floor characteristics (concrete quality, thickness, flatness)	ok GUIDEL SPECIFICATION	Specifications to be confirmed at the time of supply			
REQ 2-2 External horizontal positioner			<i>mandatory, functional</i>		
headstock shall be combined with a tailstock mounted on a sliding rail.	OK	ok			
The headstock can be mounted on the floor or on the sliding rail.	Not specified	The headstock can be mounted on the floor			
The horizontal positioner and the sliding rail under the tailstock shall be aligned with linear track unit rail under the robot.	Not specified	OK			
The sliding rail shall be mounted in a recessed configuration in the floor.	ok, max load not specified	ok			
adequately covered to allow trolley and forklift movements (12 tons max load)					
Dimensions, load capacity and all other performances of horizontal positioner shall be compatible with the fulfillment of all operativity and layout performance requirements (specifically with 8 meters long, 8 tons reference mandrel, defined in chapter 2.1).	Not specified	ok			
1. the manufacturer	ESEA	COMEC			
2. the model	EFESTO	Comec Innovative			
3. the accuracy	±/- 0.000"	±0.1			
4. the repeatability	±/- 0.000"	±0.03			
5. the loading capacity	8 ton	20 Ton			
6. the electric power	17 kW	1500W			
7. the maximum acceleration with the max reference mandrel	0.2 m/sec ²	0.05 m/sec ²			
8. the clamping mechanism	eccentric pin.	Pneumatic Mandrel			
9. the length of sliding rail	18 mt (ESEA will offer an extension of the length of rail)	11.500 mm			
10. the mandatory and the maximum distance achievable between headstock and tailstock	every length between the max length 14.5 mt and minimum length 0.5 mt	- min. 0 mm. -max 10500 mm			
11. the linearity of sliding rail under the tailstock	±/- 0.05 mm	±0.05/meter			
12. the expected parallelism error of sliding rail under the tailstock with respect to the rail under the robot	minus of ±/- 0.1 mm	0,05 with laser tracker			
13. the required floor characteristics	the same of GUIDEL specification	recessed and covered to allow trolley and forklift movement			
14. the proposed recessed configuration of the rail in the floor	The trail of the horizontal positioner will be installed in a recessed configuration of the concrete floor. Steel plates will be supplied to cover the rail and to permit the loading/unloading by forklift	the proposed recessed configuration of the rail in the floor			
Req 2-3 Stand-alone positioner performances			<i>mandatory, performance</i>		
The horizontal positioner shall be capable to clamp, hold and move the max reference mandrel defined in chapter 2.1 at a maximum rotational speed of 5 rpm in stand-alone condition.	OK	OK			
Req 2-4 Possibility of extension of rails			<i>mandatory, functional</i>		
The robotic cell linear track rail and the sliding rail under the tailstock shall be extendable by adding modular parts.					
To simplify the possible extension of rails, in the basic supply configuration the headstock position shall be already chosen as opposite to the extendable end of rails.	ok	ok			
No fixed obstacle on the floor shall be mounted at the extendable end of rails.	ok	ok			
Req 2-5 Possible extended rails			<i>scoring functional add on</i>		
an extension of length for 6 meters, both for the rail of linear track unit, under the robot, and for the sliding rail under the positioner tailstock, with respect to the basic mandatory configuration proposed equivalent to an extension of reference mandrel maximum length from 8 to 14 meters, included domes.	This improvement shall be equivalent to an extension of reference mandrel maximum length from 8 to 14 meters, included domes.	This improvement will be equivalent to an extension of reference mandrel maximum length from 8 to 14 meters, included domes.		Punteggio +6	Punteggio +6
All the above factors require an amount of extra length other than 14 meters.	OK	OK			
clearly indicate the length of rails under the robot and under the positioner tailstock.	18 METER	19 meters			
Req 2-6 Possible two-axis positioner			<i>scoring functional add on</i>		
rails extension defined in the Req 2-5 Possible extended rails.	ESEA includes KP2-SV HW 5000	ESEA includes KP2-SV HW 5000		PUNTEGGIO +6	PUNTEGGIO +6
an extension of cell capability, capable of supporting and moving an object weighing 5 tons	OK	OK			
The possible two-axis positioner to be considered shall be fixed on a platform moveable on the extended sliding rail used for the tailstock. The platform shall be not actuated and shall slide on the rail like the tailstock.	OK	OK			
The sliding position of the two-axis positioner on the rail shall be external to the	OK	OK			
The possible two-axis positioner shall be alternatively used with respect to the horizontal positioner (headstock-tailstock), to layout complex shapes.	OK	OK			
The possible two-axis positioner shall not be supposed to interfere physically with horizontal positioner basic performance included in the supply	OK	OK			
The possible two-axis positioner shall be controlled by the robotic cell controller, included in the supply	OK	OK			
The programming of the two-axis positioner shall be perfectly integrated in the software package of the basic supply.	OK	OK			
Req 2-7 Fiber Placement Head			<i>mandatory, functional</i>		
the Fiber Placement Head configured for thermosets and thermoplastics by using pictures and drawings showing whenever possible detailed numerical quotes.	OK (more accurate)	OK		DOES NOT SHOW PHOTOGRAPHS (DRAWINGS ONLY)	
The bidder can propose a single physical device (head) with the two configurations (thermoset/thermoplastic), or even two separate physical devices	single	single			
1. the head parts	OK	OK			
2. the dimensions	to be obtained from the drawing	diameter 1050 mm. x height 930 mm.			
3. the volumes	Absent	Absent		ABSENT	ABSENT
4. the weight.	400 kg	280 kg.			
1. the possible heating source selected for the thermoset/thermoplastic materials	Removal of the IR lamp and installation of the laser optics on board the tool	IR LAMP heat source for thermoset • Laser source for thermoplastic (features to follow)			
2. the possible modularity of bobbins on board	2 DIFFERENT TYPES OF SPOOLS	Not specified			
3. the modularity of roller dimension in case of reduced number of tapes showing the different quotes, volumes and derived limitations or advantages for the movement of the head.	The supply includes 10 compaction rollers of different hardness, but with different dimensions	compaction roller specific for the type of material, MA but with different dimensions			
Req 2-8 Number and size of tapes			<i>mandatory, performance</i>		
Fiber Placement Head shall be capable to place at least 8 prepreg slit tapes 1/4 inch large, in parallel, both for thermoset and thermoplastic materials	ok	ok			
Req 2-9 Processable Materials			<i>mandatory, performance</i>		
The head shall be capable to process	ok	ok			
1. thermoset slit tape prepregs	ok	ok			
2. thermoplastic slit tape prepregs:					
a. PEEK thermoplastic carbon fiber prepregs (for example APC2-)	ok	ok			
PEEK (Sohay product), CETEX TC1200 PEEK (Toray)	ok	ok			
b. PAEK thermoplastic carbon fiber prepregs (for example CETEX)	ok	ok			
laminated dry fibers.	ok	ok			
The head shall be capable to process, by in situ consolidation, thermoplastic laminates in PEEK reaching a minimum required performance:					
1. minimum porosity: 2.5 % in volume	ok				
2. minimum ILSS (InterLaminar Shear Strength): 40% less than nominal data sheet value (depending on the material supplier)	ok				
The bidder shall declare in the proposal the achievable performances of a laminate with PEEK obtained by in situ consolidation with the proposed head, without any postprocessing in oven or in autoclave. The bidder shall declare in the proposal:					
1. the temperature	400°	390°			
2. the pressure	300 N				
3. the layout max velocity	80 mm/sec				
4. ILSS value	60.3 Mpa				
5. porosity	less of 2%	2.50%			
used for in situ consolidation of laminate with PEEK					
The bidder shall support this declaration of the achievable performance values by means of available testing results from previous installation experiences. In case no evidence will be provided, the requirement will be considered not met and the offer will be excluded from the competition.	ok	ok			The available tests haven't been carried out through previous experience of installing the same AFP configuration proposed in the offer
Req 2-10 Compaction Roller			<i>mandatory, functional</i>		
a roller acting on the tapes	ok	ok			
roller can be internally segmented to be more conformable	ok	ok			
the roller external part shall be polymeric	ok	ok			
1. the internal structure	metal	metal			
2. the different rollers choice - if any - for different materials to be laid up	Other shone are available if requested by CIRA.				
3. the dimensions	to be obtained from the attached drawing	60 diameter and other dimensions to be obtained from the drawing			
the materials	metal-polyurethan rubber	thermo-setting, expandable material			
full metal is a chiller roller specific for consolidation in situ					
Req 2-11 Possible modularity of roller dimension			<i>scoring functional add on</i>		
modularity of roller dimension (width, along the meridian)	ESEA will supply rollers with a section width that can be adapt to different bandwidths of layout. Following the design of the roller for a layout of 2 slit tape 1/4"	Included in the supply modularity of roller dimension		PUNTEGGIO +3	PUNTEGGIO +3
Req 2-12 Roller refrigeration			<i>mandatory, functional</i>		
The roller shall be locally refrigerated by actively controlled systems	OK	OK			
1. the refrigerating system.	cold water by chiller unit	the air refrigerating system			
2. the actuators aimed at refrigeration		the actuators aimed at refrigeration if'll be a Vortex		NO ACTUATOR AND SENSOR INFO	

3. the sensors used to monitor the area involved in the refrigeration, declaring:		it'll be a PT100			
a. the temperature range	between 12° - 20°	range: 5° - 15°			
b. the tolerances guaranteed by the controlled system.	accuracy of +/- 2°	±3°			
Req 2-13 Possible tooling free maintenance			scoring functional add on		
the procedures for the ordinary operations of	This req is partial conform.			PUNTEGGIO +1	PUNTEGGIO +1
1. inspection,					
2. material loading and unloading,	Only the change of the blades requests tools.	can be done without any tooling			
3. blade substitution,					
4. roller substitution,					
can be done without any tooling (tool free maintenance).					
Req 2-14 Compaction Forces and Dynamic Compliance			mandatory performance		
The compaction force on the roller during layup shall be controlled and modulated at least up to 1200 N for a course with 8 slit tapes in parallel, within a dynamic compliance of ± 5 mm.	The AFP compaction roller is able to apply until 1200 N, with different set up made on HMI of the machine. The compaction roller is guaranted within a dynamic compliance of +/- 15 mm	The compaction force on the roller during layup will be controlled and modulated at least up to 1200 N for a course with 8 slit tapes in parallel, within a dynamic compliance of ± 5 mm.			
Req 2-15 Roller Conformability			scoring performance		
the technical characteristics of roller and declare the expected pressure variation tolerance among the slit tapes in the above case, supporting this declaration of the achievable performance values by means of available testing results from previous installation experiences, or validated studies based on FEM simulations.	This req is partial conform: ESEA deposition roller is made with 30 sh rubber able to adapt to low radius geometry and there is a version in which each section is able to move a section respect to an other, with spring but ESEA hasn't data about uniformity of the pressure	The roller will be sufficiently conformable to apply a uniform pressure on each of the 8 parallel slit tapes of a course when placing the tapes along a meridian path on a cylindrical surface having a diameter of 300 mm. The technical characteristics of roller and the expected pressure variation tolerance among the slit tapes in the above case, are validated in the studies based on FEM simulations.		PUNTEGGIO 0	PUNTEGGIO +3
Req 2-16 Spare rollers			mandatory functional		
Ten spare rollers, other than the basic set of rollers	OK	OK			
describe the different spare rollers offered in terms of characteristics of the polymeric cover (material, shore A).	Polyurethane rubber compaction roller 3 rollers 30 sh 3 rollers 40 sh 1 roller 60 sh (for thermoplastic material) 30 di 54 2 roller at movable section Metal compaction roller 2 roller	n.5 will for processing thermoset materials and n.5 five for processing thermoplastic materials. Dal disegno in sez 5 si ricava il che materiale sono fatti			
Req 2-17 Heating and temperature control			mandatory functional		
the head shall be capable to heat locally the contact region between them in a controlled way.					
The heating system shall be able to produce (by radiation) at least 400°C temperature at nip point, at the maximum deposition speed, on a full 8 tapes course of thermoplastic prepregs slit tapes.	ok	ok			
The heating system cannot include hot gas torch	OK	OK			
The heating system can include infrared and/or pulsed light and/or laser sources.	ok	ok			
1. the heating system	For Thermosetting slit tape, the AFP and effector is equipped with a Short Wave IR lamp: Section 23 x 11 mm - QBC reflector - Heated length 52 mm - Total length 142 mm - Power 1 KW - continuous modulation of power according to line speed, with different set ups along the same path. For thermosetting slit tape: Laser diodes: sono riportati i laser data	Fiber Laser solution to reach 400° to be used for the lamination of thermoplastic, an IR lamp to work with thermosetting materials for temperatures up to 150° degreiodde laser system 4000W according to the configuration. It is fiber delivered up to the optics.			
2. the sensors and the sources used to control the area involved in the heating	IR camera is used to control the T of slit tape during laying .	Single color pyrometer with integrated computer for quality monitoring as described above			
3. the temperature range at the nip point vs placement velocity	to 520° at low speed (for reference 50 mm/ s)	Temperature measurement may rang from 150 to 500 °C. exact range may change according to the final set up			
4. the tolerances guaranteed by the control system	Laser Power Stability: ± 2% over 24 h (cooling water <= ± 1K)	Accuracy = ± 0.3% of measured value b. Repeatability = ± 0.1% if measured value Resolution: 0.1 °C			
5. the power of sources	laser: 6000 W	Power: 6000 W cw (fiber tip)			
6. the necessity to mount/dismount heat sources, depending on the material choice.	ok	Not specified			
REQ 2-18 HEATED AREA MODULATION			mandatory functional		
The heating system shall be capable to dynamically modulate the heating intensity and the width of the heated region, depending on the number of tapes involved in the deposition, from 1 to 8.	ok	ok			
The bidder shall describe the system evidencing the modulation capability.	The heat is regulated in HMI, proportional to lay up speed. It is possible to define a minimum and a maximum power along different parts of the same trajectory in the receipt of the machine, to reach the best performance. The control of Temperature is based on IR camera.	To obtain this size variation, the Laser solution will be homogenized spots with dynamic adjustment in one direction (width) up to 6 KW laser power. Spot dimensions can be adjusted dynamically. Homogeneous intensity profile in both directions over a large zoom range.			
REQ 2-19 TEMPERATURE FIELD AND OTHER PARAMETERS MONITORING SYSTEM			mandatory functional		
The cell shall have, included in the supply, a monitoring system to monitor the temperature field and other parameters during placement, in real time. he monitoring system shall include all the necessary hardware and software to	ok	ok			
1. acquire,					
2. elaborate,	ok				
3. display and					
4. store data					
		Measurement period: From 0.1 ms depending on signal strength. • Pilot laser 635 nm for adjustment of measuring spot (x-, y- position), Class 2 laser • Controller by industrial PC • Integrated into laser supply unit, otherwise as separate 19" rack mount. Configuration via LAN interface with a standard Windows PC/Notebook. • Software Linux (real time), with specific process manager software. • Data exportable in Windows data base. • Individual setting of upper and lower limit values for laser power, temperature and others via software. • Temperature acquisition is acquired by the integrated computer, is elaborated and stored. Conditional signal for the feedback of the laser power according to the temperature is processed, elaborated and sent back to the laser			
REQ 2-20 HEAD FEEDING			mandatory functional		
The prepreg slit tapes shall be delivered to the head coming from a dedicated creel, under thermal control, through twist-free feeding tubes.	ok	ok			
The creel cannot be in a fixed position on the floor	ok	ok			
The creel can be on board, on the head or on a link of the robot arm, or off board with respect to the robot, but following the robot on the track rail.	The creel is a part of the end effector of the robot arm.	The creel will be on board, on the head			
The creel system shall give to the operator the possibility to trace material data through bar code readers, storing information related to the length, the expiry date, the loading date, the real time residual length of single bobbin.	ok	ok			
The bobbin packaging dimensions allowed in the creel shall include at the minimum					
1. cardboard core inner diameter 76mm	cardboard core inner diameter 76mm (3")	cardboard core inner diameter 76mm			
2. cardboard core length range from 182 to 297 mm	cardboard core length range from 182 to 297 mm	• cardboard core length range from 182 to 297 mm			
1. max bobbin diameter	max bobbin diameter 300 mm	max bobbin diameter: 200 mm			
2. max bobbin weight	max bobbin weight 6 kg.	• max bobbin weight: 10kg.			
2-21 Creel temperature control			mandatory functional		
The creel, the feeding tubes and the head parts housing prepregs shall be under thermal control to maintain the prepreg refrigerated at constant temperature, adjustable at lower value than 15° C. The temperature history in the creel shall be recorded and stored. The bidder shall describe the refrigerating system, declaring 1. the maximum temperature range. 2. the tolerances guaranteed by the system.	ok The temperature range: 10°- 18° The tolerances guaranteed by the system +/- 3°	ok the maximum temperature range: between 5° to 15° 2. the tolerances guaranteed by the system: ± 3°			
Req 2-22 Cut and restart			mandatory functional		
The minimum deposition length for each fiber tape, placed on a flat surface, shall be less or equal to 105 mm.	less of 105 mm	ok - equal to 100 mm			
The minimum distance between cutting and feeding for each fiber tape shall be less or equal to 10 mm.	equal to 10 mm.	ok - equal to 10 mm			
The bidder shall support this declaration of the achievable performance values by means of available testing results from previous installation experiences	This performance are checked and confirmed during the FAT of AFP machine used to produce cryogenic tank.	OK			THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
Req 2-23 Possible angled cut			scoring functional add on		
the possibility to have a variable angle of cut of tapes course (at least 4 tapes in parallel), during placement, from 90° to 10°.	ESEA will design a special configuration for the cutting of 4 slit tape at at angle selectable from 90° to 30°.	variable angle of cut of tapes course (4 tapes in parallel)		PUNTEGGIO +15	PUNTEGGIO 0
it is supposed that the same angle used for a cut is taken on the material at the following restart	ok	ok			
it is supposed that the angle is continuously selectable from 90° to 10°	ok	only during placement ±20°			
Req 2-24 Cut and restart improvement			scoring performance		
A reduction of the minimum length between cuts and restarts has to be considered a performance improvement the achievable minimum deposition length for thermoset fiber tape, placed on a flat surface at the velocity of 0.5 m/s.	This req is not conform.	99 mm/105mm		PUNTEGGIO 0	PUNTEGGIO 4
the achievable minimum distance between cutting and feeding thermoset fiber tape at the velocity of 0.5 m/s		9.9 mm/10			
Req 2-25 Cutting blades -durability			mandatory performance		
the cutting mechanism, explicitly declaring the durability of blades in terms of number of cuts before substitution, and the procedure to substitute them.	OK	OK			
The number of cuts before substitution of a blade cannot be less than 20000.	OK	OK			
The bidder shall support this declaration of the achievable performance values by means of available maintenance or testing documentation from previous installation experiences	VIDEO AND TEST REPORT	REPORT TEST			
Req 2-26 Cutting blades - durability improvement			scoring performance		
The bidder shall declare the achievable number of cuts before blades substitution.	25.000 cutting.	22.000 cycles		PUNTEGGIO 1	PUNTEGGIO 8
Req 2-27 Speed					

The maximum linear deposition speed possible while starting the feeding of fibers shall be not be less than 50 cm/s (with thermostat prepress).	OK	OK	mandatory, performance		
The maximum linear deposition speed possible while cutting fibers shall not be less than 50 cm/s (with thermostat prepress).	OK	OK			
The maximum linear deposition speed possible while placing shall not be less than 50 cm/s (with thermostat prepress).	OK	OK			
The bidder shall support this declaration of the achievable performance values by means of available testing results from previous installation experiences.	ESA tested these parameter during the performance test of the AFP machine for Cryotank Material: thermo-setting silt tape TORAY The best performance during the test was 500 mm/s. MINUTE OF FAT	OK			THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
Req 2-32 Speed improvement			scoring, performance		
The bidder shall declare the achievable value of linear deposition speed.	0,8 m/s	1,05 m/s			
The bidder shall support this declaration of the achievable performance values by means of available testing results from previous installation experiences	MINUTE OF FAT	OK		PUNTEGGIO 0	PUNTEGGIO 1
					THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
Req 2-33 Accuracy and repeatability			mandatory, performance		
The repeatability of cutting and feeding fibers on a flat surface at 50 cm/s shall be less than or equal to ±2mm for all the placed materials thermostos or thermoplastics	ok	ok			
The accuracy of cutting and feeding fibers on a flat surface at 50 cm/s shall be less than or equal to ±2,5mm	ok	ok			
The tolerance between parallel courses on a flat surface at 50 cm/s deposition speed for all the placed materials shall be less than ±2,5/0 mm	ok	ok			
The bidder shall support this declaration of the achievable performance values by means of available testing results from previous installation experiences.	MINUTE OF FAT	OK			THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
			scoring, performance		
Req 2-30 Accuracy and repeatability improvement					
The bidder shall declare the value of achievable:	n.c	n.c		PUNTEGGIO 0	PUNTEGGIO 5*2/3- 10/3 = 3,33
1. repeatability of cutting and feeding fibers at 25 cm/s for all the placed materials.	n.c	ok			
2. accuracy of cutting and feeding fibers at 25 cm/s.	n.c	ok			
3. tolerance between parallel courses at 25 cm/s.	n.c	ok			
		OK			THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
Req 2-31 Laying up on the reference flat surface			mandatory, performance		
The AFP Robotic Cell, as a whole, shall be capable to fully operate, laying up the thermostat and thermoplastic materials in optimal conditions at the maximum speed, on the reference flat surface, defined in chapter 2.1.	ok				
The bidder shall clearly describe in the proposal this operativity condition on the overall reference surface, by using off line simulations, pictures and drawings showing numerical quotes.	There are only two photos of the simulation. There is no description of the process. There are no photographs of the mock up.	Description of the process, final measurements of size, porosity and density. The panel is not the required size. There are no PHOTOGRAPHS of the mock up. There are no images of the simulation.			
The supplier shall use the software referred in Req 2-37 Path Planning, Req 2-38 Generation of programs, Req 2-39 Verification of programs, to produce the offline simulations required.	The software used is not explicitly specified (can be obtained from the simulation image)	not explicitly specified the software used			
The bidder shall support the declaration by means of available testing results from previous installation experiences showing experimental test cases as much as possible near to the required reference surface.	document "P7240834"	OK			THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
Req 2-32 Laying up on the reference mandrel			mandatory, performance		
The AFP Robotic Cell, as a whole, shall be capable to fully operate, laying up the thermostat and thermoplastic materials in optimal conditions, at the maximum speed, on the reference mandrel, including domes and polar bosses, defined in chapter 2.1.					
The bidder shall clearly describe in the proposal this operativity condition on the overall reference surface at the maximum dimensions defined in 2.1 (2.4 m diameter, 8 meters long, included domes with 0.3 meters polar bosses) by using off line simulations, pictures and drawings showing numerical quotes.	There is no description of the process. There are images and videos of the simulation in the document "P7240834"	only theoretical description of the process and final measurements of size, porosity and density. There are no PHOTOGRAPHS of the process or the mock up. Just an image of the simulation from which the used software could be obtained.			
The bidder shall clearly describe in the proposal this operativity condition on the overall reference surface at the minimum dimensions defined in 2.1 (0.1 m diameter cylinder, without domes) by using off line simulations, pictures and drawings showing numerical quotes.	There is no description of the process. There are images and videos of the simulation in the document "P7240834"	only theoretical description of the process and final measurements of size, porosity and density. There are no PHOTOGRAPHS of the process or the mock up. Just an image of the simulation from which the used software could be obtained.			
The supplier shall use the software referred in Req 2-37 Path Planning, Req 2-38 Generation of programs, Req 2-39 Verification of programs to produce the offline simulations required.	The software used is not explicitly specified (it can be obtained from the simulation videos)	The software used is not explicitly specified (it can only be obtained from the simulation image)			
The bidder shall support the declaration by means of available testing results from previous installation experiences showing experimental test cases as much as possible near to the required reference surface.	document "P7240834"	OK			THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
Req 2-33 Laying up on the reference concave surface			mandatory, performance		
The AFP Robotic Cell, as a whole, shall be capable to fully operate, laying up the thermostat and thermoplastic materials in optimal conditions at the maximum speed, on the reference concave surface, defined in chapter 2.1.					
The bidder shall clearly describe in the proposal this operativity condition on the overall reference surface, by using off line simulations, pictures and drawings showing numerical quotes.	There is no description of the process. There are images of the simulation in the document "P7240834"	Only theoretical description of the process and final measurements of size, porosity and density. There are no PHOTOGRAPHS of the process or the mock up. Just an image of the simulation from which the used software could be obtained.			
The supplier shall use the software referred in Req 2-37 Path Planning, Req 2-38 Generation of programs, Req 2-39 Verification of programs to produce the offline simulations required.	The software used is not explicitly specified (can be obtained from the simulation videos)	The software used is not explicitly specified (it can only be obtained from the simulation image)			
The bidder shall support the declaration by means of available testing results from previous installation experiences showing experimental test cases as much as possible near to the required reference surface. In case no evidence will be provided, the requirement will be considered not met and the offer will be excluded from the competition.	document "P7240834"	OK			THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
Req 2-34 laying up on the reference convex surface			mandatory, performance		
The AFP Robotic Cell, as a whole, shall be capable to fully operate, laying up the thermostat and thermoplastic materials in optimal conditions at the maximum speed, on the reference convex surface, defined in chapter 2.1.					
The bidder shall clearly describe in the proposal this operativity condition on the overall reference surface, by using off line simulations, pictures, drawings showing numerical quotes.	There is no description of the process. There are images of the simulation in the document "P7240834"	only theoretical description of the process and final measurements of size, porosity and density. There are no PHOTOGRAPHS of the process or the mock up. Just an image of the simulation from which the used software could be obtained.			
The supplier shall use the software referred in Req 2-37 Path Planning, Req 2-38 Generation of programs, Req 2-39 Verification of programs to produce the offline simulations required.	The software used is not explicitly specified (can be obtained from the simulation videos)	software used is not explicitly specified (it can only be obtained from the simulation image)			
The bidder shall support the declaration by means of available testing results from previous installation experiences showing experimental test cases as much as possible near to the required reference surface.	document "P7240834"	OK			THE MACHINE WITH WHICH THE TEST WAS CARRIED OUT IS NOT THE ONE PROPOSED IN THE OFFER
Req 2-35 Possible quality monitoring system			scoring functional add on		
The bidder can include in the proposal a monitoring system to monitor the quality of placement during layup.	This req is not conform	This req is not conform		PUNTEGGIO 0	PUNTEGGIO 0
The monitoring system shall include all the necessary hardware and software to get, elaborate, show and store data describing spatially the quality of layup placed on the surface, layer by layer.					
The hardware shall be completely integrated in the cell and shall not interfere with the functionality of the cell and movement of the AFP Head, mainly during the lay-up on the reference surfaces defined in chapter 2.1.					
The bidder shall describe the technical characteristics of the proposed monitoring system, the sensors used and the collected data.					
The bidder shall support where possible the description by means of available testing results from previous installation experiences showing experimental test cases monitored by the software.					
Req 2-36 Control System			mandatory, functional		
The AFP Robotic Cell shall be controlled by a SIEMENS or Rockwell Automation system controller.	OK	OK			
The bidder shall clearly indicate in the proposal	SIEMENS CNC 840 Dsl with application RUN MY ROBOTY to drive all the axis of the machine and the robot	SIEMENS system controller, model: 6ES7511-1TU03-0AB0 CPU511T-1 PN UNITA' C. 450KB,			
1. the model	PLC 571300 cpu technological fail safe to drive the function of the end effector devices.				
2. the technical data of the proposed control system.	THERE ARE NO TECHNICAL DATA	THERE ARE TECHNICAL DATA			
Req 2-37 Path Planning			mandatory, functional		
The software package in the supply shall include an off-line optimal planning software for the definition of deposition paths on the tool surface, starting from the geometry of the surface given by a CATIA V model.	VERICUT software (VCS + VCP) with not expired license OK	CAESA from SWMS Systemtechnik Ingenieurgesellschaft mbH. OK			
The bidder shall use the reference surfaces described in chapter 2.1 as indicated in Req 2-31, Req 2-32, Req 2-33, Req 2-34, to clearly describe in details the functionalities of the proposed software.	Missing	Missing			
Req 2-38 Generation of programs			mandatory, functional		
The software package in the supply shall include a software for the automated generation of placement and movement programs to be executed by the overall robotic system included in the supply – contemporary movement of head, robot arm, linear track unit and horizontal positioner.	OK	OK			
The bidder shall use the surfaces described in chapter 2.1 as indicated in Req 2-31, Req 2-32, Req 2-33, Req 2-34, to clearly describe in details the functionalities of the proposed software.	Missing	Missing			
Req 2-39 Verification of programs			mandatory, functional		
The software package in the supply shall include a simulation software for the off-line verification of generated programs, before execution	OK	OK			

The bidder shall use the surfaces described in chapter 2.1 as indicated in Req 2-31, Req 2-32, Req 2-33, Req 2-34, to clearly describe in details the functionalities of the proposed software.	Missing	Missing			
Req 2-40 SOFTWARE CAPABILITY TO MANAGE OPTIONAL HARDWARE				mandatory, functional	
The software of Req 2-38 Generation of programs, and Req 2-39 Verification of programs shall be able, without additional packages, to generate programs and to verify them applied to the complete cell configured with the two-axis positioner included in the improvement described in Req 2-6 Possible two-axis positioner, even if those improvements were not included in the proposal.	OK	OK			
The bidder shall present a simulation case of placement on a spherical surface moved on a two-axis positioner (configuration equivalent to the one described in Req 2-6 Possible two-axis positioner) to clearly describe in details the software capability.					
CIRA-DTS.					
Req 2-41 Room Layout				mandatory, functional	
The bidder shall include a preliminary design of the laser safety room structure, including walls, roof, openings and doors, compliant to quotes referred in annex 1.	OK	OK			
The bidder shall describe in the proposal the room layout, with all the parts included in the supply.	MISSING DESCRIPTION	MISSING DESCRIPTION			
Req 2-42 Laser Safety Room Characteristics				mandatory, functional	
The bidder shall describe in the proposal the technical characteristics of the room aimed at Laser Safety conditions, to shield operators acting outside the room from the radiation of a high-power laser (class 4).	OK	OK			
The description shall include safety characteristics of:					
1. Walls and ceilings of the room (included sandwich panel and materials description)					
2. Openings and doors (access, loading, section, swinging)					
3. Windows (specific laser protection)					
4. Joints sealing (Lap joint, Baseboard, roof)					
5. Ventilation Grids (folded sheets or baffles)					
6. Holes sealing					
7. Laser Safety system (laser source shutdown in case of open door or any other emergency)					
	OK, VERY DETAILED TECHNICAL DESCRIPTION	OK, BUT NOT VERY DETAILED TECHNICAL DESCRIPTION			
Req 2-43 Roof				mandatory, functional	
The bidder shall describe in the proposal the technical characteristics of the roof of the laser safety room.	OK	OK			
The roof shall have a walkable area only if necessary for the maintenance of possible equipment and ducts specific of the present supply such as the lighting, air ventilation and conditioning systems, and/or any other utilities of laser safety room. A walkable area is not necessary for reasons other than that.	OK	OK			
Req 2-44 Utilities				mandatory, functional	
The Laser Safety Room shall be equipped with the following services with delivery points in a position to be defined.	OK	OK			
All the "service points" shall be completed with any needed connection (piping or cabling) to the CIRA utilities access points.					
	OK	OK			
Lighting of the room : minimum 500Lux					
Adequate air ducts and ventilation grids for the ventilation and air conditioning system to connect to the HVAC unit located outside the hangar.	OK	OK			
N. 6 electrical wall mounted socket groups, each one including:					
o N.1 wall socket single phase 16A					
o N.1 wall socket three-phase 32A	OK	OK			
o At least 4 wall sockets single phase 10A, including Schuko					
N. 6 compressed air wall mounted connection (Max 12 bar), derived from the compressed air line of CIRA, each one including:					
o pressure regulator	OK	OK			
o pneumatic lubricator					
o female connector					
N. 6 wall mounted connection to vacuum line derived from the vacuum system of CIRA	OK	OK			
The air ducts and ventilation grids in the laser safety room shall be included in the supply.	OK	OK			
Piping for air ventilation and vacuum as well as the terminations of the internal electrical distribution system, shall arrive at the battery limit just outside the	OK	OK			
Req 2-45 CE certification and compliance with EU directives				mandatory, functional	
All devices must have the CE marking and the necessary declarations of compliance with EU directives. Declarations of conformity must be provided, where a whole instrument and for any other component relating to it as well as for the AFP as applicable, for both the instrument and for any other component relating to it as well as for the AFP as a whole.	OK	OK			
Req 2-46 Compliance with regulations on safety and protection of workers				mandatory, functional	
Laser Safety Room and AFP installations shall be done in compliance with all accident-prevention and safety regulations applicable. In this regard, the Contractor shall provide the Staff with the technical means, clothing and equipment required to work safely, paying particular attention to Personal Protective Equipment.	OK	OK			
Req 2-47 Do No Significant Harm				mandatory, functional	
In compliance with the European principle of Do No Significant Harm to the environment (so-called DNSH), the components of any supplied computer shall be marked with the ISO type I eco-label, according to UNI EN ISO 14024 (e.g.: TCO Certified, EPAT 2018, Blue Angel, TÜV Green Product Mark, or equivalent). In the absence of this label, EnergyStar certification and a declaration of conformity to the following regulations are required: Reach (Regulation (EC) n.1907/2006); RoHS (Directive 2011/65/EU and subsequent amendments) and electromagnetic compatibility (Directive 2014/53/EU)	OK	OK			
Req 2-48 Transport				mandatory, functional	
The transport at CIRA and all the corresponding costs, including downloading on site at CIRA, shall be included in the supply. The transport at CIRA installation site shall be under the full responsibility of the supplier. All the tools, trolley, forklifts necessary to unload the parts at CIRA are in charge of the supplier.	OK	OK			
Req 2-49 Transport Plan				mandatory, functional	
The bidder shall define and propose, as included in the supply, a detailed transportation schedule.	OK The machine will be shipped in module after FAT in ESEA. Following the bill of lading of the modules: • Safety room (panels, doors, accessory, ecc) • ROBOT with AFP end effector on a section of GUEDEL trail • Electrical cabinet • Head stock and tail stock on a section of rail • Other modules of GUEDEL rail and horizontal positioner rail Each module will be protected with specific packaging and identify with a description of the code of the part. ESEA will use a track equipped with lifter to move the parts inside the CIRA factory. Transport plan is: 1 and 1/2 week to disassembly the machine, to load in ESEA /unloading in CIRA, after FAT in ESEA	OK Comec Innovative will define and propose, as included in the supply, a detailed transportation schedule			
Req 2-50 Installation				mandatory, functional	
The overall cell installation at CIRA, including the laser safety room and all the necessary utilities, shall be included in the supply. The installation shall be under the full responsibility of the supplier. All the corresponding installation costs are in charge of the supplier, included in the overall offer. All the costs - for instruments, tools, manpower, travel and accommodation, permission and authorization from civil authority, safety - necessary for the installation shall be in full charge of the supplier, included in the overall offer.	OK	OK			
Req 2-51 General planning					
The bidder shall define and propose, as included in the supply, a detailed supply schedule. The supply, installation and acceptance shall be completed in 14 months, from the reception of the purchase order and subject to CIRA final acceptance. The overall time above mentioned is linked to the fundings constraints. For this reason, it is very important to respect this deadline. The bidder shall include in the proposed schedule at least the following phases: - Final Design of the laser safety room structure and of the AFP cell, the layout definition, the utilities (electrical energy, pneumatic energy, HVAC unit, etc.) - Pre-acceptance in-factory verifications - Installation of the laser safety room - AFP installation and final acceptance test at CIRA - Training	This req. is conform. Kick off meeting TO + 1 week Preliminary design review minimum each 3 weeks Purchase of Long Delivery Item TO+ 1 month Critical design review (final design) TO + 3 months Purchase TO+ 3 months Assembly in ESEA TO + 7 months MIS in ESEA TO+ 10 months FAT at ESEA TO + 11 months Assembly of the laser safety room in CIRA TO + 9 months Assembly and MIS in CIRA TO +11 months SAT in Cira TO +12 months Training TO + 12 months ESEA can supply the machine in 12 months.	Comec Innovative will define and propose, as included in the supply, a detailed supply schedule. The supply, installation and acceptance will be completed in 12 months, from the reception of the purchase order and subject to CIRA final acceptance. Comec Innovative will include in the proposed schedule at least the following phases: • Final Design of the laser safety room structure and of the AFP cell, the layout definition, the utilities (electrical energy, pneumatic energy, HVAC unit, etc.) • Pre-acceptance in-factory verifications • Installation of the laser safety room • AFP installation and final acceptance test at CIRA • Training			
Req 2-52 Training course contents				mandatory, functional	

The bidder shall describe contents proposed in the training course on site to be transferred to CIRA personnel. Among the contents, the bidder shall include the procedures for - the manoeuvre of robotic cell in manual mode by teach pendant - the uploading and downloading of mandrel on the horizontal positioner - the acquisition of tool surfaces for calibration - the ordinary operations for the use of the head, uploading of materials in the crenel, maintenance on blades, verification of fiber paths to the roller, maintenance on the rollers - the use of software (simulation, generation and verification of programs, uploading and execution of programs)	ok The course will be done in Italian language. The training will include 1 week (5 days) of course on site CIRA, about (not only, minimum content) • configuration of the machine and of each modules • manual function and automatic function • the manoeuvre of robotic cell in manual mode by teach pendant • the uploading and downloading of mandrel on the horizontal positioner • the acquisition of tool surfaces for calibration • the ordinary operations for the use of the head, uploading of materials in the crenel, maintenance on blades, verification of fiber paths to the roller, maintenance on the rollers • the use of software (simulation, generation and verification of programs, uploading and execution of programs) • test of the functionality on the machine with ESEA teacher, to realize a full laying of the reference mandrel • Etc	ok Comec Innovative will provide complete training to Cira staff, the contents and topics covered will include the following topics • the use of robotic cell in manual mode by teach pendant • the uploading and downloading of mandrel on the horizontal positioner • the acquisition of tool surfaces for calibration • the ordinary operations for the use of the head, uploading of materials in the crenel, maintenance on blades, verification of fiber paths to the roller, maintenance on the rollers • the use of software (simulation, generation and verification of programs, uploading and execution of programs)			
Req 2-53 Training plan			mandatory, functional		
The bidder shall define, included in the supply, a detailed training plan on site at CIRA personnel for not less than 5 lesson days.	OK The course will be done in Italian language. The training will include : • 10 days on site CIRA after SAT how to use the machine for the technicians, including production of sample. • 3 days on site CIRA after SAT for the service department. Other training on the job, will be done during the assembly of the machine.	OK Comec Innovative, included in the supply, will provide a detailed training plan on site at CIRA personnel for 5 lesson days. In addition, 10 days of support will be provided by an Italian engineer expert in lamination with AFP who will support you in the entire process of a test case starting from the object to be laminated, the design phase of the ply, the simulation and the subsequent creation of the product			
Req 2-54 Warranty mandatory			mandatory, functional		
A full warranty, including on line assistance and programmed maintenance, both for hardware and software, for two years, shall be included in the supply. The full warranty for two years shall cover, in case of failure not due to the user negligence, the costs of on-site maintenance for the full repairing, including personnel, travel, substitution of parts and parts costs.	OK	OK A full warranty, including on line assistance and programmed maintenance, both for hardware and software, for two years, will be included in the supply. The full warranty for two years will cover, in case of failure not due to the user negligence, the costs of on-site maintenance for the full repairing, including personnel, travel, substitution of parts and parts costs.			
Req 2-55 Maintenance plan			mandatory, functional		
The bidder shall define and propose, as included in the supply, a detailed ordinary maintenance plan for two years.	ok ESEA will include in the scope of the furniture a detailed ordinary maintenance plan for 2 years.	ok Comec Innovative define and propose, as included in the supply, a detailed ordinary maintenance plan for two years.			
Req 2-56 Documentation					
The bidder shall define and propose, as included in the supply, a detailed list of documents for - the technical description of the full cell, including technical drawings - the CE certification, - the DNGH documentation (for each possible computer), - the warranty certificate, - the safety certifications, - the use and the ordinary maintenance of the cell, - the installation and demontallation procedures, - the software user and reference manuals, - the spare part list	ok ESEA will include in the scope of the furniture a detailed documentation as for Direttiva 2006/42/CE Direttiva machine. In detail, ESEA will provide the following documents: • the technical description of the full cell, including technical drawings • CE certification, • DNGH documentation (for each possible computer), • the warranty certificate, • the safety certifications, • The user manual of the machine as for Dir. 2006/42/CE, including - the use and the ordinary maintenance of the cell, - the installation and demontallation procedures, - the software user and reference manuals, - the spare part list	OK Comec Innovative will supply as included in the supply the follows documents for: 1. the technical description of the full cell, including technical drawings of the main groups of the machine 2. the CE certification, 3. DNGH documentation (for each possible computer), 4. the warranty certificate, 5. the safety certifications, 6. the use and the ordinary maintenance of the cell, 7. the installation and demontallation procedures, 8. the software user and reference manuals, 9. the spare part list			
J Acceptance Tests					
To demonstrate compliance with the requirements and values stated in the proposal, the bidder shall implement, included in the supply, the verification matrix proposed by CIRA (see Table 1 - Pre-Acceptance and Acceptance Verification Matrix) to be carried out partly in-factory, on the preassembled AFP cell, and partly on site at CIRA, on the installed AFP cell. For all the tests, the bidder shall define and propose an implementation method. For some tests, CIRA test matrix in Table 1 includes some mandatory recommendations to be adopted in the implementation method.	APPROVED	APPROVED			
Req 2-1 Pre-acceptance verification			mandatory, functional		
The bidder shall define and propose, included in the supply, the implementation methods corresponding to the pre-acceptance tests in the Test Matrix in Table 1, accepting CIRA recommendations where expressed.	ok	ok		ESEA refers to rev.1 of CIRA OTS-24-0362. However Rev.2 differs to Rev.1 only: 1. Added the reference to the Discipline di gara 2. Modified the payment plan	
The tests and checks shall be executed in factory on the preassembled AFP cell which will then be installed at CIRA.	ok	ok			
All the costs of testing execution in factory shall be included in the supply.	ok	ok			
CIRA personnel will be free to witness testing phase in factory.	ok	ok			
Travel and accommodation costs for CIRA personnel will not be included in the supply.	ok	ok			
Once the tests and checks will have been executed, the supplier shall submit to CIRA test reports for acceptance.	ok ESEA will realize a table to laying a flat pannel of 800 mm x 800 mm to qualify the machine, that will be connected to the horizontal positioner, too. The test plane of laying will be submit to CIRA for its approval	ok			
Req 3-2 Acceptance verifications			mandatory, functional		
The bidder shall define and propose, included in the supply, the implementation methods corresponding to the acceptance tests in the Test Matrix in Table 1, accepting CIRA recommendations where expressed.	ok	ok			
The tests and checks shall be executed on site at CIRA on the installed AFP cell, to verify the proper installation and to complete the demonstration of achievement of stated performances.	ok	ok			
CIRA will make available some test mandrels with characteristics compatible with reference feasible objects defined in chapter 2.1.	ok	ok			
The test matrix proposed by the bidder shall include manufacturing tests on CIRA test mandrels	ok	ok			
The bidder shall define in the technical proposal all the instruments and other tools to be used for testing in case of selection as a supplier. All the costs of testing on site at CIRA shall be included in the supply.	ok	ok			
CIRA personnel will witness the testing activities. Once the tests and checks have been completed, within 10 (ten) working days the supplier shall submit the test reports to CIRA for acceptance.	ok ESEA will use: -a laser tracker with ISOOS to measure all the machine position as for layout and to verify the right alignments of the different modules and to validate the 3D model of the machine, to validate the accuracy/repeatability of positioning of the machine -a Black Body to qualify the laser (instruments in charge to the supplier of the laser) CIRA personnel will witness the testing activities. Once the tests and checks have been completed, within 10 (ten) working days , ESEA will submit the test reports to CIRA for acceptance	ok			