



ΑΝΩΤΑΤΟ ΕΚΠΑΙΔΕΥΤΙΚΟ ΙΔΡΥΜΑ ΠΕΙΡΑΙΑ ΤΕΧΝΟΛΟΓΙΚΟΥ ΤΟΜΕΑ

Α.Ε.Ι. ΠΕΙΡΑΙΑ Τ.Τ.

ΤΜΗΜΑ: ΜΗΧΑΝΟΛΟΓΩΝ ΜΗΧΑΝΙΚΩΝ

ΠΤΥΧΙΑΚΗ ΕΡΓΑΣΙΑ

**ΣΧΕΔΙΑΣΗ ΜΕ CAD ΔΟΜΙΚΩΝ ΣΤΟΙΧΕΙΩΝ ΠΤΕΡΥΓΑΣ
ΜΕΓΑΛΟΥ ΜΕΓΕΘΟΥΣ ΑΕΡΟΣΚΑΦΟΥΣ**

(AUTODESK INVENTOR PROFESSIONAL 2015)

ΠΑΠΑΪΩΑΝΝΟΥ ΑΛΚΙΒΙΑΔΗΣ Α.Μ.: 39085

ΓΙΟΥΛΑΤΟΣ ΚΩΝΣΤΑΝΤΙΝΟΣ Α.Μ.: 38907

ΕΠΟΠΤΗΣ: ΚΑΘΗΓΗΤΗΣ ΔΡ. ΦΙΛΗΜΩΝ ΣΚΙΤΤΙΔΗΣ

ΑΙΓΑΛΕΩ 2016

ΠΕΡΙΛΗΨΗ

Στην παρούσα πτυχιακή εργασία, με τίτλο «Σχεδίαση με CAD δομικών στοιχείων πτέρυγας μεγάλου μεγέθους αεροσκάφους», παρουσιάζεται ο σχεδιασμός της πτέρυγας αεροπλάνου με το πρόγραμμα «Inventor».

Γίνεται ιστορική αναφορά για την κατασκευή αεροσκάφους βαρύτερο απ' τον αέρα. Επίσης, περιγράφονται τα μέρη ενός ανεμόπτερου, καθώς και τα μέρη των αεροτομών. Η πτέρυγα του αεροπλάνου είναι το σημαντικότερο τμήμα του, γιατί σε αυτήν αναπτύσσονται αεροδυναμικές δυνάμεις. Οι πιο κύριες δυνάμεις είναι η άντωση, η οπισθέλκουσα και η ροπή πρόνευσης. Έπειτα, αναφέραμε τα είδη των πτερυγίων και έγινε ο υπολογισμός των πλευρών της πτέρυγας αεροπλάνου με μαθηματικά μοντέλα.

Οι τύποι των πτερύγων που ασχοληθήκαμε είναι τρεις:

1. Naca0010
2. Naca0012
3. Naca0025

Οι τιμές των σημείων με τις οποίες σχεδιάσαμε τα νεύρα(ribs) πάρθηκαν με τη βοήθεια του προγράμματος της NASA. Οι τιμές αναγράφονται όλες αναλυτικά σε περίπτωση να χρησιμοποιηθούν μελλοντικά.

SUMMARY

In the present final work, titled "Design with CAD of aircraft wing parts" is presented the planning of wing of plane with the program "Inventor".

Becomes historical report on the manufacture of plane heavier than air.

Also, are described the parts of glider, as well as the parts of aerofoils. The wing of plane is his more important department, because in this are developed aerodynamic forces. The mainest forces are the antosi, the opisthelkoysa and propensity proneysis. Then, we reported the types of fins and became the calculation of sides of wing of plane with mathematic models.

The types of wings where we dealt are three:

1. Naca0010
2. Naca0012
3. Naca0025

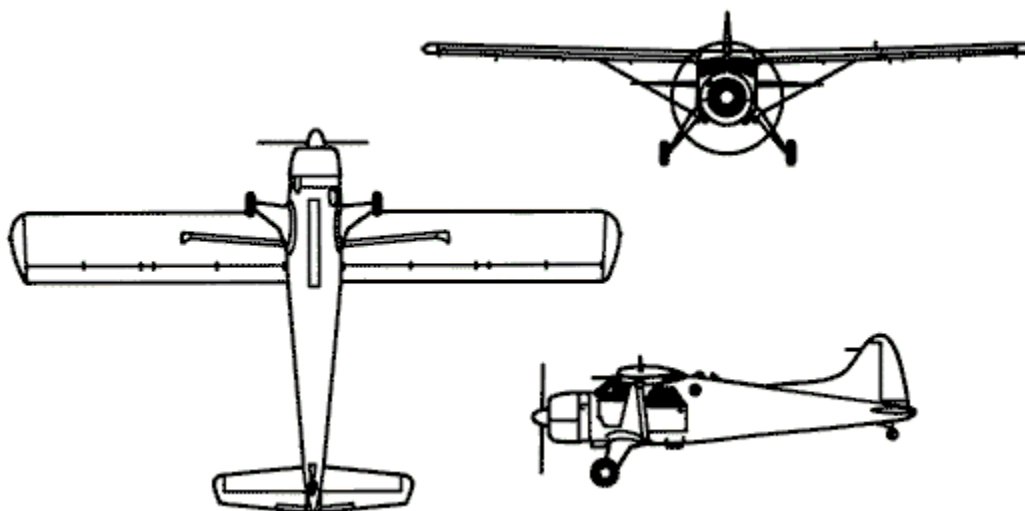
The prices of points with which we drew the ribs were taken with the help of program of NASA. The prices are entered all analytically in the event to be used in future.

ΠΕΡΙΕΧΟΜΕΝΑ

ΠΕΡΙΛΗΨΗ.....	2
SUMMARY	3
ΑΕΡΟΠΛΑΝΟ.....	5
Ιστορική Αναδρομή	5
Περιγραφή.....	7
ΑΕΡΟΤΟΜΗ(AIRFOIL)	8
Αεροτομή.....	8
Leading Edge (χείλος προσβολής).....	8
Trailing Edge (χείλος εκφυγής).....	8
Χορδή	9
Μέση γραμμή καμπυλότητας	9
ΑΝΑΛΥΣΗ ΑΕΡΟΤΟΜΗΣ	10
Άντωση, οπισθέλκουσα, και ροπή πρόνευσης (διαμήκης ροπή)	10
Δυνάμεις που ακούονται σε ένα αεροπλάνο(Τρόπος που πετάει ένα αεροπλάνο)	11
ΕΙΣΑΓΩΓΗ ΣΤΗΝ ΑΕΡΟΤΟΜΕΣ ΝΑCΑ.....	14
Γεωμετρικά χαρακτηριστικά αεροτομών ΝΑCΑ.....	14
Η Τετραψήφια αεροτομή ΝΑCΑ (4-Digit Airfoil)	15
Πλεονεκτήματα – μειονεκτήματα και εφαρμογές των αεροτομών ΝΑCΑ 4 Ψηφίων	16
ΥΠΟΛΟΓΙΣΜΟΙ ΓΙΑ ΤΗΝ ΚΑΤΑΣΚΕΥΗ ΠΤΕΡΥΓΑΣ ΑΕΡΟΣΚΑΦΟΥΣ	17
Παράδειγμα Υπολογισμών.....	17
ΜΗΧΑΝΟΛΟΓΙΚΑ ΣΧΕΔΙΑ ΠΤΕΡΥΓΑΣ ΑΕΡΟΠΛΑΝΟΥ	21
ΠΙΝΑΚΕΣ-ΣΧΕΔΙΑ ΠΤΕΡΥΓΑΣ	21
ΒΙΒΛΙΟΓΡΑΦΙΑ	22

ΑΕΡΟΠΛΑΝΟ

Το αεροπλάνο είναι αεροσκάφος (πτητική συσκευή) βαρύτερο από τον αέρα (σε αντίθεση με το αερόστατο), με ακίνητες πτέρυγες (σε αντίθεση με το ελικόπτερο), στις οποίες, εκ της ταχύτητας που αναπτύσσει, δημιουργείται δύναμη άνωσης, που κρατά αυτή στον αέρα. Η κίνηση προς τα εμπρός επιτυγχάνεται με την προωθητική δύναμη του κινητήρα, ελικοφόρου ή στροβιλοκινητήρα. Χρησιμοποιείται για τη μεταφορά ανθρώπων και εμπορευμάτων, σε ειρηνικούς αλλά και πολεμικούς σκοπούς.



Ιστορική Αναδρομή

Το αεροπλάνο άρχισε να χρησιμοποιείται από τον 20ό αιώνα, αλλά η ιδέα να πετάξει στον αέρα ο άνθρωπος είναι πολύ παλιά. Σε όλους τους αρχαίους πολιτισμούς (Κίνας, Ινδίας, Αιγύπτου) υπάρχουν εικόνες φτερωτών ανθρώπων. Είναι επίσης γνωστός ο μύθος για το ζωγράφο, γλύπτη και αρχιτέκτονα Δαίδαλο και τον γιο του Ίκαρο που πέταξαν με φτερά φτιαγμένα από τον Δαίδαλο. Κατά τη γνωστή ιστορία έγιναν πολλές απόπειρες κατασκευής πτητικών συσκευών. Χαρταετοί χρησιμοποιήθηκαν για πολεμικούς σκοπούς από πολλούς λαούς στην αρχαιότητα και στον Μεσαίωνα. Για πολλούς αιώνες ο άνθρωπος προσπάθησε, χωρίς όμως επιτυχία, να χρησιμοποιήσει τη μυϊκή του δύναμη, για να πετάξει. Ο Ιταλός ζωγράφος, σοφός και μηχανικός Λεονάρντο Ντα Βίντσι, που έζησε τον 15ο και στις αρχές του 16ου αιώνα, προσπάθησε για πρώτη φορά να στηρίξει θεωρητικά τη δυνατότητα κατασκευής πτητικής συσκευής, με βάση την προσεκτική μελέτη του τρόπου πτήσης των πουλιών. Ο Λεονάρντο σχεδίασε πτητικές συσκευές που κινούνταν με τη βοήθεια της μυϊκής δύναμης του ανθρώπου, καθώς και ένα πρότυπο ελικόπτερο με μηχανική κίνηση.

Τον 17ο αιώνα ο Ιταλός Τζιοβάνι Μπορέλι και ο Άγγλος Ρ. Γκουκ κατάληξαν σε ένα σοβαρό, αν και αρνητικό αποτέλεσμα. Είπαν ότι δεν είναι δυνατή η πτήση του ανθρώπου με τη χρήση μόνο της μυϊκής δύναμης καθώς, προκειμένου να πετάξει αυτόνομα, ο άνθρωπος θα έπρεπε να έχει πολλαπλάσιο μυϊκό όγκο. Απέδειξαν έτσι θεωρητικά πως, για να κατασκευαστεί συσκευή πιο βαριά από τον αέρα που να πετά, χρειάζεται οπωσδήποτε κινητήρας. Όταν εφευρέθηκε η ατμομηχανή τον 18ο αιώνα και ιδιαίτερα όταν τελειοποιήθηκε τον 19ο αιώνα, έγιναν πολλές απόπειρες να κατασκευαστεί ατμοκίνητη πτητική συσκευή.

Έτσι, τον 19ο αιώνα κατασκευάστηκε το πρώτο αεροπλάνο από τον Ρώσο εφευρέτη Α.Φ. Μοζάισκι. Η συσκευή έκανε μικρή πτήση. Αργότερα, στο τέλος του αιώνα, ο Χ. Μαξίμ στην Αγγλία έκανε δοκιμή αεροπλάνου με ατμομηχανή, αλλά στην πρώτη απόπειρα να αποσπαστεί από το έδαφος η μηχανή έπαθε βλάβη.

Γενικά η ατμομηχανή, με τις διαστάσεις και το βάρος που είχε, δεν ανταποκρινόταν στις απαιτήσεις μιας πτητικής συσκευής και έτσι μόνο στο τέλος του 19ου αιώνα, όταν αναπτύχθηκαν κινητήρες εσωτερικής καύσης, μπόρεσε να επιτευχθεί κατασκευή αεροπλάνου ικανού για πτήση.

Έτσι, οι αδελφοί Ράιτ (εφευρέτες και αεροπόροι) κατάφεραν να κατασκευάσουν αεροπλάνο που να επιτυγχάνει σταθερή πτήση και μάλιστα με επιβάτη. Διαβλέποντας τη στρατηγική του σημασία, πολλές κυβερνήσεις ανέπτυξαν το αεροπλάνο κυρίως για στρατιωτική χρήση, ιδιαίτερα κατά τον Α΄ Παγκόσμιο Πόλεμο. Το αεροπλάνο χρησιμοποιήθηκε σε ακόμα μεγαλύτερη κλίμακα στον Β΄ Παγκόσμιο Πόλεμο, στη διάρκεια του οποίου αναπτύχθηκαν πολύ τα καταδιωκτικά και τα βομβαρδιστικά. Στο τέλος του πολέμου οι Γερμανοί κατασκεύασαν αεροπλάνο με στροβιλοκινητήρα. Μετά τον πόλεμο κατασκευάστηκαν τα πυραυλοκίνητα αεροπλάνα.

Περιγραφή

Το αεροπλάνο αποτελείται βασικά από τρία μέρη που διαφέρουν στη μορφή και στον προορισμό τους. Αυτά είναι:

- το κύριο σώμα του αεροπλάνου που λέγεται σκάφος
- το σύστημα προώθησης και
- ο μηχανικός εξοπλισμός.

Το σκάφος αποτελεί τον κορμό του αεροπλάνου και αποτελείται από 2 μέρη: τις πτέρυγες και την άτρακτο. Οι πτέρυγες είναι σταθερά συνδεδεμένες με την άτρακτο και σ' αυτό ακριβώς διαφέρει από το ελικόπτερο, που σ' αυτό τα πτερύγιά του κινούνται. Ανάλογα με τον αριθμό των πτερύγων, τα αεροπλάνα ονομάζονται μονοπτέρυγα, διπτέρυγα, πολυπτέρυγα. Τα κλασικά αεροπλάνα, επειδή παρουσιάζουν αστάθεια στην πτήση, χρησιμοποιούν βοηθητικές πτερυγικές επιφάνειες στην πίσω άκρη της ατράκτου. Αυτές αποτελούνται από τις οριζόντιες σταθερές πτέρυγες που δίνουν ευστάθεια, για να μην αναποδογυρίσει το αεροπλάνο και τις κάθετες σταθερές για να μη γυρίζει γύρω - γύρω. Η άτρακτος, όπως το λέει και το όνομά της, έχει σχήμα ατρακτοειδές και αποτελεί το βασικό τμήμα του σκάφους, στο οποίο προσαρμόζονται και οι πτέρυγες. Στο μπροστινό τμήμα της ατράκτου υπάρχει ο θάλαμος διακυβέρνησης και το μεγαλύτερο μέρος της χρησιμοποιείται για επιβάτες, αποσκευές ή εμπορεύματα, αν το αεροπλάνο είναι μεταφορικό ή για αμυντικό ή επιθετικό εξοπλισμό, αν είναι πολεμικό.

Το προωθητικό σύστημα είναι, είτε η έλικα στα πιο παλιά αεροπλάνα είτε ο κινητήρας τζετ (στροβιλοαντιδραστήρας) στα πιο καινούργια. Ο δεύτερος χρησιμοποιείται στα αεροπλάνα που θέλουν να έχουν μεγάλες ταχύτητες, γιατί η απόδοση της έλικας ελαττώνεται, όταν η ταχύτητα είναι πάνω από 700 χλμ. την ώρα.

ΑΕΡΟΤΟΜΗ(AIRFOIL)

Αεροτομή

Είναι το εμβαδόν της επιφάνειας του σχήματος, που προέρχεται από την κάθετη τομή μιας πτέρυγας αεροπλάνου σε κάποιο σημείο αυτής. Είναι δηλαδή το εμβαδόν του προφίλ. Μέγιστη αεροτομή έχουμε στο σώμα του αεροπλάνου και ελάχιστη στο ακρο της πτέρυγας.



Leading Edge (χείλος προσβολής)

Ορολογία της αεροδυναμικής, που αναφέρεται στο εμπρόσθιο μέρος της αεροτομής ή της πτέρυγας του αεροπλάνου, που πετά.



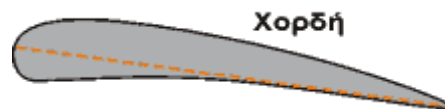
Trailing Edge (χείλος εκφυγής)

Είναι το οπίσθιο μέρος της αεροτομής ή της πτέρυγας του αεροπλάνου, που πετά. Λέγεται επίσης και χείλος εκφυγής.



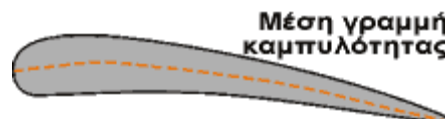
Χορδή

Είναι η ευθεία γραμμή, που συνδέει τα άκρα της μέσης γραμμής καμπυλότητας, δηλαδή το leading edge (χείλος προσβολής) και το trailing edge (χείλος εκφυγής) του αετού.



Μέση γραμμή καμπυλότητας

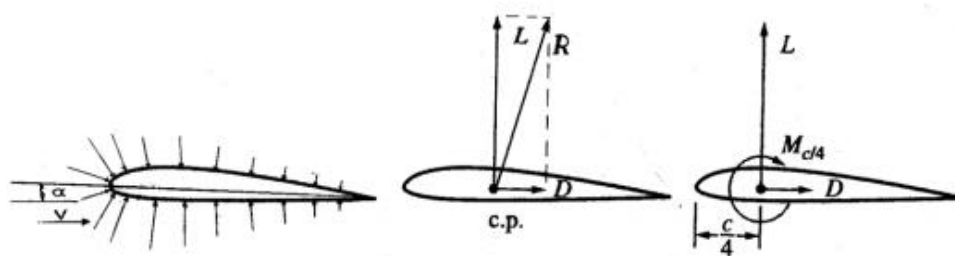
Είναι ο γεωμετρικός τόπος των σημείων, που απέχουν ίση απόσταση από την άνω επιφάνεια της πτέρυγας (ράχη) και από την κάτω επιφάνεια της αεροτομής του αεροπλάνου, που πετά.



ΑΝΑΛΥΣΗ ΑΕΡΟΤΟΜΗΣ

Άντωση, οπισθέλκουσα, και ροπή πρόνευσης (διαμήκης ροπή)

Στο παρακάτω σχήμα βλέπουμε μια πτέρυγα σε τομή που κινείται μέσα σε ρεύμα αέρα ταχύτητας V με γωνία προσβολής α . Ο αέρας ασκεί πιέσεις σε κάθε σημείο της επιφάνειας της πτέρυγας και επομένως αναπτύσσονται στοιχειώδεις δυνάμεις κάθετες σε κάθε σημείο της επιφάνειας. Η συνισταμένη όλων αυτών των στοιχειωδών δυνάμεων είναι η αεροδυναμική δύναμη R που ασκείται επάνω στη πτέρυγα και μπορεί να αναλυθεί στην άντωση L κάθετη στη διεύθυνση της ροής και στην οπισθέλκουσα D παράλληλη με τη διεύθυνση της χορδής και με φορά προς τα πίσω. Αν η πτέρυγα ήταν ελεύθερη να περιστραφεί γύρω από άξονα κάθετο στη διεύθυνση της ροής που περνά από ένα τυχαίο σημείο της πτέρυγας η δύναμη R θα δημιουργούσε μια τάση περιστροφής δηλαδή μια ροπή ως προς τον άξονα. Όταν αναφερόμαστε σε πτέρυγες, κατά κανόνα οι ροπές λαμβάνονται ως προς ένα σημείο πάνω στη χορδή σε απόσταση $c/4$ από το ΧΠ. Η επιλογή αυτού του σημείου δεν είναι τυχαία και εξηγείται παρακάτω. Το σημείο εφαρμογής της R που ονομάζεται κέντρο πιέσεων δεν είναι σταθερό αλλά εξαρτάται από τη γωνία προσβολής (ΓΠ). Για να αποφύγουμε τη δυσκολία προσδιορισμού του κέντρου πιέσεων, είναι ισοδύναμο να θεωρήσουμε ότι η R εφαρμόζεται στο σημείο $c/4$ και να προσθέσουμε τη ροπή περιστροφής της R ως προς το σημείο $c/4$. Η ροπή αυτή ονομάζεται ροπή πρόνευσης ή διαμήκης ροπή, συμβολίζεται $M_{c/4}$ και ορίζεται θετική όταν τείνει να αυξήσει τη ΓΠ.



Ισοδυναμία σημειακών φορτίων με άντωση, οπισθέλκουσα και ροπή πρόνευσης

Δυνάμεις που ακούονται σε ένα αεροπλάνο(Τρόπος που πετάει ένα αεροπλάνο)

Σε ένα αεροσκάφος υπάρχουν 4 δυνάμεις:

1) η δύναμη της ανύψωσης,

είναι αυτή που ωθεί το αεροπλάνο προς τα πάνω, εξαιτίας της συμπεριφοράς του (πχ επιτάχυνση κατά την απογείωση και ρύθμιση των φτερών για απογείωση)

2) η δύναμη της αντίστασης,

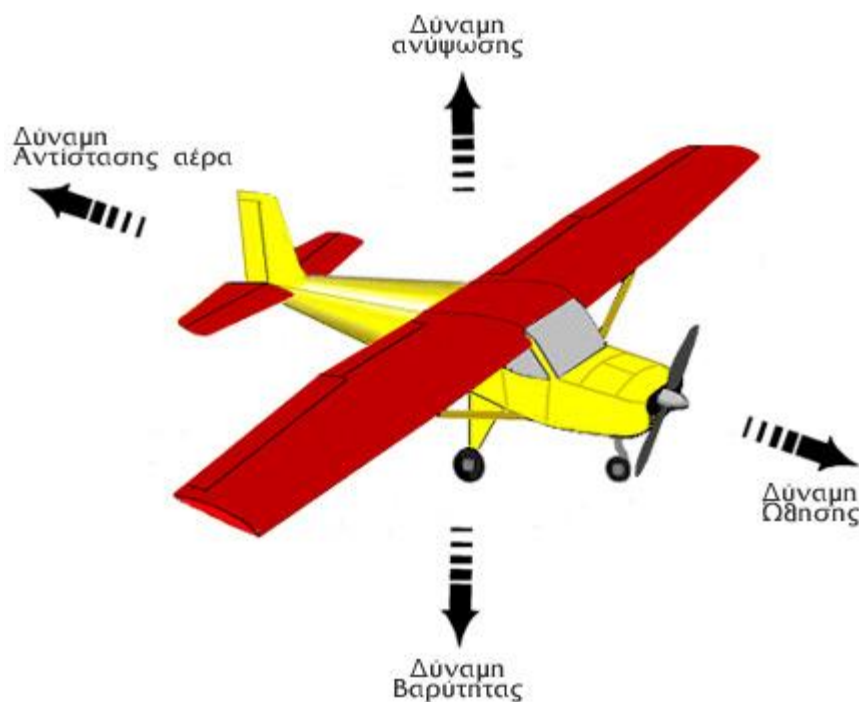
είναι η δύναμη της αντίστασης του αέρα

3) η δύναμη της ώθησης,

είναι η δύναμη που δίνει ο κινητήρας στο σκάφος για να επιταχύνει - κινείται

4) η δύναμη της βαρύτητας,

είναι αυτή που δημιουργείται από το βάρος του αεροσκάφους.



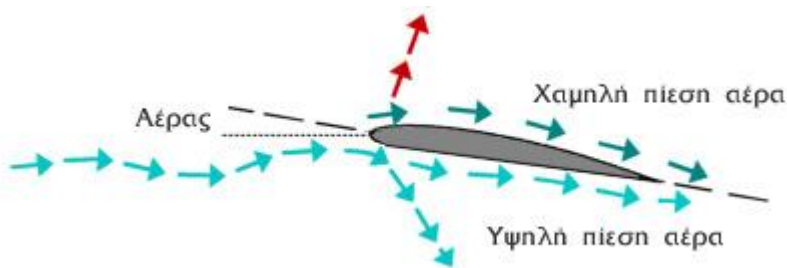
Έτσι, για να καταφέρει ένα αεροσκάφος να πετάξει, θα πρέπει η δύναμη της ώθησης να είναι μεγαλύτερη από τη δύναμη της αντίστασης του αέρα και η δύναμη της ανύψωσης μεγαλύτερη επίσης από τη δύναμη της βαρύτητας.

Τα φτερά του αεροπλάνου, δεν είναι επίπεδα. Είναι ελαφρώς καμπύλα, κατά τρόπο

αεροδυναμικό.

Κατά την πτήση μας, ο αέρας περνάει πάνω και κάτω από κάθε φτερό.

Έτσι, τα φτερά έχουν μια ελαφρώς ανηφορική κλίση, ώστε να εξοστρακίζουν τον περισσότερο αέρα στο κάτω μέρος των φτερών, με αποτέλεσμα να δημιουργείται πίεση κάτω από τα φτερά.



Αυτή η πίεση ωθεί το αεροπλάνο να πάει προς τα πάνω. Είναι σαν να το πιάνουμε κάτω από τα φτερά και να το πιέζουμε προς τα πάνω.

Τώρα, στο αεροπλάνο, όσο περισσότερη επιτάχυνση για **απογείωση** αποκτήσει, τόσο πιο έντονα γίνεται αυτό, δηλαδή τόσο μεγαλύτερη πίεση δημιουργείται κάτω από τα φτερά και τόσο ελαχιστοποιείται η πίεση του αέρα από πάνω.

Έτσι αυξάνετε η δύναμη της ανύψωσης που αναφέραμε στην αρχή!

Βέβαια, παράλληλα όσο επιταχύνει το αεροπλάνο, τόσο μεγαλύτερη γίνεται και η αντίσταση του αέρα στο σκάφος.

Γ' αυτό το λόγο όλο το σκάφος έχει πλήρως αεροδυναμική μορφή, ώστε να ελαχιστοποιεί όσο γίνεται την αύξηση της **αντίστασης του αέρα**, κατά την επιτάχυνση και την κίνησή του.

Τώρα, για τον περαιτέρω χειρισμό του αεροπλάνου, εκμεταλλευόμαστε με παρόμοιο τρόπο τον αέρα είτε για να το στρίψουμε, είτε για να το ανεβοκατεβάσουμε, είτε για να το "φρενάρουμε".



Κατά τη διάρκεια της πτήσης, όταν αποκτήσει το επιθυμητό ύψος, για να μη συνεχίσει να πηγαίνει κι άλλο επάνω, το πίσω μέρος των φτερών, παίρνει τέτοια κλίση, ώστε να ρυθμίσει την πίεση του αέρα που περνάει από τα φτερά: να την εξισορροπήσει εξίσου ίδια πάνω και κάτω από τα φτερά.

Έτσι, το αεροπλάνο πηγαίνει ευθεία (και δεν ανεβαίνει προς τα πάνω).

Αντίστοιχα, αν θέλουμε να κατέβει, το πίσω μέρος των φτερών αλλάζει κλίση, με αποτέλεσμα να χαλαίει την ισορροπία της πίεσης πάνω και κάτω από τα φτερά: δημιουργεί μεγαλύτερη πίεση από πάνω και μικρότερη από κάτω από τα φτερά.

Έτσι εδώ γίνεται το αντίστροφο, ωθεί το αεροπλάνο να κατέβει.

Επίσης, για να στρίψει το αεροπλάνο με γύρισμο, παίρνουν αντίστοιχες κλίσεις τα πίσω μέρη των φτερών, παίζοντας πάντα με την πίεση του αέρα, και πάει λέγοντας.

ΕΙΣΑΓΩΓΗ ΣΤΗΝ ΑΕΡΟΤΟΜΕΣ NACA

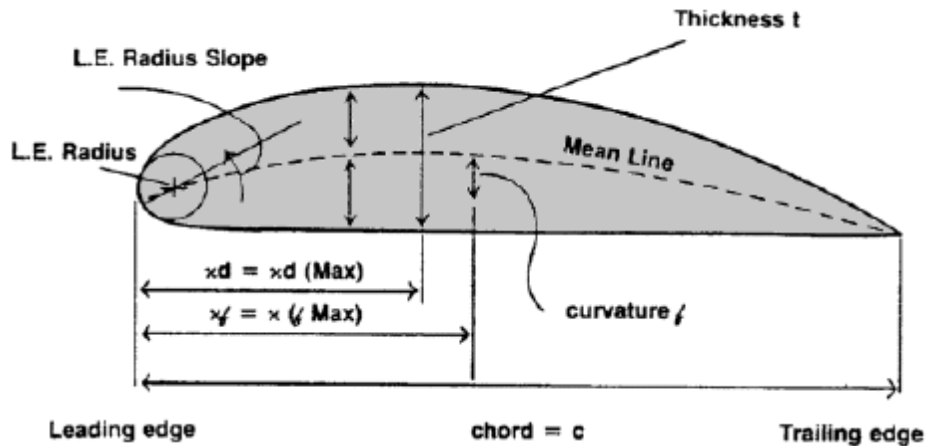
Οι αεροτομές NACA σχεδιάστηκαν κατά τη διάρκεια της περιόδου από το 1929 μέχρι το 1947 υπό την καθοδήγηση του Eastman Jacobs στο Εργαστήριο της NACA στο Langley. Οι περισσότερες από τις αεροτομές βασίστηκαν σε απλές γεωμετρικές περιγραφές, αν και οι σειρές 6 και 6A αναπτύχθηκαν χρησιμοποιώντας θεωρητική ανάλυση και δεν έχουν τους απλούς ορισμούς των υπόλοιπων σειρών. Αν και νέες γενιές αεροτομών έχουν προκύψει, ως αποτέλεσμα της βελτιωμένης κατανόησης της απόδοσης αεροτομών και της δυνατότητας να σχεδιαστούν οι νέες αεροτομές, χρησιμοποιώντας υπολογιστικές μεθόδους, οι αεροτομές NACA είναι ακόμα χρήσιμες σε πολλές εφαρμογές αεροδυναμικής σχεδίασης.

Γεωμετρικά χαρακτηριστικά αεροτομών NACA

Μία αεροτομή συντίθεται από την άνω επιφάνεια (πλευρά υποπίεσης) και την κάτω επιφάνεια (πλευρά υπερπίεσης). Μια οικογένεια αεροτομών βασίζεται σε ένα μικρό αριθμό παραμέτρων, με την μεταβολή των οποίων υπολογίζονται διαφορετικές συντεταγμένες των δύο επιφανειών της αεροτομής. Μερικές από τις κύριες παραμέτρους, που χρησιμοποιούνται για την κατασκευή διαφόρων οικογενειών αεροτομών είναι οι εξής [Abbott and Doenhoff, 1959]:

1. μέγιστο πάχος (maximum thickness),
2. μέγιστη καμπυλότητα σε σχέση με τη χορδή (maximum camber),
3. θέση του μέγιστου πάχους (position of max thickness),
4. θέση της μέγιστης καμπυλότητας (position of maximum camber),
5. ακτίνα καμπυλότητας του χείλους προσβολής (nose radius).

Χρησιμοποιώντας πολυώνυμα συγκεκριμένου βαθμού και τις παραπάνω παραμέτρους μπορούν να παραχθούν διαφορετικές μορφές αεροτομών. Αυτό έγινε από τον Eastman Jacobs στις αρχές της δεκαετίας του 1930 για να δημιουργήσει μια οικογένεια αεροτομών, γνωστές ως αεροτομές NACA. Τα βασικά χαρακτηριστικά μια αεροτομής παρουσιάζονται στο παρακάτω σχήμα. Οι αεροτομές NACA κατασκευάζονται με βάση μία διανομή μέσης γραμμής και μία διανομή πάχους. Η μέση γραμμή δημιουργεί την κύρτωση της αεροτομής. Η τελική αεροτομή προκύπτει εάν στη μέση γραμμή τοποθετηθούν κύκλοι με ακτίνα τη διανομή πάχους στο συγκεκριμένο σημείο. Η περιβάλλουσα των κύκλων αποτελεί την τελική αεροτομή.



Η Τετραψήφια αεροτομή NACA (4-Digit Airfoil)

Το σύστημα αρίθμησης για τις αεροτομές αυτές καθορίζεται ως εξής: NACA MPXX

Όπου:

- XX είναι το μέγιστο πάχος, t/c , ως ποσοστό χορδής επί τοις εκατό.
- M είναι η μέγιστη τιμή της κύρτωσης της μέσης γραμμής (mean line) επί τοις εκατό της χορδής,
- P είναι η θέση της μέγιστης κύρτωσης (camber) σε δέκατα της χορδής.

Παράδειγμα: NACA 4412

- 12% πάχος αεροτομής,
- μέγιστη τιμή της κύρτωσης 0,04c
- θέση μέγιστης κύρτωσης $x = 0,4c$

Οι αεροτομές που τα δυο πρώτα τους ψηφία αρχίζουν με 00 δεν διαθέτουν καμπυλότητα και αναφερόμαστε σε αυτές ως συμμετρικές αεροτομές (π.χ. NACA 0012). Να σημειώσουμε ότι όταν μια αεροτομή αρχίζει με μη-μηδενικό αριθμό στα πρώτα δύο ψηφία, τότε και το τρίτο θα είναι ένας μη-μηδενικός αριθμός. Αυτό οφείλεται στο γεγονός ότι η εξίσωση παρουσιάζει μια ιδιομορφία όταν το σημείο της μέγιστης καμπυλότητας ταυτίζεται με το χείλος προσβολής (leading edge).

Πλεονεκτήματα – μειονεκτήματα και εφαρμογές των αεροτομών NACA 4 Ψηφίων

ΠΛΕΟΝΕΚΤΗΜΑΤΑ

- Καλά χαρακτηριστικά στην απώλεια στήριξης
- Μικρή μετακίνηση του κέντρου πίεσης σε μεγάλες μεταβολές της ταχύτητας.
- Μικρή επίδραση της τραχύτητας

ΜΕΙΟΝΕΚΤΗΜΑΤΑ

- Μικρή τιμή του μέγιστου συντελεστή άνωσης
- Σχετικά μεγάλη αντίσταση
- Υψηλή ροπή προνεύσεως

ΕΦΑΡΜΟΓΕΣ

- Γενική αεροπορία
- Οριζόντια ουραία πτερύγια

ΣΥΜΜΕΤΡΙΚΕΣ

- Υπερηχητικά αεροσκάφη
- Πτερύγια ελικοπτέρων
- Κελύφη κινητήρων
- Πτερύγια πυραύλων

ΥΠΟΛΟΓΙΣΜΟΙ ΓΙΑ ΤΗΝ ΚΑΤΑΣΚΕΥΗ ΠΤΕΡΥΓΑΣ ΑΕΡΟΣΚΑΦΟΥΣ

Για να γίνει η σχεδίαση της πτέρυγας αεροπλάνου είναι απαραίτητο να υπολογιστούν οι πλευρές της και οι κλίσεις της. Αυτό επιτυγχάνεται με την βοήθεια συγκεκριμένων μαθηματικών μοντέλων.

Παράδειγμα Υπολογισμών

Ένα αεροσκάφος έχει επιφάνεια πτερύγων (wingarea)=20², διάταμα (aspectratio) AR=8, και λόγο εκλέπτυνσης (taperratio) λ=0.6. Υπολογίζεται ότι το 50% της γωνίας βέλους της γραμμής χορδής (50% chordlinesweepangle) είναι 30°. Υπολογίστε τη χορδή ακροπτερυγίου (tipchord), τη χορδή ρίζας (rootchord), τη μέση αεροδυναμική χορδή (mean aerodynamic chord), το εκπέτασμα (span), το δραστικό εκπέτασμα (effectivespan), καθώς επίσης και τη γωνία βέλους του χείλους προσβολής (leadingedgesweep), τη γωνία βέλους του χείλους εκφυγής (trailingedgesweep), τη γωνία βέλους του τέταρτου της χορδής (quarterchordsweepangles) [SadraeyM,2013].

Λύση: Για τον προσδιορισμό των αγνώστων μεταβλητών χρησιμοποιούμε τις παρακάτω εξισώσεις:

$$AR = \frac{b^2}{S} \Rightarrow b = \sqrt{S * AR} = \sqrt{20 * 8} \Rightarrow b = 12.65 \text{ m}$$

$$AR = \frac{b}{\bar{c}} \Rightarrow \bar{c} = \frac{b}{AR} = \frac{12.65}{8} \Rightarrow \bar{c} = 1.58 \text{ m}$$

$$\bar{c} = \frac{2}{3} c_r \left(\frac{1 + \lambda + \lambda^2}{1 + \lambda} \right) \Rightarrow 1.58 = \frac{2}{3} c_r \left(\frac{1 + 0.6 + 0.6^2}{1 + 0.6} \right) \Rightarrow c_r = 1.936 \text{ m}$$

$$\lambda = \frac{c_t}{c_r} \Rightarrow 0.6 = \frac{c_t}{1.935} \Rightarrow c_t = 1.161 \text{ m}$$

Από τη στιγμή που το 50% της γωνίας βέλους της γραμμής χορδής είναι 30° (ΛC/2=30deg), το χείλος προσβολής, το χείλος εκφυγής, και η γωνία βέλους του τέταρτου της χορδής υπολογίζονται από το νόμο του τριγώνου (εικόνα 5.45). Όμως πρώτα απαιτείται ο υπολογισμός κάποιων παραμέτρων.

Στο ορθογώνιο τρίγωνο CIF που περιέχει το 50% της γωνίας βέλους γραμμής χορδής ($\Lambda_{C/2}$), μπορούμε να γράψουμε:

$$\sin(\Lambda_{C/2}) = \frac{FI}{b/2} \Rightarrow FI = \frac{12.65}{2} \sin(30) = \mathbf{3.1625\ m}$$

$$\begin{aligned} (CI)^2 + (FI)^2 &= (CF)^2 \Rightarrow CI = \sqrt{(CF)^2 - (FI)^2} \Rightarrow \frac{beff}{2} \\ &= \sqrt{\left(\frac{12.65}{2}\right)^2 - 3.1625^2} \Rightarrow \mathbf{beff = 10.955\ m} \end{aligned}$$

Ως εκ τούτου, το δραστικό εκπέτασμα είναι μικρότερο από το κανονικό εκπέτασμα. Συνεπώς, το δραστικό διάταμα μειώνεται και γίνεται ίσο με:

$$AR_{eff} = \frac{beff^2}{S} = \frac{10.955^2}{20} \Rightarrow \mathbf{AR_{eff} = 6}$$

Σημειώνεται ότι το διάταμα AR έχει μειωθεί από 8 σε 6. Η απόσταση IH ισούται με:

$$\mathbf{IH = FI - \frac{C_t}{2} = 3.1625 - \frac{1.161}{2} = 2.582\ m}$$

Στο ορθογώνιο τρίγωνο AKH το οποίο περιέχει τη γωνία βέλους του χείλους προσβολής (Λ_{LE}), έχουμε:

$$\begin{aligned} \tan(\Lambda_{LE}) &= \frac{KH}{AK} = \frac{KI + IH}{\frac{beff}{2}} = \frac{\frac{Cr}{2} + 2.582}{\frac{10.955}{2}} = \frac{\frac{1.936}{2} + 2.582}{\frac{10.955}{2}} = 0.648 \\ &\Rightarrow \Lambda_{LE} = 33 \text{ deg} \end{aligned}$$

Στο ορθογώνιο τρίγωνο GJB το οποίο περιέχει τη γωνία βέλους του τέταρτου της χορδής ($\Lambda_{C/4}$), έχουμε:

$$\begin{aligned} \tan\left(\Lambda_{\frac{C}{4}}\right) &= \frac{GJ}{BJ} = \frac{GH + JH}{\frac{beff}{2}} = \frac{\frac{Cr}{4} + KH - KJ}{\frac{beff}{2}} = \frac{\frac{Cr}{4} + (KI + IH) - KJ}{\frac{beff}{2}} \\ &= \frac{\frac{Cr}{4} + \left(\frac{Cr}{2} + 2.582\right) - \frac{Cr}{4}}{\frac{beff}{2}} = \frac{\frac{1.161}{4} + \left(\frac{1.936}{2} + 2.582\right) - \frac{1.936}{4}}{\frac{10.955}{2}} \\ &\Rightarrow \Lambda_{C/4} = 31.5 \text{ deg} \end{aligned}$$

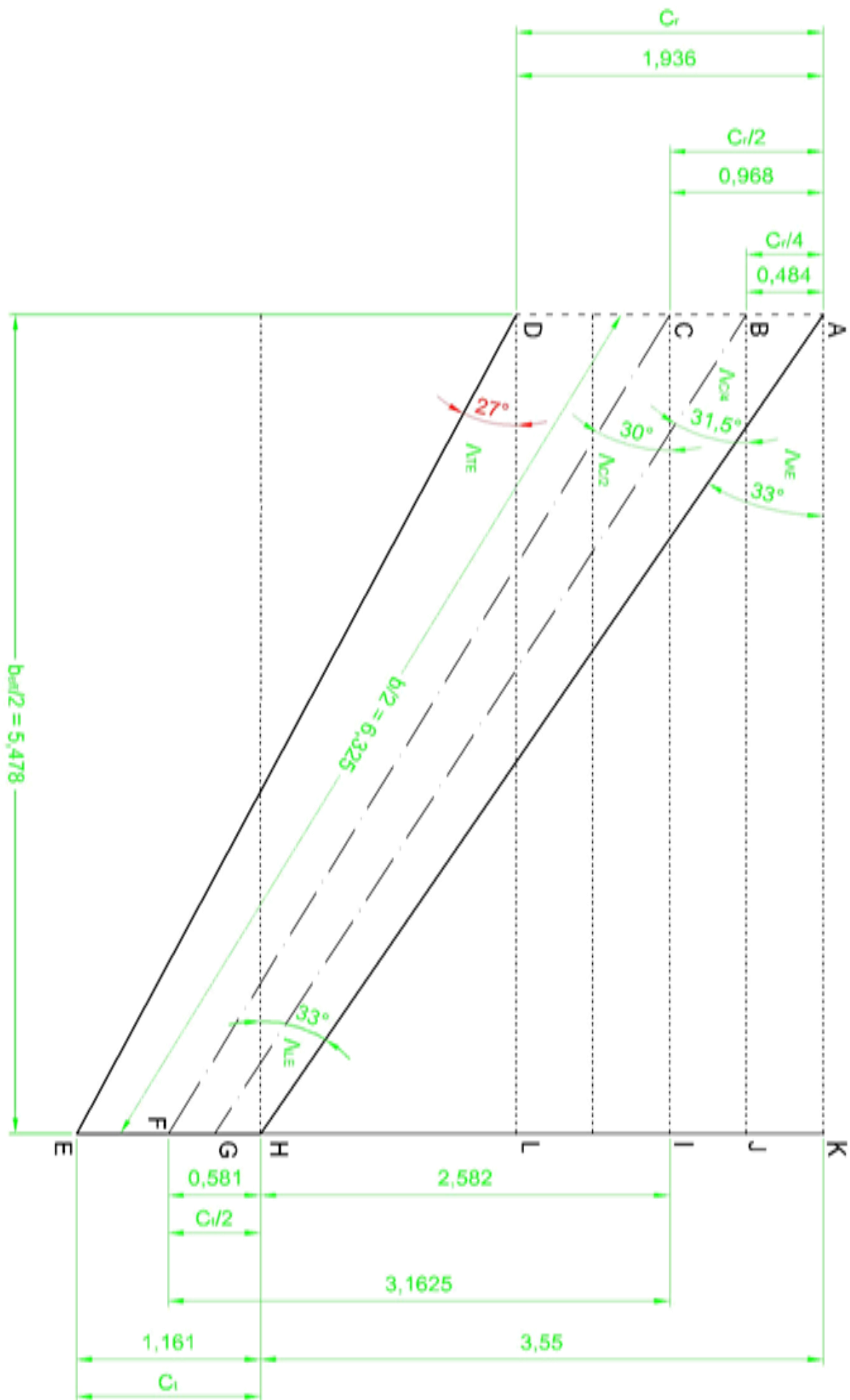
(οπίσθια γωνία βέλους).

Αυτό αποκαλύπτει ότι οι γωνίες βέλους του χείλους προσβολής και του τέταρτου της χορδής είναι μεγαλύτερες από το 50% της γωνίας βέλους της γραμμής χορδής.

Τελικά, στο ορθογώνιο τρίγωνο DLE το οποίο περιέχει τη γωνία βέλους του χείλους εκφυγής (Λ_{TE}), έχουμε

$$\begin{aligned} \tan(\Lambda_{TE}) &= \frac{EL}{LD} = \frac{EK - KL}{\frac{beff}{2}} = \frac{EK - Cr}{\frac{beff}{2}} = \frac{\frac{Ct}{2} + KH - Cr}{\frac{beff}{2}} \\ &= \frac{\frac{Ct}{2} + \left(\frac{Cr}{2} + 2.582\right) - Cr}{\frac{beff}{2}} = \frac{0.581 + (2.582) - 1.161}{5.488} = 0.541 \\ &\Rightarrow \Lambda_{TE} \approx 27 \text{ deg (aft sweep)} \end{aligned}$$

Η γωνία βέλους του χείλους εκφυγής είναι σημαντικά μικρότερη από το 50% της γωνίας βέλους της γραμμής χορδής [SadrareyM, 2013].



ΜΗΧΑΝΟΛΟΓΙΚΑ ΣΧΕΔΙΑ ΠΤΕΡΥΓΑΣ ΑΕΡΟΠΛΑΝΟΥ

Μετά τον σχεδιασμό των τριών πτερύγων αεροπλάνου(naca0010, naca0012, naca0025) σε συμπαγή μορφή, γίνεται η αναλυτική παρουσίασή της μέσα από 42 μηχανολογικά Σχέδια. Στα μηχανολογικά σχέδια αναφέρεται το κάθε εξάρτημα ξεχωριστά συναρμολογημένα μεταξύ τους με όλες τις διαστάσεις τους.

Αρχικά παρουσιάζονται όλα τα νεύρα σε σειρά μεγέθους και σε συμπαγή μορφή. Στη συνέχεια φαίνεται η εμπρόσθια και οπίσθια δοκός σε συμπαγή μορφή.

Στο τέλος παρουσιάζεται όλη η κατασκευαστική συνδεσμολογία της πτέρυγας του αεροπλάνου με όλες τις λεπτομέρειες. Καθώς επίσης και ξεχωριστή σχεδίαση της συνδεσμολογίας του κάθε νεύρου(rib) με την εμπρόσθια και οπίσθια δοκό(spar).

Επίσης στην πτυχιακή εργασία έχουν συμπεριληφθεί και όλοι οι πίνακες με τις τιμές x-y, σύμφωνα με τις οποίες σχεδιάστηκαν όλα τα νεύρα.

ΠΙΝΑΚΕΣ-ΣΧΕΔΙΑ ΠΤΕΡΥΓΑΣ

ΒΙΒΛΙΟΓΡΑΦΙΑ

[file:///C:/Users/%CE%91%CE%BB%CE%BA%CE%B9%CE%B2%CE%B9%CE%AC%CE%B4%CE%B7%CF%82/Downloads/Amoiralis_Eletherios_Dip_2004%20\(1\).pdf](file:///C:/Users/%CE%91%CE%BB%CE%BA%CE%B9%CE%B2%CE%B9%CE%AC%CE%B4%CE%B7%CF%82/Downloads/Amoiralis_Eletherios_Dip_2004%20(1).pdf)

<https://el.wikipedia.org/wiki/%CE%91%CE%B5%CF%81%CE%BF%CF%80%CE%BB%CE%AC%CE%BD%CE%BF>

http://www.kiteboard.gr/index.php?option=com_k2&view=item&id=58:%CF%87%CE%B1%CF%81%CE%B1%CE%BA%CF%84%CE%B7%CF%81%CE%B9%CF%83%CF%84%CE%B9%CE%BA%CE%B1-%CF%84%CE%B7%CF%82-%CE%B1%CE%B5%CF%81%CE%BF%CF%84%CE%BF%CE%BC%CE%B7%CF%82&Itemid=17

<http://coolweb.gr/pos-petane-aeroplana/>

<http://anla.gr/greek/books/GenikesTechnikesGnoseis.pdf>

ΣΗΜΕΙΑ X-Y NACA 0010 PART 1

1161	1.21905
1160.204715	1.31193
1157.820021	1.59057
1153.852884	2.051487
1148.314914	2.692359
1141.220043	3.507381
1132.588008	4.491909
1122.44319	5.636655
1110.813453	6.934653
1097.728983	8.376615
1083.228093	9.952092
1067.347935	11.650635
1050.133788	13.461795
1031.633253	15.373962
1011.895092	17.375526
990.975033	19.453716
968.929965	21.596922
945.82026	23.793534
921.709773	26.030781
896.66352	28.295892
870.75	30.576096
844.041195	32.858622
816.610248	35.130699
788.532624	37.378395
759.883788	39.587778
730.74501	41.744916
701.192916	43.834716
671.309937	45.843246
641.178504	47.754252
610.881048	49.55148
580.5	51.219837
550.118952	52.743069
519.821496	54.104922
489.690063	55.290303
459.807084	56.284119
430.25499	57.071277
401.116212	57.639006
372.467376	57.973374
344.389752	58.063932
316.958805	57.902553
290.25	57.48111
264.33648	56.794959
239.290227	55.838295
215.17974	54.612279
192.070035	53.118072
170.024967	51.357996
149.104908	49.339017
129.366747	47.06694
110.866212	44.552214
93.652065	41.806449

77.771907	38.840094
63.271017	35.668242
50.186547	32.303664
38.55681	28.760292
28.411992	25.052058
19.779957	21.191733
12.685086	17.192088
7.147116	13.064733
3.179979	8.817795
0.795285	4.461723
0	0
0.795285	-4.461723
3.179979	-8.817795
7.147116	-13.064733
12.685086	-17.192088
19.779957	-21.191733
28.411992	-25.052058
38.55681	-28.760292
50.186547	-32.303664
63.271017	-35.668242
77.771907	-38.840094
93.652065	-41.806449
110.866212	-44.552214
129.366747	-47.06694
149.104908	-49.339017
170.024967	-51.357996
192.070035	-53.118072
215.17974	-54.612279
239.290227	-55.838295
264.33648	-56.794959
290.25	-57.48111
316.958805	-57.902553
344.389752	-58.063932
372.467376	-57.973374
401.116212	-57.639006
430.25499	-57.071277
459.807084	-56.284119
489.690063	-55.290303
519.821496	-54.104922
550.118952	-52.743069
580.5	-51.219837
610.881048	-49.55148
641.178504	-47.754252
671.309937	-45.843246
701.192916	-43.834716
730.74501	-41.744916
759.883788	-39.587778
788.532624	-37.378395
816.610248	-35.130699
844.041195	-32.858622

870.75	-30.576096
896.66352	-28.295892
921.709773	-26.030781
945.82026	-23.793534
968.929965	-21.596922
990.975033	-19.453716
1011.895092	-17.375526
1031.633253	-15.373962
1050.133788	-13.461795
1067.347935	-11.650635
1083.228093	-9.952092
1097.728983	-8.376615
1110.813453	-6.934653
1122.44319	-5.636655
1132.588008	-4.491909
1141.220043	-3.507381
1148.314914	-2.692359
1153.852884	-2.051487
1157.820021	-1.59057
1160.204715	-1.31193
1161	-1.21905

ΣΗΜΕΙΑ X-Y NACA 0010 PART 1

1166.6	1.22493
1165.801	1.318258
1163.405	1.598242
1159.418	2.061382
1153.854	2.705345
1146.725	3.524299
1138.051	4.513575
1127.857	5.663843
1116.171	6.968102
1103.024	8.417019
1088.453	10.0001
1072.496	11.70683
1055.199	13.52673
1036.609	15.44812
1016.776	17.45934
995.7549	19.54755
973.6035	21.70109
950.3824	23.9083
926.1556	26.15634
900.9885	28.43238
874.95	30.72358
848.1124	33.01711
820.5491	35.30015
792.3361	37.55869
763.549	39.77873
734.2697	41.94627
704.5751	44.04615
674.548	46.06437
644.2712	47.98459
613.8276	49.79049
583.3	51.46689
552.7724	52.99747
522.3288	54.36589
492.052	55.55699
462.0249	56.5556
432.3303	57.34656
403.051	57.91702
374.2639	58.253
346.0509	58.344
318.4876	58.18184
291.65	57.75837
265.6115	57.06891
240.4444	56.10763
216.2176	54.8757
192.9965	53.37428
170.8451	51.60572
149.8241	49.577
129.9907	47.29396
111.401	44.76711
94.10379	42.0081

78.14703	39.02744
63.5762	35.84029
50.42862	32.45948
38.74279	28.89902
28.54904	25.17289
19.87536	21.29395
12.74627	17.27501
7.18159	13.12775
3.195317	8.860327
0.799121	4.483244
0	0
0.799121	-4.48324
3.195317	-8.86033
7.18159	-13.1277
12.74627	-17.275
19.87536	-21.2939
28.54904	-25.1729
38.74279	-28.899
50.42862	-32.4595
63.5762	-35.8403
78.14703	-39.0274
94.10379	-42.0081
111.401	-44.7671
129.9907	-47.294
149.8241	-49.577
170.8451	-51.6057
192.9965	-53.3743
216.2176	-54.8757
240.4444	-56.1076
265.6115	-57.0689
291.65	-57.7584
318.4876	-58.1818
346.0509	-58.344
374.2639	-58.253
403.051	-57.917
432.3303	-57.3466
462.0249	-56.5556
492.052	-55.557
522.3288	-54.3659
552.7724	-52.9975
583.3	-51.4669
613.8276	-49.7905
644.2712	-47.9846
674.548	-46.0644
704.5751	-44.0461
734.2697	-41.9463
763.549	-39.7787
792.3361	-37.5587
820.5491	-35.3001
848.1124	-33.0171

874.95	-30.7236
900.9885	-28.4324
926.1556	-26.1563
950.3824	-23.9083
973.6035	-21.7011
995.7549	-19.5475
1016.776	-17.4593
1036.609	-15.4481
1055.199	-13.5267
1072.496	-11.7068
1088.453	-10.0001
1103.024	-8.41702
1116.171	-6.9681
1127.857	-5.66384
1138.051	-4.51358
1146.725	-3.5243
1153.854	-2.70535
1159.418	-2.06138
1163.405	-1.59824
1165.801	-1.31826
1166.6	-1.22493

ΣΗΜΕΙΑ X-Y NACA 0010 PART 2

1246,45	1,3087725
1245,596182	1,4084885
1243,035973	1,7076365
1238,776854	2,20247715
1232,831287	2,89051755
1225,214231	3,76552545
1215,946876	4,82251505
1205,055396	6,05151475
1192,569706	7,44504585
1178,522214	8,99313675
1162,954054	10,6845694
1145,905111	12,50812575
1127,423997	14,45258775
1107,561816	16,5054909
1086,370919	18,6543707
1063,911137	20,8855162
1040,243544	23,1864629
1015,432957	25,5447463
989,5479299	27,94665545
962,658264	30,3784794
934,8375	32,8265072
906,1629178	35,2770279
876,7130436	37,71633055
846,5688968	40,12945775
815,8114966	42,5014521
784,5280945	44,8173562
752,8009562	47,0609662
720,7185797	49,2173247
688,3694628	51,2689814
655,8421036	53,198486
623,225	54,98963465
590,6078964	56,62497705
558,0805372	58,0870629
525,7314204	59,35968835
493,6490438	60,42664955
461,9219055	61,27174265
430,6385034	61,8812567
399,8811032	62,2402343
369,7369564	62,3374574
340,2870823	62,16420085
311,6125	61,7117395
283,791736	60,97508755
256,9020702	59,94801275
231,017043	58,63176155
206,2064558	57,0275804
182,5388632	55,1379622
160,0790806	52,97038565
138,8881842	50,531083
119,0260034	47,8312723
100,5448893	44,88341805

83,49594615	41,6987383
67,92778565	38,2934369
53,88029415	34,6812248
41,3946045	30,8770594
30,5031244	26,8958981
21,23576865	22,75145185
13,6187127	18,4574316
7,6731462	14,02630185
3,41402655	9,46678775
0,85381825	4,79010735
0	0
0,85381825	-4,79010735
3,41402655	-9,46678775
7,6731462	-
	14,02630185
13,6187127	-18,4574316
21,23576865	-
	22,75145185
30,5031244	-26,8958981
41,3946045	-30,8770594
53,88029415	-34,6812248
67,92778565	-38,2934369
83,49594615	-41,6987383
100,5448893	-
	44,88341805
119,0260034	-47,8312723
138,8881842	-50,531083
160,0790806	-
	52,97038565
182,5388632	-55,1379622
206,2064558	-57,0275804
231,017043	-
	58,63176155
256,9020702	-
	59,94801275
283,791736	-
	60,97508755
311,6125	-61,7117395
340,2870823	-
	62,16420085
369,7369564	-62,3374574
399,8811032	-62,2402343
430,6385034	-61,8812567
461,9219055	-
	61,27174265
493,6490438	-
	60,42664955
525,7314204	-
	59,35968835
558,0805372	-58,0870629
590,6078964	-
	56,62497705
623,225	-
	54,98963465
655,8421036	-53,198486
688,3694628	-51,2689814
720,7185797	-49,2173247
752,8009562	-47,0609662
784,5280945	-44,8173562
815,8114966	-42,5014521
846,5688968	-
	40,12945775
876,7130436	-
	37,71633055
906,1629178	-35,2770279

934,8375	-32,8265072
962,658264	-30,3784794
989,5479299	-27,94665545
1015,432957	-25,5447463
1040,243544	-23,1864629
1063,911137	-20,8855162
1086,370919	-18,6543707
1107,561816	-16,5054909
1127,423997	-14,45258775
1145,905111	-12,50812575
1162,954054	-10,6845694
1178,522214	-8,99313675
1192,569706	-7,44504585
1205,055396	-6,05151475
1215,946876	-4,82251505
1225,214231	-3,76552545
1232,831287	-2,89051755
1238,776854	-2,20247715
1243,035973	-1,7076365
1245,596182	-1,4084885
1246,45	-1,3087725

ZHMEIA X-Y NACA 0010 PART 2

1252,1	1,314705
1251,242312	1,414873
1248,670498	1,715377
1244,392072	2,2124607
1238,419555	2,9036199
1230,767972	3,7825941
1221,458609	4,8443749
1210,517759	6,0789455
1197,975473	7,4787933
1183,864306	9,0339015
1168,225577	10,7330012
1151,099354	12,5648235
1132,534467	14,5180995
1112,582253	16,5803082
1091,295301	18,7389286
1068,733711	20,9801876
1044,958837	23,2915642
1020,035786	25,6605374
994,0334253	28,0733341
967,021872	30,5161812
939,075	32,9753056
910,2704395	35,4369342
880,6870728	37,8872939
850,4062864	40,3113595
819,5094668	42,6941058
788,084261	45,0205076
756,2133076	47,2742876
723,9855057	49,4404206
691,4897544	51,5013772
658,8149528	53,439628
626,05	55,2388957
593,2850472	56,8816509
560,6102456	58,3503642
528,1144943	59,6287583
495,8866924	60,7005559
464,015739	61,5494797
432,5905332	62,1617566
401,6937136	62,5223614
371,4129272	62,6200252
341,8295605	62,4459833
313,025	61,991471
285,078128	61,2514799
258,0665747	60,2197495
232,064214	58,8975319
207,1411635	57,2860792
183,3662887	55,3878956
160,8046988	53,2104937
139,5177467	50,760134
119,5655332	48,0480854
101,0006465	45,0868689

83,8744227	41,8877534
68,2356937	38,4670162
54,1245267	34,8384304
41,582241	31,0170212
30,6413912	27,0178138
21,3320277	22,8545813
13,6804446	18,5410968
7,7079276	14,0898813
3,4295019	9,5096995
0,8576885	4,8118203
0	0
0,8576885	-4,8118203
3,4295019	-9,5096995
7,7079276	-14,0898813
13,6804446	-18,5410968
21,3320277	-22,8545813
30,6413912	-27,0178138
41,582241	-31,0170212
54,1245267	-34,8384304
68,2356937	-38,4670162
83,8744227	-41,8877534
101,0006465	-45,0868689
119,5655332	-48,0480854
139,5177467	-50,760134
160,8046988	-53,2104937
183,3662887	-55,3878956
207,1411635	-57,2860792
232,064214	-58,8975319
258,0665747	-60,2197495
285,078128	-61,2514799
313,025	-61,991471
341,8295605	-62,4459833
371,4129272	-62,6200252
401,6937136	-62,5223614
432,5905332	-62,1617566
464,015739	-61,5494797
495,8866924	-60,7005559
528,1144943	-59,6287583
560,6102456	-58,3503642
593,2850472	-56,8816509
626,05	-55,2388957
658,8149528	-53,439628
691,4897544	-51,5013772
723,9855057	-49,4404206
756,2133076	-47,2742876
788,084261	-45,0205076
819,5094668	-42,6941058
850,4062864	-40,3113595
880,6870728	-37,8872939
910,2704395	-35,4369342

939,075	-32,9753056
967,021872	-30,5161812
994,0334253	-28,0733341
1020,035786	-25,6605374
1044,958837	-23,2915642
1068,733711	-20,9801876
1091,295301	-18,7389286
1112,582253	-16,5803082
1132,534467	-14,5180995
1151,099354	-12,5648235
1168,225577	-10,7330012
1183,864306	-9,0339015
1197,975473	-7,4787933
1210,517759	-6,0789455
1221,458609	-4,8443749
1230,767972	-3,7825941
1238,419555	-2,9036199
1244,392072	-2,2124607
1248,670498	-1,715377
1251,242312	-1,414873
1252,1	-1,314705

ΣΗΜΕΙΑ X-Y NACA 0010 PART 3

1331,9	1,398495
1330,987649	1,505047
1328,251926	1,824703
1323,700824	2,3534673
1317,347661	3,0886761
1309,20842	4,0236699
1299,305743	5,1531211
1287,667601	6,4663745
1274,325959	7,9554387
1259,315446	9,6096585
1242,680015	11,4170468
1224,462287	13,3656165
1204,714205	15,4433805
1183,490379	17,6370198
1160,846747	19,9332154
1136,847241	22,3173164
1111,557124	24,7760038
1085,045654	27,2959586
1057,386087	29,8625299
1028,653008	32,4610668
998,925	35,0769184
968,2846405	37,6954338
936,8158392	40,3019621
904,6051696	42,8805205
871,7392052	45,4151262
838,311179	47,8897964
804,4089964	50,2872164
770,1272223	52,5914034
735,5604216	54,7837108
700,8031592	56,845492
665,95	58,7594323
631,0968408	60,5068851
596,3395784	62,0692038
561,7727777	63,4290737
527,4910036	64,5691801
493,588821	65,4722083
460,1607948	66,1235074
427,2948304	66,5070946
395,0841608	66,6109828
363,6153595	66,4258487
332,975	65,942369
303,246992	65,1552161
274,5139133	64,0577305
246,854346	62,6512441
220,3428765	60,9370888
195,0527593	58,9179284
171,0532532	56,6017543
148,4096213	53,995226
127,1857948	51,1103306
107,4377135	47,9603871

89,2199853	44,5573826
72,5845543	40,9186318
57,5740413	37,0587856
44,232399	32,9938268
32,5942568	28,7397382
22,6915803	24,3111707
14,5523394	19,7227752
8,1991764	14,9878707
3,6480741	10,1157805
0,9123515	5,1184917
0	0
0,9123515	-5,1184917
3,6480741	-10,1157805
8,1991764	-14,9878707
14,5523394	-19,7227752
22,6915803	-24,3111707
32,5942568	-28,7397382
44,232399	-32,9938268
57,5740413	-37,0587856
72,5845543	-40,9186318
89,2199853	-44,5573826
107,4377135	-47,9603871
127,1857948	-51,1103306
148,4096213	-53,995226
171,0532532	-56,6017543
195,0527593	-58,9179284
220,3428765	-60,9370888
246,854346	-62,6512441
274,5139133	-64,0577305
303,246992	-65,1552161
332,975	-65,942369
363,6153595	-66,4258487
395,0841608	-66,6109828
427,2948304	-66,5070946
460,1607948	-66,1235074
493,588821	-65,4722083
527,4910036	-64,5691801
561,7727777	-63,4290737
596,3395784	-62,0692038
631,0968408	-60,5068851
665,95	-58,7594323
700,8031592	-56,845492
735,5604216	-54,7837108
770,1272223	-52,5914034
804,4089964	-50,2872164
838,311179	-47,8897964
871,7392052	-45,4151262
904,6051696	-42,8805205
936,8158392	-40,3019621
968,2846405	-37,6954338

998,925	-35,0769184
1028,653008	-32,4610668
1057,386087	-29,8625299
1085,045654	-27,2959586
1111,557124	-24,7760038
1136,847241	-22,3173164
1160,846747	-19,9332154
1183,490379	-17,6370198
1204,714205	-15,4433805
1224,462287	-13,3656165
1242,680015	-11,4170468
1259,315446	-9,6096585
1274,325959	-7,9554387
1287,667601	-6,4663745
1299,305743	-5,1531211
1309,20842	-4,0236699
1317,347661	-3,0886761
1323,700824	-2,3534673
1328,251926	-1,824703
1330,987649	-1,505047
1331,9	-1,398495

ΣΗΜΕΙΑ X-Y NACA 0010 PART 3

1337,6	1,40448
1336,683744	1,511488
1333,936314	1,832512
1329,365734	2,3635392
1322,985382	3,1018944
1314,811309	4,0408896
1304,866253	5,1751744
1293,178304	6,494048
1279,779565	7,9894848
1264,704813	9,650784
1247,998189	11,4659072
1229,702496	13,422816
1209,869901	15,509472
1188,555245	17,7124992
1165,814707	20,0185216
1141,712493	22,4128256
1116,314144	24,8820352
1089,689216	27,4127744
1061,911277	29,9903296
1033,055232	32,5999872
1003,2	35,2270336
972,428512	37,8567552
940,8250368	40,4744384
908,4765184	43,064032
875,4699008	45,6094848
841,898816	48,0947456
807,8515456	50,5024256
773,4230592	52,8164736
738,7083264	55,0181632
703,8023168	57,088768
668,8	59,0108992
633,7976832	60,7658304
598,8916736	62,3348352
564,1769408	63,7005248
529,7484544	64,8455104
495,701184	65,7524032
462,1300992	66,4064896
429,1234816	66,7917184
396,7749632	66,8960512
365,171488	66,7101248
334,4	66,224576
304,544768	65,4340544
275,6887232	64,331872
247,910784	62,9193664
221,285856	61,1978752
195,8875072	59,1700736
171,7852928	56,8439872
149,0447552	54,226304
127,7300992	51,3290624
107,897504	48,1656384

89,6018112	44,7480704
72,8951872	41,0937472
57,8204352	37,2173824
44,421696	33,1350272
32,7337472	28,8627328
22,7886912	24,4152128
14,6146176	19,8071808
8,2342656	15,0520128
3,6636864	10,159072
0,916256	5,1403968
0	0
0,916256	-5,1403968
3,6636864	-10,159072
8,2342656	-15,0520128
14,6146176	-19,8071808
22,7886912	-24,4152128
32,7337472	-28,8627328
44,421696	-33,1350272
57,8204352	-37,2173824
72,8951872	-41,0937472
89,6018112	-44,7480704
107,897504	-48,1656384
127,7300992	-51,3290624
149,0447552	-54,226304
171,7852928	-56,8439872
195,8875072	-59,1700736
221,285856	-61,1978752
247,910784	-62,9193664
275,6887232	-64,331872
304,544768	-65,4340544
334,4	-66,224576
365,171488	-66,7101248
396,7749632	-66,8960512
429,1234816	-66,7917184
462,1300992	-66,4064896
495,701184	-65,7524032
529,7484544	-64,8455104
564,1769408	-63,7005248
598,8916736	-62,3348352
633,7976832	-60,7658304
668,8	-59,0108992
703,8023168	-57,088768
738,7083264	-55,0181632
773,4230592	-52,8164736
807,8515456	-50,5024256
841,898816	-48,0947456
875,4699008	-45,6094848
908,4765184	-43,064032
940,8250368	-40,4744384
972,428512	-37,8567552

1003,2	-35,2270336
1033,055232	-32,5999872
1061,911277	-29,9903296
1089,689216	-27,4127744
1116,314144	-24,8820352
1141,712493	-22,4128256
1165,814707	-20,0185216
1188,555245	-17,7124992
1209,869901	-15,509472
1229,702496	-13,422816
1247,998189	-11,4659072
1264,704813	-9,650784
1279,779565	-7,9894848
1293,178304	-6,494048
1304,866253	-5,1751744
1314,811309	-4,0408896
1322,985382	-3,1018944
1329,365734	-2,3635392
1333,936314	-1,832512
1336,683744	-1,511488
1337,6	-1,40448

ZHMEIA X-Y NACA 0010 PART 4

1417,35	1,4882175
1416,379115	1,6016055
1413,467878	1,9417695
1408,624793	2,50445745
1401,864034	3,28683465
1393,202608	4,28181435
1382,664611	5,48372715
1370,279807	6,88123425
1356,082212	8,46583155
1340,108677	10,22618025
1322,405976	12,1495242
1303,019462	14,22310725
1282,004414	16,43417325
1259,418942	18,7685487
1235,322574	21,2120601
1209,783345	23,7491166
1182,870703	26,3655447
1154,658351	29,0471709
1125,224244	31,77840435
1094,647752	34,5436542
1063,0125	37,3273296
1030,406363	40,1138397
996,9186348	42,88759365
962,6414424	45,63158325
927,6669138	48,3288003
892,0942635	50,9622366
856,0170366	53,5134666
819,535865	55,9654821
782,7513804	58,2984402
745,7642148	60,492498
708,675	62,52922995
671,5857852	64,38879315
634,5986196	66,0513447
597,8141351	67,49845905
561,3329634	68,71171065
525,2557365	69,67267395
489,6830862	70,3657581
454,7085576	70,7739549
420,4313652	70,8845082
386,9436368	70,68749655
354,3375	70,1729985
322,702248	69,33534465
292,1257565	68,16744825
262,691649	66,67072665
234,4792973	64,8465972
207,5666555	62,6978946
182,0274258	60,23312295
157,9310585	57,459369
135,3455862	54,3893889
114,3305378	51,03735615

94,94402445	47,4160269
77,24132295	43,5438267
61,26778845	39,4363464
47,0701935	35,1105942
34,6853892	30,5835783
24,14739195	25,87088955
15,4859661	20,9881188
8,7252066	15,94943955
3,88212165	10,76477325
0,97088475	5,44687605
0	0
0,97088475	-5,44687605
3,88212165	-10,76477325
8,7252066	-15,94943955
15,4859661	-20,9881188
24,14739195	-25,87088955
34,6853892	-30,5835783
47,0701935	-35,1105942
61,26778845	-39,4363464
77,24132295	-43,5438267
94,94402445	-47,4160269
114,3305378	-51,03735615
135,3455862	-54,3893889
157,9310585	-57,459369
182,0274258	-60,23312295
207,5666555	-62,6978946
234,4792973	-64,8465972
262,691649	-66,67072665
292,1257565	-68,16744825
322,702248	-69,33534465
354,3375	-70,1729985
386,9436368	-70,68749655
420,4313652	-70,8845082
454,7085576	-70,7739549
489,6830862	-70,3657581
525,2557365	-69,67267395
561,3329634	-68,71171065
597,8141351	-67,49845905
634,5986196	-66,0513447
671,5857852	-64,38879315
708,675	-62,52922995
745,7642148	-60,492498
782,7513804	-58,2984402
819,535865	-55,9654821
856,0170366	-53,5134666
892,0942635	-50,9622366
927,6669138	-48,3288003
962,6414424	-45,63158325
996,9186348	-42,88759365
1030,406363	-40,1138397

1063,0125	-37,3273296
1094,647752	-34,5436542
1125,224244	-31,77840435
1154,658351	-29,0471709
1182,870703	-26,3655447
1209,783345	-23,7491166
1235,322574	-21,2120601
1259,418942	-18,7685487
1282,004414	-16,43417325
1303,019462	-14,22310725
1322,405976	-12,1495242
1340,108677	-10,22618025
1356,082212	-8,46583155
1370,279807	-6,88123425
1382,664611	-5,48372715
1393,202608	-4,28181435
1401,864034	-3,28683465
1408,624793	-2,50445745
1413,467878	-1,9417695
1416,379115	-1,6016055
1417,35	-1,4882175

ΣΗΜΕΙΑ X-Y NACA 0010 PART 4

1423	1,49415
1422,025245	1,60799
1419,102403	1,94951
1414,240012	2,514441
1407,452302	3,299937
1398,756349	4,298883
1388,176344	5,505587
1375,74217	6,908665
1361,487979	8,499579
1345,450769	10,266945
1327,677499	12,197956
1308,213705	14,279805
1287,114884	16,499685
1264,439379	18,843366
1240,246956	21,296618
1214,605919	23,843788
1187,585995	26,470646
1159,26118	29,162962
1129,709739	31,905083
1099,01136	34,681356
1067,25	37,476128
1034,513885	40,273746
1000,892664	43,058557
966,478832	45,813485
931,364884	48,521454
895,65043	51,165388
859,429388	53,726788
822,802791	56,188578
785,871672	58,530836
748,737064	60,73364
711,5	62,778491
674,262936	64,645467
637,128328	66,314646
600,197209	67,767529
563,570612	68,985617
527,34957	69,950411
491,635116	70,646258
456,521168	71,056082
422,107336	71,167076
388,486115	70,969279
355,75	70,45273
323,98864	69,611737
293,290261	68,439185
263,73882	66,936497
235,414005	65,105096
208,394081	62,947828
182,753044	60,473231
158,560621	57,68842
135,885116	54,606202
114,786295	51,240807

95,322501	47,605042
77,549231	43,717406
61,512021	39,593552
47,25783	35,250556
34,823656	30,705494
24,243651	25,974019
15,547698	21,071784
8,759988	16,013019
3,897597	10,807685
0,974755	5,468589
0	0
0,974755	-5,468589
3,897597	-10,807685
8,759988	-16,013019
15,547698	-21,071784
24,243651	-25,974019
34,823656	-30,705494
47,25783	-35,250556
61,512021	-39,593552
77,549231	-43,717406
95,322501	-47,605042
114,786295	-51,240807
135,885116	-54,606202
158,560621	-57,68842
182,753044	-60,473231
208,394081	-62,947828
235,414005	-65,105096
263,73882	-66,936497
293,290261	-68,439185
323,98864	-69,611737
355,75	-70,45273
388,486115	-70,969279
422,107336	-71,167076
456,521168	-71,056082
491,635116	-70,646258
527,34957	-69,950411
563,570612	-68,985617
600,197209	-67,767529
637,128328	-66,314646
674,262936	-64,645467
711,5	-62,778491
748,737064	-60,73364
785,871672	-58,530836
822,802791	-56,188578
859,429388	-53,726788
895,65043	-51,165388
931,364884	-48,521454
966,478832	-45,813485
1000,892664	-43,058557
1034,513885	-40,273746

1067,25	-37,476128
1099,01136	-34,681356
1129,709739	-31,905083
1159,26118	-29,162962
1187,585995	-26,470646
1214,605919	-23,843788
1240,246956	-21,296618
1264,439379	-18,843366
1287,114884	-16,499685
1308,213705	-14,279805
1327,677499	-12,197956
1345,450769	-10,266945
1361,487979	-8,499579
1375,74217	-6,908665
1388,176344	-5,505587
1398,756349	-4,298883
1407,452302	-3,299937
1414,240012	-2,514441
1419,102403	-1,94951
1422,025245	-1,60799
1423	-1,49415

ΣΗΜΕΙΑ X-Y NACA 0010 PART 5

1502,8	1,57794
1501,770582	1,698164
1498,683831	2,058836
1493,548763	2,6554476
1486,380407	3,4849932
1477,196796	4,5399588
1466,023478	5,8143332
1452,892012	7,296094
1437,838464	8,9762244
1420,901908	10,842702
1402,131936	12,8820016
1381,576638	15,080598
1359,294622	17,424966
1335,347504	19,9000776
1309,798402	22,4909048
1282,719448	25,1809168
1254,184282	27,9550856
1224,271048	30,7983832
1193,0624	33,6942788
1160,642496	36,6262416
1127,1	39,5777408
1092,528086	42,5322456
1057,02143	45,4732252
1020,677715	48,382646
983,5946224	51,2424744
945,877348	54,0346768
907,6250768	56,7397168
868,9445076	59,3395608
829,9423392	61,8131696
790,7252704	64,139504
751,4	66,2990276
712,0747296	68,2707012
672,8576608	70,0334856
633,8554924	71,5678444
595,1749232	72,8542412
556,922652	73,8731396
519,2053776	74,6080088
482,1222848	75,0408152
445,7785696	75,1580336
410,271914	74,9491444
375,7	74,403628
342,157504	73,5154732
309,7375996	72,277166
278,528952	70,6902092
248,615718	68,7561056
220,0805516	66,4778608
193,0015984	63,8644916
167,4524956	60,923512
143,5053776	57,6684472
121,223362	54,1143252

100,6680636	50,2746712
81,8980916	46,1690216
64,9615356	41,8139072
49,907988	37,2273616
36,7765216	32,4274184
25,6032036	27,4306084
16,4195928	22,2534624
9,2512368	16,9110084
4,1161692	11,413766
1,029418	5,7752604
0	0
1,029418	-5,7752604
4,1161692	-11,413766
9,2512368	-16,9110084
16,4195928	-22,2534624
25,6032036	-27,4306084
36,7765216	-32,4274184
49,907988	-37,2273616
64,9615356	-41,8139072
81,8980916	-46,1690216
100,6680636	-50,2746712
121,223362	-54,1143252
143,5053776	-57,6684472
167,4524956	-60,923512
193,0015984	-63,8644916
220,0805516	-66,4778608
248,615718	-68,7561056
278,528952	-70,6902092
309,7375996	-72,277166
342,157504	-73,5154732
375,7	-74,403628
410,271914	-74,9491444
445,7785696	-75,1580336
482,1222848	-75,0408152
519,2053776	-74,6080088
556,922652	-73,8731396
595,1749232	-72,8542412
633,8554924	-71,5678444
672,8576608	-70,0334856
712,0747296	-68,2707012
751,4	-66,2990276
790,7252704	-64,139504
829,9423392	-61,8131696
868,9445076	-59,3395608
907,6250768	-56,7397168
945,877348	-54,0346768
983,5946224	-51,2424744
1020,677715	-48,382646
1057,02143	-45,4732252
1092,528086	-42,5322456

1127,1	-39,5777408
1160,642496	-36,6262416
1193,0624	-33,6942788
1224,271048	-30,7983832
1254,184282	-27,9550856
1282,719448	-25,1809168
1309,798402	-22,4909048
1335,347504	-19,9000776
1359,294622	-17,424966
1381,576638	-15,080598
1402,131936	-12,8820016
1420,901908	-10,842702
1437,838464	-8,9762244
1452,892012	-7,296094
1466,023478	-5,8143332
1477,196796	-4,5399588
1486,380407	-3,4849932
1493,548763	-2,6554476
1498,683831	-2,058836
1501,770582	-1,698164
1502,8	-1,57794

ΣΗΜΕΙΑ X-Y NACA 0010 PART 5

1508,45	1,5838725
1507,416712	1,7045485
1504,318355	2,0665765
1499,163982	2,66543115
1491,968675	3,49809555
1482,750537	4,55702745
1471,535212	5,83619305
1458,354376	7,32352475
1443,244232	9,00997185
1426,244	10,88346675
1407,40346	12,9304334
1386,770881	15,13729575
1364,405093	17,49047775
1340,367942	19,9748949
1314,722783	22,5754627
1287,542023	25,2755882
1258,899574	28,0601869
1228,873877	30,9141743
1197,547896	33,82095745
1165,006104	36,7639434
1131,3375	39,7265392
1096,635608	42,6921519
1060,99546	45,64418855
1024,515105	48,56454775
987,2925926	51,4351281
949,4335145	54,2378282
911,0374282	56,9530382
872,2114337	59,5626567
833,0626308	62,0455654
793,6981196	64,380646
754,225	66,54828865
714,7518804	68,52737505
675,3873692	70,2967869
636,2385664	71,83691435
597,4125718	73,12814755
559,0164855	74,15087665
521,1574074	74,8885087
483,9348952	75,3229423
447,4545404	75,4406014
411,8143923	75,23092685
377,1125	74,6833595
343,443896	73,79186555
310,9021042	72,54890275
279,576123	70,95597955
249,5504258	69,0146044
220,9079772	66,7277942
193,7272166	64,10459965
168,0820582	61,152563
144,0449074	57,8852603
121,6791193	54,31777605

101,0465402	50,4636863
82,20599965	46,3426009
65,20576815	41,9711128
50,0956245	37,3673234
36,9147884	32,5493341
25,69946265	27,53373785
16,4813247	22,3371276
9,2860182	16,97458785
4,13164455	11,45667775
1,03328825	5,79697335
0	0
1,03328825	-5,79697335
4,13164455	-11,45667775
9,2860182	-16,97458785
16,4813247	-22,3371276
25,69946265	-27,53373785
36,9147884	-32,5493341
50,0956245	-37,3673234
65,20576815	-41,9711128
82,20599965	-46,3426009
101,0465402	-50,4636863
121,6791193	-54,31777605
144,0449074	-57,8852603
168,0820582	-61,152563
193,7272166	-64,10459965
220,9079772	-66,7277942
249,5504258	-69,0146044
279,576123	-70,95597955
310,9021042	-72,54890275
343,443896	-73,79186555
377,1125	-74,6833595
411,8143923	-75,23092685
447,4545404	-75,4406014
483,9348952	-75,3229423
521,1574074	-74,8885087
559,0164855	-74,15087665
597,4125718	-73,12814755
636,2385664	-71,83691435
675,3873692	-70,2967869
714,7518804	-68,52737505
754,225	-66,54828865
793,6981196	-64,380646
833,0626308	-62,0455654
872,2114337	-59,5626567
911,0374282	-56,9530382
949,4335145	-54,2378282
987,2925926	-51,4351281
1024,515105	-48,56454775
1060,99546	-45,64418855
1096,635608	-42,6921519

1131,3375	-39,7265392
1165,006104	-36,7639434
1197,547896	-33,82095745
1228,873877	-30,9141743
1258,899574	-28,0601869
1287,542023	-25,2755882
1314,722783	-22,5754627
1340,367942	-19,9748949
1364,405093	-17,49047775
1386,770881	-15,13729575
1407,40346	-12,9304334
1426,244	-10,88346675
1443,244232	-9,00997185
1458,354376	-7,32352475
1471,535212	-5,83619305
1482,750537	-4,55702745
1491,968675	-3,49809555
1499,163982	-2,66543115
1504,318355	-2,0665765
1507,416712	-1,7045485
1508,45	-1,5838725

ZHMEIA X-Y NACA 0010 PART 6

1588,25	1,6676625
1587,162049	1,7947225
1583,899783	2,1759025
1578,472733	2,80643775
1570,896781	3,68315175
1561,190985	4,79810325
1549,382346	6,14493925
1535,504218	7,71095375
1519,594717	9,48661725
1501,69514	11,45922375
1481,857897	13,614479
1460,133814	15,93808875
1436,584831	18,41575875
1411,276067	21,0316065
1384,274229	23,7697495
1355,655552	26,612717
1325,497861	29,5446265
1293,883745	32,5495955
1260,900557	35,61015325
1226,63724	38,708829
1191,1875	41,828152
1154,649809	44,9506515
1117,124226	48,05885675
1078,713988	51,13370875
1039,522331	54,1561485
999,6604325	57,107117
959,233117	59,965967
918,3531503	62,7136395
877,133298	65,327899
835,686326	67,78651
794,125	70,06882525
752,563674	72,15260925
711,116702	74,0156265
669,8968498	75,63722975
629,016883	76,99677175
588,5895675	78,07360525
548,727669	78,8502595
509,536012	79,3076755
471,125774	79,431559
433,6001913	79,21079225
397,0625	78,6342575
361,61276	77,69560175
327,3494428	76,38688375
294,366255	74,70969175
262,7521388	72,665614
232,5944478	70,257827
203,975771	67,49586025
176,9739328	64,387655
151,665169	60,9475055
128,1161863	57,19129425

106,3921028	53,1333155
86,55486025	48,7942165
68,65528275	44,191468
52,7457825	39,344129
38,867654	34,2712585
27,05901525	28,99032725
17,3532195	23,518806
9,777267	17,87257725
4,35021675	12,06275875
1,08795125	6,10364475
0	0
1,08795125	-6,10364475
4,35021675	-12,06275875
9,777267	-17,87257725
17,3532195	-23,518806
27,05901525	-28,99032725
38,867654	-34,2712585
52,7457825	-39,344129
68,65528275	-44,191468
86,55486025	-48,7942165
106,3921028	-53,1333155
128,1161863	-57,19129425
151,665169	-60,9475055
176,9739328	-64,387655
203,975771	-67,49586025
232,5944478	-70,257827
262,7521388	-72,665614
294,366255	-74,70969175
327,3494428	-76,38688375
361,61276	-77,69560175
397,0625	-78,6342575
433,6001913	-79,21079225
471,125774	-79,431559
509,536012	-79,3076755
548,727669	-78,8502595
588,5895675	-78,07360525
629,016883	-76,99677175
669,8968498	-75,63722975
711,116702	-74,0156265
752,563674	-72,15260925
794,125	-70,06882525
835,686326	-67,78651
877,133298	-65,327899
918,3531503	-62,7136395
959,233117	-59,965967
999,6604325	-57,107117
1039,522331	-54,1561485
1078,713988	-51,13370875
1117,124226	-48,05885675
1154,649809	-44,9506515

1191,1875	-41,828152
1226,63724	-38,708829
1260,900557	-35,61015325
1293,883745	-32,5495955
1325,497861	-29,5446265
1355,655552	-26,612717
1384,274229	-23,7697495
1411,276067	-21,0316065
1436,584831	-18,41575875
1460,133814	-15,93808875
1481,857897	-13,614479
1501,69514	-11,45922375
1519,594717	-9,48661725
1535,504218	-7,71095375
1549,382346	-6,14493925
1561,190985	-4,79810325
1570,896781	-3,68315175
1578,472733	-2,80643775
1583,899783	-2,1759025
1587,162049	-1,7947225
1588,25	-1,6676625

ΣΗΜΕΙΑ X-Y NACA 0010 PART 6

1593,9	1,673595
1592,808179	1,801107
1589,534308	2,183643
1584,087952	2,8164213
1576,485049	3,6962541
1566,744726	4,8151719
1554,894079	6,1667991
1540,966581	7,7383845
1525,000485	9,5203647
1507,037232	11,4999885
1487,129421	13,6629108
1465,328057	15,9947865
1441,695301	18,4812705
1416,296505	21,1064238
1389,198611	23,8543074
1360,478127	26,7073884
1330,213154	29,6497278
1298,486574	32,6653866
1265,386053	35,7368319
1231,000848	38,8465308
1195,425	41,9769504
1158,757331	45,1105578
1121,098255	48,2298201
1082,551378	51,3156105
1043,220301	54,3488022
1003,216599	57,3102684
962,6454684	60,1792884
921,6200763	62,9367354
880,2535896	65,5602948
838,6591752	68,027652
796,95	70,3180863
755,2408248	72,4092831
713,6464104	74,2789278
672,2799237	75,9062997
631,2545316	77,2706781
590,683401	78,3513423
550,6796988	79,1307594
511,3486224	79,5898026
472,8017448	79,7141268
435,1426695	79,4925747
398,475	78,913989
362,899152	77,9719941
328,5139473	76,6586205
295,413426	74,9754621
263,6868465	72,9241128
233,4218733	70,5077604
204,7013892	67,7359683
177,6034953	64,616706
152,2046988	61,1643186
128,5719435	57,3947451

106,7705793	53,3223306
86,8627683	48,9677958
68,8995153	44,3486736
52,933419	39,4840908
39,0059208	34,3931742
27,1552743	29,0934567
17,4149514	23,6024712
9,8120484	17,9361567
4,3656921	12,1056705
1,0918215	6,1253577
0	0
1,0918215	-6,1253577
4,3656921	-12,1056705
9,8120484	-17,9361567
17,4149514	-23,6024712
27,1552743	-29,0934567
39,0059208	-34,3931742
52,933419	-39,4840908
68,8995153	-44,3486736
86,8627683	-48,9677958
106,7705793	-53,3223306
128,5719435	-57,3947451
152,2046988	-61,1643186
177,6034953	-64,616706
204,7013892	-67,7359683
233,4218733	-70,5077604
263,6868465	-72,9241128
295,413426	-74,9754621
328,5139473	-76,6586205
362,899152	-77,9719941
398,475	-78,913989
435,1426695	-79,4925747
472,8017448	-79,7141268
511,3486224	-79,5898026
550,6796988	-79,1307594
590,683401	-78,3513423
631,2545316	-77,2706781
672,2799237	-75,9062997
713,6464104	-74,2789278
755,2408248	-72,4092831
796,95	-70,3180863
838,6591752	-68,027652
880,2535896	-65,5602948
921,6200763	-62,9367354
962,6454684	-60,1792884
1003,216599	-57,3102684
1043,220301	-54,3488022
1082,551378	-51,3156105
1121,098255	-48,2298201
1158,757331	-45,1105578

1195,425	-41,9769504
1231,000848	-38,8465308
1265,386053	-35,7368319
1298,486574	-32,6653866
1330,213154	-29,6497278
1360,478127	-26,7073884
1389,198611	-23,8543074
1416,296505	-21,1064238
1441,695301	-18,4812705
1465,328057	-15,9947865
1487,129421	-13,6629108
1507,037232	-11,4999885
1525,000485	-9,5203647
1540,966581	-7,7383845
1554,894079	-6,1667991
1566,744726	-4,8151719
1576,485049	-3,6962541
1584,087952	-2,8164213
1589,534308	-2,183643
1592,808179	-1,801107
1593,9	-1,673595

ZHMEIA X-Y NACA 0010 PART 7

1673,85	1,7575425
1672,703413	1,8914505
1669,265325	2,2931745
1663,545779	2,95769295
1655,561515	3,88165815
1645,332618	5,05670085
1632,887543	6,47612565
1618,261442	8,12654175
1601,494486	9,99790605
1582,630197	12,07682775
1561,72381	14,3482422
1538,82889	16,79708475
1514,010716	19,40829075
1487,337916	22,1651217
1458,880792	25,0508391
1428,719689	28,0470306
1396,936625	31,1369577
1363,618641	34,3038819
1328,857798	37,52939085
1292,747832	40,7950722
1255,3875	44,0825136
1216,880581	47,3733027
1177,332527	50,64902715
1136,852138	53,88960075
1095,548216	57,0749373
1053,537929	60,1849506
1010,931751	63,1978806
967,8485255	66,0936411
924,4070964	68,8487982
880,7263068	71,439918
836,925	73,84524045
793,1236932	76,04133165
749,4429036	78,0047577
706,0014746	79,71375855
662,9182494	81,14657415
620,3120715	82,28144445
578,3017842	83,0999571
536,9978616	83,5820259
496,5174732	83,7125862
456,9694193	83,47992105
418,4625	82,8723135
381,102168	81,88306815
344,992202	80,50381575
310,231359	78,73623015
276,9133748	76,5819852
245,130311	74,0444286
214,9692078	71,13360345
186,512084	67,857879
159,8392842	64,2323199
135,0211103	60,27366465

112,12619	55,9969779
91,21980345	51,4240197
72,35551395	46,5732024
55,5885585	41,4646122
40,9624572	36,1183353
28,51738245	30,55278405
18,2884851	24,7863708
10,3042206	18,83583405
4,58467515	12,71289075
1,14658725	6,43260555
0	0
1,14658725	-6,43260555
4,58467515	-12,71289075
10,3042206	-18,83583405
18,2884851	-24,7863708
28,51738245	-30,55278405
40,9624572	-36,1183353
55,5885585	-41,4646122
72,35551395	-46,5732024
91,21980345	-51,4240197
112,12619	-55,9969779
135,0211103	-60,27366465
159,8392842	-64,2323199
186,512084	-67,857879
214,9692078	-71,13360345
245,130311	-74,0444286
276,9133748	-76,5819852
310,231359	-78,73623015
344,992202	-80,50381575
381,102168	-81,88306815
418,4625	-82,8723135
456,9694193	-83,47992105
496,5174732	-83,7125862
536,9978616	-83,5820259
578,3017842	-83,0999571
620,3120715	-82,28144445
662,9182494	-81,14657415
706,0014746	-79,71375855
749,4429036	-78,0047577
793,1236932	-76,04133165
836,925	-73,84524045
880,7263068	-71,439918
924,4070964	-68,8487982
967,8485255	-66,0936411
1010,931751	-63,1978806
1053,537929	-60,1849506
1095,548216	-57,0749373
1136,852138	-53,88960075
1177,332527	-50,64902715
1216,880581	-47,3733027

1255,3875	-44,0825136
1292,747832	-40,7950722
1328,857798	-37,52939085
1363,618641	-34,3038819
1396,936625	-31,1369577
1428,719689	-28,0470306
1458,880792	-25,0508391
1487,337916	-22,1651217
1514,010716	-19,40829075
1538,82889	-16,79708475
1561,72381	-14,3482422
1582,630197	-12,07682775
1601,494486	-9,99790605
1618,261442	-8,12654175
1632,887543	-6,47612565
1645,332618	-5,05670085
1655,561515	-3,88165815
1663,545779	-2,95769295
1669,265325	-2,2931745
1672,703413	-1,8914505
1673,85	-1,7575425

ΣΗΜΕΙΑ X-Y NACA 0010 PART 7

1679,5	1,763475
1678,349543	1,897835
1674,89985	2,300915
1669,160998	2,9676765
1661,149783	3,8947605
1650,886359	5,0737695
1638,399276	6,4979855
1623,723805	8,1539725
1606,900254	10,0316535
1587,972289	12,1175925
1566,995334	14,396674
1544,023133	16,8537825
1519,121186	19,4738025
1492,358354	22,239939
1463,805174	25,135397
1433,542264	28,141702
1401,651918	31,242059
1368,22147	34,419673
1333,343294	37,6560695
1297,11144	40,932774
1259,625	44,231312
1220,988103	47,533209
1181,306556	50,8199905
1140,689528	54,0715025
1099,246186	57,267591
1057,094095	60,388102
1014,344102	63,411202
971,1154515	66,316737
927,527388	69,081194
883,699156	71,68106
839,75	74,0945015
795,800844	76,2980055
751,972612	78,268059
708,3845485	79,9828285
665,155898	81,4204805
622,405905	82,5591815
580,253814	83,380457
538,810472	83,864153
498,193444	83,995154
458,5118975	83,7617035
419,875	83,152045
382,38856	82,1594605
346,1567065	80,7755525
311,27853	79,0020005
277,8480825	76,840484
245,9577365	74,294362
215,694826	71,3737115
187,1416465	68,08693
160,378814	64,449133
135,4768675	60,4771155

112,5046665	56,185993
91,5277115	51,597599
72,5997465	46,730408
55,776195	41,604574
41,100724	36,240251
28,6136415	30,6559135
18,350217	24,870036
10,339002	18,8994135
4,6001505	12,7558025
1,1504575	6,4543185
0	0
1,1504575	-6,4543185
4,6001505	-12,7558025
10,339002	-18,8994135
18,350217	-24,870036
28,6136415	-30,6559135
41,100724	-36,240251
55,776195	-41,604574
72,5997465	-46,730408
91,5277115	-51,597599
112,5046665	-56,185993
135,4768675	-60,4771155
160,378814	-64,449133
187,1416465	-68,08693
215,694826	-71,3737115
245,9577365	-74,294362
277,8480825	-76,840484
311,27853	-79,0020005
346,1567065	-80,7755525
382,38856	-82,1594605
419,875	-83,152045
458,5118975	-83,7617035
498,193444	-83,995154
538,810472	-83,864153
580,253814	-83,380457
622,405905	-82,5591815
665,155898	-81,4204805
708,3845485	-79,9828285
751,972612	-78,268059
795,800844	-76,2980055
839,75	-74,0945015
883,699156	-71,68106
927,527388	-69,081194
971,1154515	-66,316737
1014,344102	-63,411202
1057,094095	-60,388102
1099,246186	-57,267591
1140,689528	-54,0715025
1181,306556	-50,8199905
1220,988103	-47,533209

1259,625	-44,231312
1297,11144	-40,932774
1333,343294	-37,6560695
1368,22147	-34,419673
1401,651918	-31,242059
1433,542264	-28,141702
1463,805174	-25,135397
1492,358354	-22,239939
1519,121186	-19,4738025
1544,023133	-16,8537825
1566,995334	-14,396674
1587,972289	-12,1175925
1606,900254	-10,0316535
1623,723805	-8,1539725
1638,399276	-6,4979855
1650,886359	-5,0737695
1661,149783	-3,8947605
1669,160998	-2,9676765
1674,89985	-2,300915
1678,349543	-1,897835
1679,5	-1,763475

ΣΗΜΕΙΑ X-Y NACA 0010 PART 8

1759,3	1,847265
1758,09488	1,988009
1754,481277	2,410241
1748,469749	3,1086831
1740,077888	4,0798167
1729,326806	5,3148453
1716,24641	6,8067317
1700,873647	8,5414015
1683,250739	10,5082989
1663,423428	12,6933495
1641,449771	15,0807196
1617,386066	17,6545755
1591,300924	20,3990835
1563,266479	23,2966506
1533,35662	26,3296838
1501,655793	29,4788308
1468,250205	32,7264986
1433,231338	36,0550942
1396,695955	39,4452653
1358,742576	42,8776596
1319,475	46,3329248
1279,002304	49,7917086
1237,435322	53,2346587
1194,888411	56,6406635
1151,475924	59,9886114
1107,321013	63,2573908
1062,539791	66,4241308
1017,257168	69,4677198
971,5980552	72,3635276
925,6873624	75,086924
879,65	77,6150381
833,6126376	79,9232397
787,7019448	81,9868986
742,0428319	83,7831439
696,7602092	85,2891047
651,978987	86,4819101
607,8240756	87,3422078
564,4115888	87,8488862
521,8646776	87,9861116
480,2976965	87,7415689
439,825	87,102943
400,557424	86,0631967
362,6040451	84,6135335
326,068662	82,7557127
291,0497955	80,4914936
257,6442071	77,8243948
225,9433804	74,7649721
196,0335211	71,322022
167,9990756	67,5113782
141,9139345	63,3506337

117,8502291	58,8556222
95,8765721	54,0492146
76,0492611	48,9507632
58,426353	43,5813796
43,0535896	37,9621754
29,9731941	32,1125029
19,2221118	26,0517144
10,8302508	19,7974029
4,8187227	13,3618835
1,2051205	6,7609899
0	0
1,2051205	-6,7609899
4,8187227	-13,3618835
10,8302508	-19,7974029
19,2221118	-26,0517144
29,9731941	-32,1125029
43,0535896	-37,9621754
58,426353	-43,5813796
76,0492611	-48,9507632
95,8765721	-54,0492146
117,8502291	-58,8556222
141,9139345	-63,3506337
167,9990756	-67,5113782
196,0335211	-71,322022
225,9433804	-74,7649721
257,6442071	-77,8243948
291,0497955	-80,4914936
326,068662	-82,7557127
362,6040451	-84,6135335
400,557424	-86,0631967
439,825	-87,102943
480,2976965	-87,7415689
521,8646776	-87,9861116
564,4115888	-87,8488862
607,8240756	-87,3422078
651,978987	-86,4819101
696,7602092	-85,2891047
742,0428319	-83,7831439
787,7019448	-81,9868986
833,6126376	-79,9232397
879,65	-77,6150381
925,6873624	-75,086924
971,5980552	-72,3635276
1017,257168	-69,4677198
1062,539791	-66,4241308
1107,321013	-63,2573908
1151,475924	-59,9886114
1194,888411	-56,6406635
1237,435322	-53,2346587
1279,002304	-49,7917086

1319,475	-46,3329248
1358,742576	-42,8776596
1396,695955	-39,4452653
1433,231338	-36,0550942
1468,250205	-32,7264986
1501,655793	-29,4788308
1533,35662	-26,3296838
1563,266479	-23,2966506
1591,300924	-20,3990835
1617,386066	-17,6545755
1641,449771	-15,0807196
1663,423428	-12,6933495
1683,250739	-10,5082989
1700,873647	-8,5414015
1716,24641	-6,8067317
1729,326806	-5,3148453
1740,077888	-4,0798167
1748,469749	-3,1086831
1754,481277	-2,410241
1758,09488	-1,988009
1759,3	-1,847265

ΣΗΜΕΙΑ X-Y NACA 0010 PART 8

1765	1,85325
1763,790975	1,99445
1760,165665	2,41805
1754,13466	3,118755
1745,71561	4,093035
1734,929695	5,332065
1721,80692	6,828785
1706,38435	8,569075
1688,704345	10,542345
1668,812795	12,734475
1646,767945	15,12958
1622,626275	17,711775
1596,45662	20,465175
1568,331345	23,37213
1538,32458	26,41499
1506,521045	29,57434
1473,007225	32,83253
1437,8749	36,17191
1401,221145	39,573065
1363,1448	43,01658
1323,75	46,48304
1283,146175	49,95303
1241,44452	53,407135
1198,75976	56,824175
1155,20662	60,18297
1110,90865	63,46234
1065,98234	66,63934
1020,553005	69,69279
974,74596	72,59798
928,68652	75,3302
882,5	77,866505
836,31348	80,182185
790,25404	82,25253
744,446995	84,054595
699,01766	85,565435
654,09135	86,762105
609,79338	87,62519
566,24024	88,13351
523,55548	88,27118
481,853825	88,025845
441,25	87,38515
401,8552	86,342035
363,778855	84,887675
327,1251	83,023835
291,992775	80,75228
258,478955	78,07654
226,67542	75,007205
196,668655	71,5531
168,54338	67,73011
142,373725	63,555885

118,232055	59,04631
96,187205	54,22433
76,295655	49,10936
58,61565	43,72258
43,19308	38,08517
30,070305	32,216545
19,28439	26,13612
10,86534	19,861545
4,834335	13,405175
1,209025	6,782895
0	0
1,209025	-6,782895
4,834335	-13,405175
10,86534	-19,861545
19,28439	-26,13612
30,070305	-32,216545
43,19308	-38,08517
58,61565	-43,72258
76,295655	-49,10936
96,187205	-54,22433
118,232055	-59,04631
142,373725	-63,555885
168,54338	-67,73011
196,668655	-71,5531
226,67542	-75,007205
258,478955	-78,07654
291,992775	-80,75228
327,1251	-83,023835
363,778855	-84,887675
401,8552	-86,342035
441,25	-87,38515
481,853825	-88,025845
523,55548	-88,27118
566,24024	-88,13351
609,79338	-87,62519
654,09135	-86,762105
699,01766	-85,565435
744,446995	-84,054595
790,25404	-82,25253
836,31348	-80,182185
882,5	-77,866505
928,68652	-75,3302
974,74596	-72,59798
1020,553005	-69,69279
1065,98234	-66,63934
1110,90865	-63,46234
1155,20662	-60,18297
1198,75976	-56,824175
1241,44452	-53,407135
1283,146175	-49,95303

1323,75	-46,48304
1363,1448	-43,01658
1401,221145	-39,573065
1437,8749	-36,17191
1473,007225	-32,83253
1506,521045	-29,57434
1538,32458	-26,41499
1568,331345	-23,37213
1596,45662	-20,465175
1622,626275	-17,711775
1646,767945	-15,12958
1668,812795	-12,734475
1688,704345	-10,542345
1706,38435	-8,569075
1721,80692	-6,828785
1734,929695	-5,332065
1745,71561	-4,093035
1754,13466	-3,118755
1760,165665	-2,41805
1763,790975	-1,99445
1765	-1,85325

ZHMEIA X-Y NACA 0010 PART 9

1844,75	1,9369875
1843,486346	2,0845675
1839,69723	2,5273075
1833,393719	3,25967325
1824,594262	4,27797525
1813,320994	5,57298975
1799,605278	7,13733775
1783,485853	8,95626125
1765,006992	11,01869175
1744,216659	13,30987125
1721,175732	15,813197
1695,943241	18,51206625
1668,591133	21,38987625
1639,195042	24,4281795
1607,832447	27,6085285
1574,591897	30,910631
1539,563784	34,3160395
1502,844035	37,8063065
1464,534112	41,36113975
1424,73732	44,960247
1383,5625	48,583336
1341,124026	52,2101145
1297,538118	55,82029025
1252,924684	59,39172625
1207,403633	62,9022855
1161,104098	66,329831
1114,147831	69,650381
1066,665811	72,8417985
1018,789014	75,878257
970,648418	78,73393
922,375	81,38483575
874,101582	83,80514775
825,960986	85,9690395
778,0841893	87,85252925
730,602169	89,43163525
683,6459025	90,68237575
637,346367	91,5844585
591,825316	92,1157465
547,211882	92,259637
503,6259738	92,00321675
461,1875	91,3335725
420,01268	90,24332525
380,2158883	88,72325125
341,905965	86,77519525
305,1862163	84,401002
270,1581033	81,604361
236,917553	78,39634075
205,5549583	74,786165
176,158867	70,7904365
148,8067588	66,42760275

123,5742683	61,7142665
100,5333408	56,6744095
79,74300825	51,328324
61,2641475	45,698147
45,144722	39,8060155
31,42900575	33,67222175
20,1557385	27,317058
11,356281	20,75897175
5,05277025	14,01087625
1,26365375	7,08937425
0	0
1,26365375	-7,08937425
5,05277025	-14,01087625
11,356281	-20,75897175
20,1557385	-27,317058
31,42900575	-33,67222175
45,144722	-39,8060155
61,2641475	-45,698147
79,74300825	-51,328324
100,5333408	-56,6744095
123,5742683	-61,7142665
148,8067588	-66,42760275
176,158867	-70,7904365
205,5549583	-74,786165
236,917553	-78,39634075
270,1581033	-81,604361
305,1862163	-84,401002
341,905965	-86,77519525
380,2158883	-88,72325125
420,01268	-90,24332525
461,1875	-91,3335725
503,6259738	-92,00321675
547,211882	-92,259637
591,825316	-92,1157465
637,346367	-91,5844585
683,6459025	-90,68237575
730,602169	-89,43163525
778,0841893	-87,85252925
825,960986	-85,9690395
874,101582	-83,80514775
922,375	-81,38483575
970,648418	-78,73393
1018,789014	-75,878257
1066,665811	-72,8417985
1114,147831	-69,650381
1161,104098	-66,329831
1207,403633	-62,9022855
1252,924684	-59,39172625
1297,538118	-55,82029025
1341,124026	-52,2101145

1383,5625	-48,583336
1424,73732	-44,960247
1464,534112	-41,36113975
1502,844035	-37,8063065
1539,563784	-34,3160395
1574,591897	-30,910631
1607,832447	-27,6085285
1639,195042	-24,4281795
1668,591133	-21,38987625
1695,943241	-18,51206625
1721,175732	-15,813197
1744,216659	-13,30987125
1765,006992	-11,01869175
1783,485853	-8,95626125
1799,605278	-7,13733775
1813,320994	-5,57298975
1824,594262	-4,27797525
1833,393719	-3,25967325
1839,69723	-2,5273075
1843,486346	-2,0845675
1844,75	-1,9369875

ΣΗΜΕΙΑ X-Y NACA 0010 PART 9

1850,4	1,94292
1849,132476	2,090952
1845,331754	2,535048
1839,008938	3,2696568
1830,18253	4,2910776
1818,874735	5,5900584
1805,117011	7,1591976
1788,948216	8,983692
1770,412759	11,0524392
1749,558751	13,350636
1726,447255	15,8616288
1701,137484	18,568764
1673,701603	21,455388
1644,215479	24,5029968
1612,756829	27,6930864
1579,414471	31,0053024
1544,279076	34,4211408
1507,446864	37,9220976
1469,019607	41,4878184
1429,100928	45,0979488
1387,8	48,7321344
1345,231548	52,3700208
1301,512147	55,9912536
1256,762074	59,573628
1211,101603	63,0949392
1164,660264	66,5329824
1117,560182	69,8637024
1069,932737	73,0648944
1021,909306	76,1106528
973,6212672	78,975072
925,2	81,6340968
876,7787328	84,0618216
828,4906944	86,2323408
780,4672632	88,1215992
732,8398176	89,7055416
685,739736	90,9601128
639,2983968	91,8649584
593,6379264	92,3978736
548,8878528	92,5422048
505,168452	92,2849992
462,6	91,613304
421,299072	90,5197176
381,3803928	88,994988
342,953136	87,0409656
306,120924	84,6595008
270,9855288	81,8542944
237,6431712	78,6364488
206,1845208	75,015216
176,6983968	71,0072496
149,262516	66,6310536

123,9527448	61,9032816
100,8412488	56,8479888
79,9872408	51,4855296
61,451784	45,8381088
45,2829888	39,9279312
31,5252648	33,7753512
20,2174704	27,4007232
11,3910624	20,8225512
5,0682456	14,053788
1,267524	7,1110872
0	0
1,267524	-7,1110872
5,0682456	-14,053788
11,3910624	-20,8225512
20,2174704	-27,4007232
31,5252648	-33,7753512
45,2829888	-39,9279312
61,451784	-45,8381088
79,9872408	-51,4855296
100,8412488	-56,8479888
123,9527448	-61,9032816
149,262516	-66,6310536
176,6983968	-71,0072496
206,1845208	-75,015216
237,6431712	-78,6364488
270,9855288	-81,8542944
306,120924	-84,6595008
342,953136	-87,0409656
381,3803928	-88,994988
421,299072	-90,5197176
462,6	-91,613304
505,168452	-92,2849992
548,8878528	-92,5422048
593,6379264	-92,3978736
639,2983968	-91,8649584
685,739736	-90,9601128
732,8398176	-89,7055416
780,4672632	-88,1215992
828,4906944	-86,2323408
876,7787328	-84,0618216
925,2	-81,6340968
973,6212672	-78,975072
1021,909306	-76,1106528
1069,932737	-73,0648944
1117,560182	-69,8637024
1164,660264	-66,5329824
1211,101603	-63,0949392
1256,762074	-59,573628
1301,512147	-55,9912536
1345,231548	-52,3700208

1387,8	-48,7321344
1429,100928	-45,0979488
1469,019607	-41,4878184
1507,446864	-37,9220976
1544,279076	-34,4211408
1579,414471	-31,0053024
1612,756829	-27,6930864
1644,215479	-24,5029968
1673,701603	-21,455388
1701,137484	-18,568764
1726,447255	-15,8616288
1749,558751	-13,350636
1770,412759	-11,0524392
1788,948216	-8,983692
1805,117011	-7,1591976
1818,874735	-5,5900584
1830,18253	-4,2910776
1839,008938	-3,2696568
1845,331754	-2,535048
1849,132476	-2,090952
1850,4	-1,94292

ZHMEIA X-Y NACA 0010 PART 10

1930,35	2,0268675
1929,02771	2,1812955
1925,062771	2,6445795
1918,466765	3,41092845
1909,258996	4,47648165
1897,462627	5,83158735
1883,110475	7,46852415
1866,243077	9,37184925
1846,906761	11,52998055
1825,151716	13,92747525
1801,041645	16,5469602
1774,638317	19,37106225
1746,017018	22,38240825
1715,256891	25,5616947
1682,43901	28,8896181
1647,656034	32,3449446
1611,002548	35,9083707
1572,578931	39,5605929
1532,491353	43,28037735
1490,847912	47,0464902
1447,7625	50,8376976
1403,354798	54,6327657
1357,746419	58,41046065
1311,062834	62,14761825
1263,429518	65,8210743
1214,981594	69,4076646
1165,846465	72,8822946
1116,161186	76,2218001
1066,062812	79,3991562
1015,688399	82,387338
965,175	85,16125095
914,6616012	87,69387015
864,2871876	89,9581707
814,1888141	91,92905805
764,5035354	93,58143765
715,3684065	94,89021495
666,9204822	95,8341561
619,2871656	96,3900969
572,6035812	96,5406642
526,9952018	96,27234555
482,5875	95,5716285
439,502088	94,43079165
397,8586475	92,84018325
357,771069	90,80173365
319,3474523	88,3173732
282,6939665	85,3909626
247,9109898	82,03408395
215,0931095	78,256389
184,3329822	74,0752509
155,7116828	69,50997315

129,3083555	64,5779289
105,198284	59,3042127
83,44323945	53,7100584
64,1069235	47,8186302
47,2395252	41,6530923
32,88737295	35,23467855
21,0910041	28,5846228
11,8832346	21,72222855
5,28722865	14,66100825
1,32228975	7,41833505
0	0
1,32228975	-7,41833505
5,28722865	-14,66100825
11,8832346	-21,72222855
21,0910041	-28,5846228
32,88737295	-35,23467855
47,2395252	-41,6530923
64,1069235	-47,8186302
83,44323945	-53,7100584
105,198284	-59,3042127
129,3083555	-64,5779289
155,7116828	-69,50997315
184,3329822	-74,0752509
215,0931095	-78,256389
247,9109898	-82,03408395
282,6939665	-85,3909626
319,3474523	-88,3173732
357,771069	-90,80173365
397,8586475	-92,84018325
439,502088	-94,43079165
482,5875	-95,5716285
526,9952018	-96,27234555
572,6035812	-96,5406642
619,2871656	-96,3900969
666,9204822	-95,8341561
715,3684065	-94,89021495
764,5035354	-93,58143765
814,1888141	-91,92905805
864,2871876	-89,9581707
914,6616012	-87,69387015
965,175	-85,16125095
1015,688399	-82,387338
1066,062812	-79,3991562
1116,161186	-76,2218001
1165,846465	-72,8822946
1214,981594	-69,4076646
1263,429518	-65,8210743
1311,062834	-62,14761825
1357,746419	-58,41046065
1403,354798	-54,6327657

1447,7625	-50,8376976
1490,847912	-47,0464902
1532,491353	-43,28037735
1572,578931	-39,5605929
1611,002548	-35,9083707
1647,656034	-32,3449446
1682,43901	-28,8896181
1715,256891	-25,5616947
1746,017018	-22,38240825
1774,638317	-19,37106225
1801,041645	-16,5469602
1825,151716	-13,92747525
1846,906761	-11,52998055
1866,243077	-9,37184925
1883,110475	-7,46852415
1897,462627	-5,83158735
1909,258996	-4,47648165
1918,466765	-3,41092845
1925,062771	-2,6445795
1929,02771	-2,1812955
1930,35	-2,0268675

ZHMEIA X-Y NACA 0010 PART 10

1936	2,0328
1934,67384	2,18768
1930,697296	2,65232
1924,081984	3,420912
1914,847264	4,489584
1903,016368	5,848656
1888,622208	7,490384
1871,70544	9,39928
1852,312528	11,563728
1830,493808	13,96824
1806,313168	16,595392
1779,83256	19,42776
1751,127488	22,44792
1720,277328	25,636512
1687,363392	28,974176
1652,478608	32,439616
1615,71784	36,013472
1577,18176	39,676384
1536,976848	43,407056
1495,21152	47,184192
1452	50,986496
1407,46232	54,792672
1361,720448	58,581424
1314,900224	62,32952
1267,127488	66,013728
1218,53776	69,610816
1169,258816	73,095616
1119,428112	76,444896
1069,183104	79,631552
1018,661248	82,62848
968	85,410512
917,338752	87,950544
866,816896	90,221472
816,571888	92,198128
766,741184	93,855344
717,46224	95,167952
668,872512	96,114656
621,099776	96,672224
574,279552	96,823232
528,53768	96,554128
484	95,85136
440,78848	94,707184
399,023152	93,11192
358,81824	91,067504
320,28216	88,575872
283,521392	85,640896
248,636608	82,274192
215,722672	78,48544
184,872512	74,292064
156,16744	69,713424

129,686832	64,766944
105,506192	59,477792
83,687472	53,867264
64,29456	47,958592
47,377792	41,775008
32,983632	35,337808
21,152736	28,668288
11,918016	21,785808
5,302704	14,70392
1,32616	7,440048
0	0
1,32616	-7,440048
5,302704	-14,70392
11,918016	-21,785808
21,152736	-28,668288
32,983632	-35,337808
47,377792	-41,775008
64,29456	-47,958592
83,687472	-53,867264
105,506192	-59,477792
129,686832	-64,766944
156,16744	-69,713424
184,872512	-74,292064
215,722672	-78,48544
248,636608	-82,274192
283,521392	-85,640896
320,28216	-88,575872
358,81824	-91,067504
399,023152	-93,11192
440,78848	-94,707184
484	-95,85136
528,53768	-96,554128
574,279552	-96,823232
621,099776	-96,672224
668,872512	-96,114656
717,46224	-95,167952
766,741184	-93,855344
816,571888	-92,198128
866,816896	-90,221472
917,338752	-87,950544
968	-85,410512
1018,661248	-82,62848
1069,183104	-79,631552
1119,428112	-76,444896
1169,258816	-73,095616
1218,53776	-69,610816
1267,127488	-66,013728
1314,900224	-62,32952
1361,720448	-58,581424
1407,46232	-54,792672

1452	-50,986496
1495,21152	-47,184192
1536,976848	-43,407056
1577,18176	-39,676384
1615,71784	-36,013472
1652,478608	-32,439616
1687,363392	-28,974176
1720,277328	-25,636512
1751,127488	-22,44792
1779,83256	-19,42776
1806,313168	-16,595392
1830,493808	-13,96824
1852,312528	-11,563728
1871,70544	-9,39928
1888,622208	-7,490384
1903,016368	-5,848656
1914,847264	-4,489584
1924,081984	-3,420912
1930,697296	-2,65232
1934,67384	-2,18768
1936	-2,0328

ZHMEIA X-Y NACA 0012 PART 1

1161	1,46286
1160,204715	1,574316
1157,820021	1,908684
1153,852884	2,46132
1148,314914	3,231063
1141,220043	4,209786
1132,588008	5,389362
1122,44319	6,763986
1110,813453	8,322048
1097,728983	10,051938
1083,228093	11,942046
1067,347935	13,980762
1050,133788	16,154154
1031,633253	18,449451
1011,895092	20,850399
990,975033	23,344227
968,929965	25,917003
945,82026	28,552473
921,709773	31,236705
896,66352	33,954606
870,75	36,691083
844,041195	39,429882
816,610248	42,157071
788,532624	44,854074
759,883788	47,504637
730,74501	50,093667
701,192916	52,601427
671,309937	55,011663
641,178504	57,304638
610,881048	59,461776
580,5	61,46334
550,118952	63,291915
519,821496	64,926603
489,690063	66,348828
459,807084	67,541175
430,25499	68,486229
401,116212	69,166575
372,467376	69,568281
344,389752	69,677415
316,958805	69,483528
290,25	68,977332
264,33648	68,153022
239,290227	67,005954
215,17974	65,534967
192,070035	63,741222
170,024967	61,629363
149,104908	59,206356
129,366747	56,480328
110,866212	53,462889
93,652065	50,167971

77,771907	46,608345
63,271017	42,802587
50,186547	38,764629
38,55681	34,511886
28,411992	30,061773
19,779957	25,430544
12,685086	20,63097
7,147116	15,676983
3,179979	10,581354
0,795285	5,353371
0	0
0,795285	-5,353371
3,179979	-10,581354
7,147116	-15,676983
12,685086	-20,63097
19,779957	-25,430544
28,411992	-30,061773
38,55681	-34,511886
50,186547	-38,764629
63,271017	-42,802587
77,771907	-46,608345
93,652065	-50,167971
110,866212	-53,462889
129,366747	-56,480328
149,104908	-59,206356
170,024967	-61,629363
192,070035	-63,741222
215,17974	-65,534967
239,290227	-67,005954
264,33648	-68,153022
290,25	-68,977332
316,958805	-69,483528
344,389752	-69,677415
372,467376	-69,568281
401,116212	-69,166575
430,25499	-68,486229
459,807084	-67,541175
489,690063	-66,348828
519,821496	-64,926603
550,118952	-63,291915
580,5	-61,46334
610,881048	-59,461776
641,178504	-57,304638
671,309937	-55,011663
701,192916	-52,601427
730,74501	-50,093667
759,883788	-47,504637
788,532624	-44,854074
816,610248	-42,157071
844,041195	-39,429882

870,75	-36,691083
896,66352	-33,954606
921,709773	-31,236705
945,82026	-28,552473
968,929965	-25,917003
990,975033	-23,344227
1011,895092	-20,850399
1031,633253	-18,449451
1050,133788	-16,154154
1067,347935	-13,980762
1083,228093	-11,942046
1097,728983	-10,051938
1110,813453	-8,322048
1122,44319	-6,763986
1132,588008	-5,389362
1141,220043	-4,209786
1148,314914	-3,231063
1153,852884	-2,46132
1157,820021	-1,908684
1160,204715	-1,574316
1161	-1,46286

ΣΗΜΕΙΑ X-Y NACA 0012 PART 1

1166,7	1,470042
1165,900811	1,5820452
1163,504409	1,9180548
1159,517795	2,473404
1153,952636	3,2469261
1146,822932	4,2304542
1138,148518	5,4158214
1127,953893	6,7971942
1116,267059	8,3629056
1103,11835	10,1012886
1088,546267	12,0006762
1072,588145	14,0494014
1055,289484	16,2334638
1036,698119	18,5400297
1016,863052	20,9527653
995,8402851	23,4588369
973,6869855	26,0442441
950,463822	28,6926531
926,2349631	31,3900635
901,065744	34,1213082
875,025	36,8712201
848,1850665	39,6234654
820,6194456	42,3640437
792,4039728	45,0742878
763,6144836	47,7378639
734,332647	50,3396049
704,6354652	52,8596769
674,6057739	55,2817461
644,3264088	57,5859786
613,8802056	59,7537072
583,35	61,765098
552,8197944	63,6026505
522,3735912	65,2453641
492,0942261	66,6745716
462,0645348	67,8727725
432,367353	68,8224663
403,0855164	69,5061525
374,2960272	69,9098307
346,0805544	70,0195005
318,5149335	69,8246616
291,675	69,3159804
265,634256	68,4876234
240,4650369	67,3349238
216,236178	65,8567149
193,0130145	64,0541634
170,8597149	61,9319361
149,8369476	59,4970332
130,0018809	56,7576216
111,4105164	53,7253683
94,1118555	50,4142737

78,1537329	46,8371715
63,5816499	43,0127289
50,4329409	38,9549463
38,746107	34,6813242
28,5514824	30,2093631
19,8770679	25,5553968
12,7473642	20,732259
7,1822052	15,7539501
3,1955913	10,6333038
0,7991895	5,3796537
0	0
0,7991895	-5,3796537
3,1955913	-10,6333038
7,1822052	-15,7539501
12,7473642	-20,732259
19,8770679	-25,5553968
28,5514824	-30,2093631
38,746107	-34,6813242
50,4329409	-38,9549463
63,5816499	-43,0127289
78,1537329	-46,8371715
94,1118555	-50,4142737
111,4105164	-53,7253683
130,0018809	-56,7576216
149,8369476	-59,4970332
170,8597149	-61,9319361
193,0130145	-64,0541634
216,236178	-65,8567149
240,4650369	-67,3349238
265,634256	-68,4876234
291,675	-69,3159804
318,5149335	-69,8246616
346,0805544	-70,0195005
374,2960272	-69,9098307
403,0855164	-69,5061525
432,367353	-68,8224663
462,0645348	-67,8727725
492,0942261	-66,6745716
522,3735912	-65,2453641
552,8197944	-63,6026505
583,35	-61,765098
613,8802056	-59,7537072
644,3264088	-57,5859786
674,6057739	-55,2817461
704,6354652	-52,8596769
734,332647	-50,3396049
763,6144836	-47,7378639
792,4039728	-45,0742878
820,6194456	-42,3640437
848,1850665	-39,6234654

875,025	-	36,8712201
901,065744	-	34,1213082
926,2349631	-	31,3900635
950,463822	-	28,6926531
973,6869855	-	26,0442441
995,8402851	-	23,4588369
1016,863052	-	20,9527653
1036,698119	-	18,5400297
1055,289484	-	16,2334638
1072,588145	-	14,0494014
1088,546267	-	12,0006762
1103,11835	-	10,1012886
1116,267059	-	8,3629056
1127,953893	-	6,7971942
1138,148518	-	5,4158214
1146,822932	-	4,2304542
1153,952636	-	3,2469261
1159,517795	-	2,473404
1163,504409	-	1,9180548
1165,900811	-	1,5820452
1166,7	-	1,470042

ZHMEIA X-Y NACA 0012 PART 2

1250,34	1,5754284
1249,483517	1,69546104
1246,915319	2,05555896
1242,642907	2,6507208
1236,678785	3,47969622
1229,037957	4,53373284
1219,74168	5,80407828
1208,816209	7,28448084
1196,291553	8,96243712
1182,200221	10,82544372
1166,583474	12,86099724
1149,481324	15,05659428
1130,942533	17,39723076
1111,018365	19,86915294
1089,761334	22,45485606
1067,231458	25,14058638
1043,490002	27,91133982
1018,601984	30,74961162
992,6361736	33,6403977
965,6625888	36,56744364
937,755	39,51449502
908,9909283	42,46404708
879,4491451	45,40109574
849,2109226	48,30563556
818,3575327	51,16016178
786,9764994	53,94841998
755,150345	56,64915438
722,9678438	59,24486022
690,5177698	61,71428172
657,8888971	64,03741344
625,17	66,1929996
592,4511029	68,1622851
559,8222302	69,92276382
527,3721562	71,45443032
495,189655	72,7385295
463,3635006	73,75630626
431,9824673	74,4890055
401,1290774	74,92162314
370,8908549	75,0391551
341,3490717	74,83034832
312,585	74,28520008
284,6774112	73,39745868
257,7038264	72,16212276
231,7380156	70,57794198
206,8499979	68,64616668
183,108542	66,37179822
160,5786655	63,76233864
139,3216352	60,82654032
119,3974673	57,57690666
100,8586761	54,02844174

83,75652558	50,1948993
68,13977898	46,09628478
54,04844718	41,74760226
41,5237914	37,16760684
30,59832048	32,37505362
21,30204258	27,38744736
13,66121484	22,2185418
7,69709304	16,88334102
3,42468126	11,39559876
0,8564829	5,76531774
0	0
0,8564829	-5,76531774
3,42468126	-11,39559876
7,69709304	-16,88334102
13,66121484	-22,2185418
21,30204258	-27,38744736
30,59832048	-32,37505362
41,5237914	-37,16760684
54,04844718	-41,74760226
68,13977898	-46,09628478
83,75652558	-50,1948993
100,8586761	-54,02844174
119,3974673	-57,57690666
139,3216352	-60,82654032
160,5786655	-63,76233864
183,108542	-66,37179822
206,8499979	-68,64616668
231,7380156	-70,57794198
257,7038264	-72,16212276
284,6774112	-73,39745868
312,585	-74,28520008
341,3490717	-74,83034832
370,8908549	-75,0391551
401,1290774	-74,92162314
431,9824673	-74,4890055
463,3635006	-73,75630626
495,189655	-72,7385295
527,3721562	-71,45443032
559,8222302	-69,92276382
592,4511029	-68,1622851
625,17	-66,1929996
657,8888971	-64,03741344
690,5177698	-61,71428172
722,9678438	-59,24486022
755,150345	-56,64915438
786,9764994	-53,94841998
818,3575327	-51,16016178
849,2109226	-48,30563556
879,4491451	-45,40109574
908,9909283	-42,46404708

937,755	-	39,51449502
965,6625888	-	36,56744364
992,6361736	-33,6403977	
1018,601984	-	30,74961162
1043,490002	-	27,91133982
1067,231458	-	25,14058638
1089,761334	-	22,45485606
1111,018365	-	19,86915294
1130,942533	-	17,39723076
1149,481324	-	15,05659428
1166,583474	-	12,86099724
1182,200221	-	10,82544372
1196,291553	-8,96243712	
1208,816209	-7,28448084	
1219,74168	-5,80407828	
1229,037957	-4,53373284	
1236,678785	-3,47969622	
1242,642907	-2,6507208	
1246,915319	-2,05555896	
1249,483517	-1,69546104	
1250,34	-1,5754284	

ZHMEIA X-Y NACA 0012 PART 2

1246,59	1,5707034
1245,736086	1,69037604
1243,17559	2,04939396
1238,915992	2,6427708
1232,969758	3,46925997
1225,351846	4,52013534
1216,08345	5,78667078
1205,190746	7,26263334
1192,703654	8,93555712
1178,654585	10,79297622
1163,084676	12,82242474
1146,033818	15,01143678
1127,550628	17,34505326
1107,686216	19,80956169
1086,492939	22,38750981
1064,030634	25,06518513
1040,360383	27,82762857
1015,547009	30,65738787
989,6590749	33,53950395
962,7663888	36,45777114
934,9425	39,39598377
906,2646971	42,33668958
876,8115151	45,26492949
846,6639826	48,16075806
815,9031277	51,00672303
784,6162119	53,78661873
752,88551	56,47925313
720,79953	59,06717397
688,4467798	61,52918922
655,9157671	63,84535344
623,295	65,9944746
590,6742329	67,95785385
558,1432202	69,71305257
525,79047	71,24012532
493,70449	72,52037325
461,9737881	73,53509751
430,6868723	74,26559925
399,9260174	74,69691939
369,7784849	74,81409885
340,325303	74,60591832
311,6475	74,06240508
283,8236112	73,17732618
256,9309251	71,94569526
231,0429906	70,36626573
206,2296167	68,44028418
182,5593657	66,17273697
160,0970605	63,57110364
138,9037839	60,64411032
119,0393723	57,40422291
100,5561824	53,86640049

83,50532433	50,04435555
67,93541523	45,95803353
53,88634593	41,62239351
41,3992539	37,05613434
30,50655048	32,27795487
21,23815383	27,30530736
13,62024234	22,1519043
7,67400804	16,83270477
3,41441001	11,36142126
0,85391415	5,74802649
0	0
0,85391415	-5,74802649
3,41441001	-11,36142126
7,67400804	-16,83270477
13,62024234	-22,1519043
21,23815383	-27,30530736
30,50655048	-32,27795487
41,3992539	-37,05613434
53,88634593	-41,62239351
67,93541523	-45,95803353
83,50532433	-50,04435555
100,5561824	-53,86640049
119,0393723	-57,40422291
138,9037839	-60,64411032
160,0970605	-63,57110364
182,5593657	-66,17273697
206,2296167	-68,44028418
231,0429906	-70,36626573
256,9309251	-71,94569526
283,8236112	-73,17732618
311,6475	-74,06240508
340,325303	-74,60591832
369,7784849	-74,81409885
399,9260174	-74,69691939
430,6868723	-74,26559925
461,9737881	-73,53509751
493,70449	-72,52037325
525,79047	-71,24012532
558,1432202	-69,71305257
590,6742329	-67,95785385
623,295	-65,9944746
655,9157671	-63,84535344
688,4467798	-61,52918922
720,79953	-59,06717397
752,88551	-56,47925313
784,6162119	-53,78661873
815,9031277	-51,00672303
846,6639826	-48,16075806
876,8115151	-45,26492949
906,2646971	-42,33668958

934,9425	-
	39,39598377
962,7663888	-
	36,45777114
989,6590749	-
	33,53950395
1015,547009	-
	30,65738787
1040,360383	-
	27,82762857
1064,030634	-
	25,06518513
1086,492939	-
	22,38750981
1107,686216	-
	19,80956169
1127,550628	-
	17,34505326
1146,033818	-
	15,01143678
1163,084676	-
	12,82242474
1178,654585	-
	10,79297622
1192,703654	-8,93555712
1205,190746	-7,26263334
1216,08345	-5,78667078
1225,351846	-4,52013534
1232,969758	-3,46925997
1238,915992	-2,6427708
1243,17559	-2,04939396
1245,736086	-1,69037604
1246,59	-1,5707034

ZHMEIA X-Y NACA 0012 PART 3

1337,46	1,6851996
1336,54384	1,81359576
1333,796697	2,19878424
1329,226596	2,8354152
1322,846912	3,72215118
1314,673694	4,84962996
1304,729679	6,20848932
1293,042953	7,79204196
1279,645617	9,58691328
1264,572442	11,57972868
1247,867567	13,75711356
1229,573789	16,10569332
1209,74327	18,60941844
1188,430845	21,25357686
1165,692687	24,01944414
1141,592995	26,89230822
1116,197305	29,85611958
1089,575164	32,89215378
1061,800132	35,9843613
1032,947107	39,11535516
1003,095	42,26774838
972,3267327	45,42281652
940,7265653	48,56451006
908,3814326	51,67142964
875,3782697	54,72485082
841,8106986	57,70738662
807,7669918	60,59630022
773,3421088	63,37286718
738,6310094	66,01435068
703,7286533	68,49935136
668,73	70,8051324
633,7313467	72,9116319
598,8289906	74,79477558
564,1178912	76,43316408
529,6930082	77,8067355
495,6493014	78,89542794
462,0817303	79,6791795
429,0785674	80,14194066
396,7334347	80,2676619
365,1332673	80,04430608
334,365	79,46117352
304,5128928	78,51157692
275,6598682	77,19016644
247,8848364	75,49560462
221,2626951	73,42922892
195,8670046	70,99638918
171,7673129	68,20511016
149,0291554	65,06475408
127,7167303	61,58869554
107,8862109	57,79298406

89,59243302	53,6923317
72,88755762	49,30813782
57,81438342	44,65645194
44,4170466	39,75733596
32,73032112	34,63085178
22,78630602	29,29572384
14,61308796	23,7666642
8,23340376	18,05972238
3,66330294	12,18961044
0,9161601	6,16702806
0	0
0,9161601	-6,16702806
3,66330294	-12,18961044
8,23340376	-18,05972238
14,61308796	-23,7666642
22,78630602	-29,29572384
32,73032112	-34,63085178
44,4170466	-39,75733596
57,81438342	-44,65645194
72,88755762	-49,30813782
89,59243302	-53,6923317
107,8862109	-57,79298406
127,7167303	-61,58869554
149,0291554	-65,06475408
171,7673129	-68,20511016
195,8670046	-70,99638918
221,2626951	-73,42922892
247,8848364	-75,49560462
275,6598682	-77,19016644
304,5128928	-78,51157692
334,365	-79,46117352
365,1332673	-80,04430608
396,7334347	-80,2676619
429,0785674	-80,14194066
462,0817303	-79,6791795
495,6493014	-78,89542794
529,6930082	-77,8067355
564,1178912	-76,43316408
598,8289906	-74,79477558
633,7313467	-72,9116319
668,73	-70,8051324
703,7286533	-68,49935136
738,6310094	-66,01435068
773,3421088	-63,37286718
807,7669918	-60,59630022
841,8106986	-57,70738662
875,3782697	-54,72485082
908,3814326	-51,67142964
940,7265653	-48,56451006
972,3267327	-45,42281652

1003,095	-	42,26774838
1032,947107	-	39,11535516
1061,800132	-35,9843613	
1089,575164	-	32,89215378
1116,197305	-	29,85611958
1141,592995	-	26,89230822
1165,692687	-	24,01944414
1188,430845	-	21,25357686
1209,74327	-	18,60941844
1229,573789	-	16,10569332
1247,867567	-	13,75711356
1264,572442	-	11,57972868
1279,645617	-9,58691328	
1293,042953	-7,79204196	
1304,729679	-6,20848932	
1314,673694	-4,84962996	
1322,846912	-3,72215118	
1329,226596	-2,8354152	
1333,796697	-2,19878424	
1336,54384	-1,81359576	
1337,46	-1,6851996	

ZHMEIA X-Y NACA 0012 PART 3

1332,04	1,6783704
1331,127553	1,80624624
1328,391542	2,18987376
1323,839962	2,8239248
1317,486131	3,70706732
1309,346035	4,82997704
1299,442317	6,18332968
1287,802952	7,76046504
1274,459907	9,54806272
1259,447816	11,53280232
1242,810637	13,70136344
1224,590993	16,04042568
1204,840836	18,53400456
1183,614779	21,16744764
1160,968767	23,92210636
1136,966738	26,78332828
1111,673963	29,73512892
1085,159706	32,75885972
1057,497232	35,8385362
1028,761133	38,95684184
999,03	42,09646012
968,3864198	45,23874248
936,9143107	48,36770444
904,7002554	51,46203336
871,8308363	54,50308068
838,3992964	57,47352988
804,4935502	60,35073628
770,2081727	63,11605132
735,6377386	65,74683032
700,8768227	68,22176064
666,02	70,5181976
631,1631773	72,6161606
596,4022614	74,49167292
561,8318273	76,12342192
527,5464498	77,491427
493,6407036	78,57570756
460,2091637	79,356283
427,3397446	79,81716884
395,1256893	79,9423806
363,6535802	79,71992992
333,01	79,13916048
303,2788672	78,19341208
274,5427683	76,87735656
246,8802936	75,18966188
220,3660374	73,13166008
195,0732619	70,70867932
171,0712331	67,92871184
148,4252211	64,80108192
127,1991637	61,33910996
107,4490066	57,55878044

89,22936348	53,4747458
72,59218388	49,10831868
57,58009308	44,47548356
44,2370484	39,59622104
32,59768288	34,49051172
22,69396548	29,17700416
14,55386904	23,6703508
8,20003824	17,98653612
3,64845756	12,14021256
0,9124474	6,14203644
0	0
0,9124474	-6,14203644
3,64845756	-12,14021256
8,20003824	-17,98653612
14,55386904	-23,6703508
22,69396548	-29,17700416
32,59768288	-34,49051172
44,2370484	-39,59622104
57,58009308	-44,47548356
72,59218388	-49,10831868
89,22936348	-53,4747458
107,4490066	-57,55878044
127,1991637	-61,33910996
148,4252211	-64,80108192
171,0712331	-67,92871184
195,0732619	-70,70867932
220,3660374	-73,13166008
246,8802936	-75,18966188
274,5427683	-76,87735656
303,2788672	-78,19341208
333,01	-79,13916048
363,6535802	-79,71992992
395,1256893	-79,9423806
427,3397446	-79,81716884
460,2091637	-79,356283
493,6407036	-78,57570756
527,5464498	-77,491427
561,8318273	-76,12342192
596,4022614	-74,49167292
631,1631773	-72,6161606
666,02	-70,5181976
700,8768227	-68,22176064
735,6377386	-65,74683032
770,2081727	-63,11605132
804,4935502	-60,35073628
838,3992964	-57,47352988
871,8308363	-54,50308068
904,7002554	-51,46203336
936,9143107	-48,36770444
968,3864198	-45,23874248

999,03	-	42,09646012
1028,761133	-	38,95684184
1057,497232	-	35,8385362
1085,159706	-	32,75885972
1111,673963	-	29,73512892
1136,966738	-	26,78332828
1160,968767	-	23,92210636
1183,614779	-	21,16744764
1204,840836	-	18,53400456
1224,590993	-	16,04042568
1242,810637	-	13,70136344
1259,447816	-	11,53280232
1274,459907	-	9,54806272
1287,802952	-	7,76046504
1299,442317	-	6,18332968
1309,346035	-	4,82997704
1317,486131	-	3,70706732
1323,839962	-	2,8239248
1328,391542	-	2,18987376
1331,127553	-	1,80624624
1332,04	-	1,6783704

ZHMEIA X-Y NACA 0012 PART 4

1422,52	1,7923752
1421,545574	1,92893712
1418,623718	2,33862288
1413,762967	3,0157424
1406,977546	3,95887316
1398,284527	5,15805752
1387,708091	6,60333784
1375,278111	8,28760152
1361,028728	10,19662336
1344,996928	12,31617816
1327,229653	14,63204072
1307,772424	17,12998584
1286,68072	19,79294328
1264,012864	22,60526532
1239,828601	25,54703668
1214,196214	28,60260964
1187,185404	31,75491396
1158,870143	34,98403436
1129,32867	38,2729006
1098,640646	41,60301992
1066,89	44,95589956
1034,164927	48,31162424
1000,555047	51,65312372
966,1528237	54,95763768
931,0507202	58,20525084
895,3483132	61,37747044
859,1394891	64,45011364
822,5252468	67,40326516
785,6065853	70,21274216
748,4845034	72,85578432
711,26	75,3082088
674,0354966	77,5486778
636,9134147	79,55158596
599,9947532	81,29417296
563,3805109	82,755101
527,1716868	83,91303228
491,4692798	84,746629
456,3671763	85,23882092
421,9649526	85,3725378
388,3550726	85,13497696
355,63	84,51475824
323,8793536	83,50476904
293,1913296	82,09931928
263,6498568	80,29698644
235,3345962	78,09919304
208,3237864	75,51162916
182,6913986	72,54282992
158,507136	69,20275296
135,8392798	65,50562348
114,7475758	61,46851172

95,29034724	57,1070654
77,52307244	52,44404484
61,49127204	47,49652028
47,2418892	42,28582952
34,81190944	36,83331036
24,23547324	31,15887808
15,54245352	25,2781804
8,75703312	19,20828756
3,89628228	12,96484728
0,9744262	6,55923972
0	0
0,9744262	-6,55923972
3,89628228	-12,96484728
8,75703312	-19,20828756
15,54245352	-25,2781804
24,23547324	-31,15887808
34,81190944	-36,83331036
47,2418892	-42,28582952
61,49127204	-47,49652028
77,52307244	-52,44404484
95,29034724	-57,1070654
114,7475758	-61,46851172
135,8392798	-65,50562348
158,507136	-69,20275296
182,6913986	-72,54282992
208,3237864	-75,51162916
235,3345962	-78,09919304
263,6498568	-80,29698644
293,1913296	-82,09931928
323,8793536	-83,50476904
355,63	-84,51475824
388,3550726	-85,13497696
421,9649526	-85,3725378
456,3671763	-85,23882092
491,4692798	-84,746629
527,1716868	-83,91303228
563,3805109	-82,755101
599,9947532	-81,29417296
636,9134147	-79,55158596
674,0354966	-77,5486778
711,26	-75,3082088
748,4845034	-72,85578432
785,6065853	-70,21274216
822,5252468	-67,40326516
859,1394891	-64,45011364
895,3483132	-61,37747044
931,0507202	-58,20525084
966,1528237	-54,95763768
1000,555047	-51,65312372
1034,164927	-48,31162424

1066,89	-	44,95589956
1098,640646	-	41,60301992
1129,32867	-	38,2729006
1158,870143	-	34,98403436
1187,185404	-	31,75491396
1214,196214	-	28,60260964
1239,828601	-	25,54703668
1264,012864	-	22,60526532
1286,68072	-	19,79294328
1307,772424	-	17,12998584
1327,229653	-	14,63204072
1344,996928	-	12,31617816
1361,028728	-	10,19662336
1375,278111	-	8,28760152
1387,708091	-	6,60333784
1398,284527	-	5,15805752
1406,977546	-	3,95887316
1413,762967	-	3,0157424
1418,623718	-	2,33862288
1421,545574	-	1,92893712
1422,52	-	1,7923752

ZHMEIA X-Y NACA 0012 PART 4

1417,49	1,7860374
1416,519019	1,92211644
1413,607495	2,33035356
1408,763932	3,0050788
1402,002504	3,94487467
1393,340223	5,13981874
1382,801185	6,57998858
1370,415157	8,25829674
1356,21616	10,16056832
1340,241047	12,27262842
1322,536597	14,58030214
1303,148169	17,06941458
1282,131045	19,72295586
1259,543342	22,52533359
1235,444594	25,45670291
1209,902842	28,50147143
1182,987542	31,64262927
1154,772403	34,86033157
1125,335389	38,13756845
1094,755877	41,45591254
1063,1175	44,79693647
1030,508143	48,14079538
997,0171063	51,47047939
962,7365282	54,76330866
927,7585449	57,99943833
892,1823809	61,16044103
856,1015904	64,22221943
819,6168153	67,16492867
782,8286974	69,96447142
745,8378783	72,59816784
708,745	75,0419206
671,6521217	77,27446735
634,6613026	79,27029327
597,8731847	81,00671852
561,3884096	82,46248075
525,3076191	83,61631761
489,7314551	84,44696675
454,7534718	84,93741829
420,4728937	85,07066235
386,9818575	84,83394152
354,3725	84,21591588
322,7341232	83,20949798
292,1546114	81,80901786
262,7175966	80,01305803
234,5024582	77,82303598
207,587158	75,24462167
182,0454057	72,28632004
157,9466582	68,95805352
135,3589551	65,27399701
114,3418309	61,25116039

94,95340263	56,90513605
77,24895253	52,25860383
61,27384023	47,32857361
47,0748429	42,13630774
34,68881528	36,70306857
24,14977713	31,04870096
15,48749574	25,1887973
8,72606844	19,14036747
3,88250511	12,91900386
0,97098065	6,53604639
0	0
0,97098065	-6,53604639
3,88250511	-12,91900386
8,72606844	-19,14036747
15,48749574	-25,1887973
24,14977713	-31,04870096
34,68881528	-36,70306857
47,0748429	-42,13630774
61,27384023	-47,32857361
77,24895253	-52,25860383
94,95340263	-56,90513605
114,3418309	-61,25116039
135,3589551	-65,27399701
157,9466582	-68,95805352
182,0454057	-72,28632004
207,587158	-75,24462167
234,5024582	-77,82303598
262,7175966	-80,01305803
292,1546114	-81,80901786
322,7341232	-83,20949798
354,3725	-84,21591588
386,9818575	-84,83394152
420,4728937	-85,07066235
454,7534718	-84,93741829
489,7314551	-84,44696675
525,3076191	-83,61631761
561,3884096	-82,46248075
597,8731847	-81,00671852
634,6613026	-79,27029327
671,6521217	-77,27446735
708,745	-75,0419206
745,8378783	-72,59816784
782,8286974	-69,96447142
819,6168153	-67,16492867
856,1015904	-64,22221943
892,1823809	-61,16044103
927,7585449	-57,99943833
962,7365282	-54,76330866
997,0171063	-51,47047939
1030,508143	-48,14079538

1063,1175	-
1094,755877	-
1125,335389	-
1154,772403	-
1182,987542	-
1209,902842	-
1235,444594	-
1259,543342	-
1282,131045	-
1303,148169	-
1322,536597	-
1340,241047	-
1356,21616	-
1370,415157	-
1382,801185	-
1393,340223	-
1402,002504	-
1408,763932	-
1413,607495	-
1416,519019	-
1417,49	-

ZHMEIA X-Y NACA 0012 PART 5

1508,6	1,900836
1507,566609	2,0456616
1504,467945	2,4801384
1499,313058	3,198232
1492,117036	4,1984338
1482,897982	5,4701836
1471,681541	7,0029212
1458,499394	8,7891036
1443,387748	10,8136448
1426,385826	13,0614588
1407,543412	15,5174596
1386,908781	18,1665612
1364,540769	20,9906604
1340,501228	23,9731626
1314,853519	27,0929474
1287,670056	30,3334202
1259,024759	33,6764778
1228,996076	37,1009998
1197,66698	40,588883
1165,121952	44,1205156
1131,45	47,6762858
1096,744657	51,2350732
1061,100965	54,7787746
1024,616982	58,2832524
987,3907688	61,7273862
949,527926	65,0915642
911,1280216	68,3501402
872,2981662	71,4819938
833,1454704	74,4614788
793,7770448	77,2644576
754,3	79,865284
714,8229552	82,241329
675,4545296	84,3654378
636,3018338	86,2134728
597,4719784	87,762805
559,072074	88,9908054
521,2092312	89,874845
483,9830176	90,3968206
447,4990352	90,538629
411,855343	90,2866928
377,15	89,6289432
343,478048	88,5578372
310,9330202	87,0673404
279,603924	85,1559442
249,575241	82,8251572
220,9299442	80,0810138
193,7464808	76,9325656
168,0987722	73,3903728
144,0592312	69,4695214
121,691219	65,1881146

101,0565882	60,562747
82,2141742	55,6175562
65,2122522	50,3706454
50,100606	44,8446436
36,9184592	39,0621798
25,7020182	33,0443744
16,4829636	26,807822
9,2869416	20,3706258
4,1320554	13,7493804
1,033391	6,9561546
0	0
1,033391	-6,9561546
4,1320554	-13,7493804
9,2869416	-20,3706258
16,4829636	-26,807822
25,7020182	-33,0443744
36,9184592	-39,0621798
50,100606	-44,8446436
65,2122522	-50,3706454
82,2141742	-55,6175562
101,0565882	-60,562747
121,691219	-65,1881146
144,0592312	-69,4695214
168,0987722	-73,3903728
193,7464808	-76,9325656
220,9299442	-80,0810138
249,575241	-82,8251572
279,603924	-85,1559442
310,9330202	-87,0673404
343,478048	-88,5578372
377,15	-89,6289432
411,855343	-90,2866928
447,4990352	-90,538629
483,9830176	-90,3968206
521,2092312	-89,874845
559,072074	-88,9908054
597,4719784	-87,762805
636,3018338	-86,2134728
675,4545296	-84,3654378
714,8229552	-82,241329
754,3	-79,865284
793,7770448	-77,2644576
833,1454704	-74,4614788
872,2981662	-71,4819938
911,1280216	-68,3501402
949,527926	-65,0915642
987,3907688	-61,7273862
1024,616982	-58,2832524
1061,100965	-54,7787746
1096,744657	-51,2350732

1131,45	-47,6762858
1165,121952	-44,1205156
1197,66698	-40,588883
1228,996076	-37,1009998
1259,024759	-33,6764778
1287,670056	-30,3334202
1314,853519	-27,0929474
1340,501228	-23,9731626
1364,540769	-20,9906604
1386,908781	-18,1665612
1407,543412	-15,5174596
1426,385826	-13,0614588
1443,387748	-10,8136448
1458,499394	-8,7891036
1471,681541	-7,0029212
1482,897982	-5,4701836
1492,117036	-4,1984338
1499,313058	-3,198232
1504,467945	-2,4801384
1507,566609	-2,0456616
1508,6	-1,900836

ZHMEIA X-Y NACA 0012 PART 5

1502,94	1,8937044
1501,910486	2,03798664
1498,823447	2,47083336
1493,687901	3,1862328
1486,518878	4,18268202
1477,334411	5,44966044
1466,160052	6,97664748
1453,027363	8,75612844
1437,972413	10,77307392
1421,034279	13,01245452
1402,262558	15,45924084
1381,705345	18,09840348
1359,421254	20,91190716
1335,471905	23,88321954
1309,920422	26,99129946
1282,838946	30,21961458
1254,301121	33,55012962
1224,3851	36,96180342
1193,173545	40,4366007
1160,750621	43,95498324
1127,205	47,49741282
1092,629865	51,04284828
1057,119902	54,57325434
1020,772801	58,06458396
983,6862535	61,49579598
945,9654654	64,84735218
907,7096306	68,09370258
869,025458	71,21380602
830,0196562	74,18211252
790,7989339	76,97457504
751,47	79,5656436
712,1410661	81,9327741
672,9203438	84,04891362
633,914542	85,89001512
595,2303694	87,4335345
556,9745346	88,65692766
519,2537465	89,5376505
482,167199	90,05766774
445,8200981	90,1989441
410,3101347	89,94795312
375,735	89,29267128
342,1893792	88,22558388
309,7664546	86,74067916
278,5548996	84,83645418
248,6388789	82,51441188
220,1010542	79,78056402
193,0195783	76,64392824
167,4680954	73,11502512
143,5187465	69,20888406
121,2346551	64,94354034

100,6774418	60,3355263
81,90572118	55,40888898
64,96758738	50,18166366
49,9126374	44,67639444
36,77994768	38,91562542
25,60558878	32,92039776
16,42112244	26,7072438
9,25209864	20,29419882
4,11655266	13,69779516
1,0295139	6,93005634
0	0
1,0295139	-6,93005634
4,11655266	-13,69779516
9,25209864	-20,29419882
16,42112244	-26,7072438
25,60558878	-32,92039776
36,77994768	-38,91562542
49,9126374	-44,67639444
64,96758738	-50,18166366
81,90572118	-55,40888898
100,6774418	-60,3355263
121,2346551	-64,94354034
143,5187465	-69,20888406
167,4680954	-73,11502512
193,0195783	-76,64392824
220,1010542	-79,78056402
248,6388789	-82,51441188
278,5548996	-84,83645418
309,7664546	-86,74067916
342,1893792	-88,22558388
375,735	-89,29267128
410,3101347	-89,94795312
445,8200981	-90,1989441
482,167199	-90,05766774
519,2537465	-89,5376505
556,9745346	-88,65692766
595,2303694	-87,4335345
633,914542	-85,89001512
672,9203438	-84,04891362
712,1410661	-81,9327741
751,47	-79,5656436
790,7989339	-76,97457504
830,0196562	-74,18211252
869,025458	-71,21380602
907,7096306	-68,09370258
945,9654654	-64,84735218
983,6862535	-61,49579598
1020,772801	-58,06458396
1057,119902	-54,57325434
1092,629865	-51,04284828

1127,205	-	47,49741282
1160,750621	-	43,95498324
1193,173545	-	40,4366007
1224,3851	-	36,96180342
1254,301121	-	33,55012962
1282,838946	-	30,21961458
1309,920422	-	26,99129946
1335,471905	-	23,88321954
1359,421254	-	20,91190716
1381,705345	-	18,09840348
1402,262558	-	15,45924084
1421,034279	-	13,01245452
1437,972413	-	10,77307392
1453,027363	-	8,75612844
1466,160052	-	6,97664748
1477,334411	-	5,44966044
1486,518878	-	4,18268202
1493,687901	-	3,1862328
1498,823447	-	2,47083336
1501,910486	-	2,03798664
1502,94	-	1,8937044

ZHMEIA X-Y NACA 0012 PART 6

1592,9	2,007054
1591,808864	2,1599724
1588,537047	2,6187276
1583,094108	3,376948
1575,495975	4,4330407
1565,761763	5,7758554
1553,918551	7,3942418
1539,999791	9,2802354
1524,043712	11,4179072
1506,091729	13,7913282
1486,196408	16,3845694
1464,408722	19,1817018
1440,790793	22,1636106
1415,407932	25,3127739
1388,327039	28,6068911
1359,624574	32,0284403
1329,378589	35,5583067
1297,671914	39,1741897
1264,59216	42,8569745
1230,228528	46,5859534
1194,675	50,3404187
1158,030336	54,0980698
1120,394887	57,8397919
1081,872194	61,5400986
1042,565793	65,1766893
1002,587189	68,7288563
962,0415124	72,1695203
921,0418593	75,4763807
879,7013256	78,6223582
838,1330072	81,5819664
796,45	84,328126
754,7669928	86,8369435
713,1986744	89,0797467
671,8581407	91,0310492
630,8584876	92,6669575
590,312811	93,9635781
550,3342068	94,8970175
511,0278064	95,4481609
472,5051128	95,5978935
434,8696645	95,3318792
398,225	94,6373748
362,671472	93,5064158
328,3078403	91,9326306
295,228086	89,9144263
263,5214115	87,4533958
233,2754263	84,5559107
204,5729612	81,2315284
177,4920683	77,4913992
152,1092068	73,3514521
128,4912785	68,8308019

106,7035923	63,9469705
86,8082713	58,7254443
68,8562883	53,1853381
52,900209	47,3505454
38,9814488	41,2449597
27,1382373	34,8908816
17,4040254	28,305833
9,8058924	21,5089287
4,3629531	14,5176906
1,0911365	7,3448619
0	0
1,0911365	-7,3448619
4,3629531	-14,5176906
9,8058924	-21,5089287
17,4040254	-28,305833
27,1382373	-34,8908816
38,9814488	-41,2449597
52,900209	-47,3505454
68,8562883	-53,1853381
86,8082713	-58,7254443
106,7035923	-63,9469705
128,4912785	-68,8308019
152,1092068	-73,3514521
177,4920683	-77,4913992
204,5729612	-81,2315284
233,2754263	-84,5559107
263,5214115	-87,4533958
295,228086	-89,9144263
328,3078403	-91,9326306
362,671472	-93,5064158
398,225	-94,6373748
434,8696645	-95,3318792
472,5051128	-95,5978935
511,0278064	-95,4481609
550,3342068	-94,8970175
590,312811	-93,9635781
630,8584876	-92,6669575
671,8581407	-91,0310492
713,1986744	-89,0797467
754,7669928	-86,8369435
796,45	-84,328126
838,1330072	-81,5819664
879,7013256	-78,6223582
921,0418593	-75,4763807
962,0415124	-72,1695203
1002,587189	-68,7288563
1042,565793	-65,1766893
1081,872194	-61,5400986
1120,394887	-57,8397919
1158,030336	-54,0980698

1194,675	-
1230,228528	-
1264,59216	-
1297,671914	-
1329,378589	-
1359,624574	-
1388,327039	-
1415,407932	-
1440,790793	-
1464,408722	-
1486,196408	-
1506,091729	-
1524,043712	-
1539,999791	-
1553,918551	-
1565,761763	-
1575,495975	-
1583,094108	-
1588,537047	-
1591,808864	-
1592,9	-
	50,3404187
	46,5859534
	42,8569745
	39,1741897
	35,5583067
	32,0284403
	28,6068911
	25,3127739
	22,1636106
	19,1817018
	16,3845694
	13,7913282
	11,4179072
	-9,2802354
	-7,3942418
	-5,7758554
	-4,4330407
	-3,376948
	-2,6187276
	-2,1599724
	-2,007054

ZHMEIA X-Y NACA 0012 PART 6

1588,93	2,0020518
1587,841583	2,15458908
1584,577921	2,61220092
1579,148547	3,3685316
1571,569351	4,42199219
1561,8594	5,76146018
1550,045705	7,37581306
1536,161635	9,25710618
1520,245323	11,38945024
1502,338082	13,75695594
1482,492346	16,34373398
1460,758962	19,13389506
1437,199896	22,10837202
1411,880297	25,24968663
1384,866898	28,53559387
1356,235968	31,94861551
1326,065365	35,46968439
1294,437714	39,07655549
1261,440404	42,75016165
1227,162418	46,46984678
1191,6975	50,21495479
1155,144165	53,96324066
1117,602516	57,69563723
1079,175833	61,38672162
1039,967396	65,01424881
1000,088431	68,55756271
959,6438071	71,98965151
918,7463378	75,28827019
877,5088375	78,42640694
836,0441202	81,37863888
794,465	84,1179542
752,8858798	86,62051895
711,4211625	88,85773239
670,1836622	90,80417164
629,2861929	92,43600275
588,8415687	93,72939177
548,9626036	94,66050475
509,7541669	95,21027453
471,3274838	95,35963395
433,7858347	95,09428264
397,2325	94,40150916
361,7675824	93,27336886
327,4895955	91,70350602
294,4922862	89,69033171
262,8646346	87,23543486
232,6940317	84,34517119
204,063102	81,02907428
177,0497031	77,29826664
151,7301036	73,16863757
128,1710385	68,65925423

106,4376539	63,78759485
86,59191821	58,57908231
68,68467711	53,05278377
52,7683653	47,23253318
38,88429496	41,14216449
27,07060041	34,80392272
17,36064918	28,2352861
9,78145308	21,45532179
4,35207927	14,48150802
1,08841705	7,32655623
0	0
1,08841705	-7,32655623
4,35207927	-14,48150802
9,78145308	-21,45532179
17,36064918	-28,2352861
27,07060041	-34,80392272
38,88429496	-41,14216449
52,7683653	-47,23253318
68,68467711	-53,05278377
86,59191821	-58,57908231
106,4376539	-63,78759485
128,1710385	-68,65925423
151,7301036	-73,16863757
177,0497031	-77,29826664
204,063102	-81,02907428
232,6940317	-84,34517119
262,8646346	-87,23543486
294,4922862	-89,69033171
327,4895955	-91,70350602
361,7675824	-93,27336886
397,2325	-94,40150916
433,7858347	-95,09428264
471,3274838	-95,35963395
509,7541669	-95,21027453
548,9626036	-94,66050475
588,8415687	-93,72939177
629,2861929	-92,43600275
670,1836622	-90,80417164
711,4211625	-88,85773239
752,8858798	-86,62051895
794,465	-84,1179542
836,0441202	-81,37863888
877,5088375	-78,42640694
918,7463378	-75,28827019
959,6438071	-71,98965151
1000,088431	-68,55756271
1039,967396	-65,01424881
1079,175833	-61,38672162
1117,602516	-57,69563723
1155,144165	-53,96324066

1191,6975	-	50,21495479
1227,162418	-	46,46984678
1261,440404	-	42,75016165
1294,437714	-	39,07655549
1326,065365	-	35,46968439
1356,235968	-	31,94861551
1384,866898	-	28,53559387
1411,880297	-	25,24968663
1437,199896	-	22,10837202
1460,758962	-	19,13389506
1482,492346	-	16,34373398
1502,338082	-	13,75695594
1520,245323	-	11,38945024
1536,161635	-	9,25710618
1550,045705	-	7,37581306
1561,8594	-	5,76146018
1571,569351	-	4,42199219
1579,148547	-	3,3685316
1584,577921	-	2,61220092
1587,841583	-	2,15458908
1588,93	-	2,0020518

ZHMEIA X-Y NACA 0012 PART 7

1679,21	2,1158046
1678,059741	2,27700876
1674,610644	2,76062124
1668,872783	3,5599252
1660,862952	4,67324143
1650,601299	6,08881546
1638,116373	7,79489282
1623,443436	9,78307746
1606,622789	12,03657728
1587,698093	14,53860018
1566,72476	17,27235406
1543,756525	20,22104682
1518,858879	23,36452794
1492,100667	26,68432611
1463,552418	30,15693239
1433,294733	33,76387547
1401,409894	37,48500483
1367,985219	41,29681153
1333,113065	45,17914505
1296,887467	49,11017566
1259,4075	53,06807363
1220,777274	57,02933002
1181,102579	60,97379431
1140,492565	64,87459914
1099,056379	68,70823557
1056,911566	72,45287387
1014,168955	76,07996747
970,9477686	79,56600743
927,3672314	82,88244718
883,5465673	86,00241936
839,605	88,8973774
795,6634327	91,54213315
751,8427686	93,90646083
708,2622314	95,96349308
665,0410452	97,68804175
622,2984339	99,05491869
580,1536213	100,0389358
538,7174354	100,6199424
498,1074207	100,7777882
458,4327261	100,4973601
419,8025	99,76522452
382,3225328	98,57298542
346,0969355	96,91392594
311,2247814	94,78636687
277,8001064	92,19198742
245,9152669	89,13750443
215,6575819	85,63299316
187,1093327	81,69020808
160,3511213	77,32594129
135,4534747	72,56034331

112,4852403	67,41188545
91,51190737	61,90743507
72,58721067	56,06714269
55,7665641	49,91619646
41,09362712	43,47978453
28,60870077	36,78141584
18,34704846	29,8395617
10,33721676	22,67437263
4,59935619	15,30431994
1,15025885	7,74283731
0	0
1,15025885	-7,74283731
4,59935619	-15,30431994
10,33721676	-22,67437263
18,34704846	-29,8395617
28,60870077	-36,78141584
41,09362712	-43,47978453
55,7665641	-49,91619646
72,58721067	-56,06714269
91,51190737	-61,90743507
112,4852403	-67,41188545
135,4534747	-72,56034331
160,3511213	-77,32594129
187,1093327	-81,69020808
215,6575819	-85,63299316
245,9152669	-89,13750443
277,8001064	-92,19198742
311,2247814	-94,78636687
346,0969355	-96,91392594
382,3225328	-98,57298542
419,8025	-99,76522452
458,4327261	-100,4973601
498,1074207	-100,7777882
538,7174354	-100,6199424
580,1536213	-100,0389358
622,2984339	-99,05491869
665,0410452	-97,68804175
708,2622314	-95,96349308
751,8427686	-93,90646083
795,6634327	-91,54213315
839,605	-88,8973774
883,5465673	-86,00241936
927,3672314	-82,88244718
970,9477686	-79,56600743
1014,168955	-76,07996747
1056,911566	-72,45287387
1099,056379	-68,70823557
1140,492565	-64,87459914
1181,102579	-60,97379431
1220,777274	-57,02933002

1259,4075	-	53,06807363
1296,887467	-	49,11017566
1333,113065	-	45,17914505
1367,985219	-	41,29681153
1401,409894	-	37,48500483
1433,294733	-	33,76387547
1463,552418	-	30,15693239
1492,100667	-	26,68432611
1518,858879	-	23,36452794
1543,756525	-	20,22104682
1566,72476	-	17,27235406
1587,698093	-	14,53860018
1606,622789	-	12,03657728
1623,443436	-	9,78307746
1638,116373	-	7,79489282
1650,601299	-	6,08881546
1660,862952	-	4,67324143
1668,872783	-	3,5599252
1674,610644	-	2,76062124
1678,059741	-	2,27700876
1679,21	-	2,1158046

ZHMEIA X-Y NACA 0012 PART 7

1673,98	2,1092148
1672,833324	2,26991688
1669,394969	2,75202312
1663,674979	3,5488376
1655,690095	4,65868634
1645,460403	6,06985148
1633,014361	7,77061516
1618,387124	9,75260748
1601,618867	11,99908864
1582,753112	14,49331884
1561,845102	17,21855828
1538,948403	20,15806716
1514,128302	23,29175772
1487,453431	26,60121618
1458,994097	30,06300682
1428,830651	33,65871586
1397,045119	37,36825554
1363,724547	41,16819014
1328,961004	45,0384319
1292,848234	48,95721908
1255,485	52,90278994
1216,97509	56,85170876
1177,423965	60,78388778
1136,940432	64,67254332
1095,633302	68,49423966
1053,619752	72,22721506
1011,010265	75,84301186
967,9236937	79,31819434
924,4788907	82,62430484
880,7947086	85,73455968
836,99	88,6205012
793,1852914	91,2570197
749,5011093	93,61398354
706,0563063	95,66460904
662,9697351	97,3837865
620,3602482	98,74640622
578,3466982	99,7273585
537,0395677	100,3065556
496,5560354	100,4639097
457,0049099	100,184355
418,495	99,45449976
381,1317664	98,26597396
345,0189959	96,61208172
310,2554532	94,49114906
276,9348813	91,90484996
245,1493491	88,85988034
214,9859034	85,36628408
186,5265695	81,43577904
159,8516982	77,08510502
135,0315967	72,33434978

112,1348983	67,2019271
91,22688806	61,71462066
72,36113346	55,89251822
55,5928758	49,76072948
40,96563856	43,34436414
28,51959726	36,66685792
18,28990548	29,7466246
10,30502088	22,60375194
4,58503122	15,25665372
1,1466763	7,71872178
0	0
1,1466763	-7,71872178
4,58503122	-15,25665372
10,30502088	-22,60375194
18,28990548	-29,7466246
28,51959726	-36,66685792
40,96563856	-43,34436414
55,5928758	-49,76072948
72,36113346	-55,89251822
91,22688806	-61,71462066
112,1348983	-67,2019271
135,0315967	-72,33434978
159,8516982	-77,08510502
186,5265695	-81,43577904
214,9859034	-85,36628408
245,1493491	-88,85988034
276,9348813	-91,90484996
310,2554532	-94,49114906
345,0189959	-96,61208172
381,1317664	-98,26597396
418,495	-99,45449976
457,0049099	-100,184355
496,5560354	-100,4639097
537,0395677	-100,3065556
578,3466982	-99,7273585
620,3602482	-98,74640622
662,9697351	-97,3837865
706,0563063	-95,66460904
749,5011093	-93,61398354
793,1852914	-91,2570197
836,99	-88,6205012
880,7947086	-85,73455968
924,4788907	-82,62430484
967,9236937	-79,31819434
1011,010265	-75,84301186
1053,619752	-72,22721506
1095,633302	-68,49423966
1136,940432	-64,67254332
1177,423965	-60,78388778
1216,97509	-56,85170876

1255,485	-	52,90278994
1292,848234	-	48,95721908
1328,961004	-	-45,0384319
1363,724547	-	41,16819014
1397,045119	-	37,36825554
1428,830651	-	33,65871586
1458,994097	-	30,06300682
1487,453431	-	26,60121618
1514,128302	-	23,29175772
1538,948403	-	20,15806716
1561,845102	-	17,21855828
1582,753112	-	14,49331884
1601,618867	-	11,99908864
1618,387124	-	9,75260748
1633,014361	-	7,77061516
1645,460403	-	6,06985148
1655,690095	-	4,65868634
1663,674979	-	3,5488376
1669,394969	-	2,75202312
1672,833324	-	2,26991688
1673,98	-	2,1092148

ZHMEIA X-Y NACA 0012 PART 8

1765,09	2,2240134
1763,880913	2,39346204
1760,255418	2,90180796
1754,224106	3,7419908
1745,804627	4,91224547
1735,018162	6,40021634
1721,894718	8,19354778
1706,471361	10,28341434
1688,790455	12,65216512
1668,89789	15,28214922
1646,851916	18,15571574
1622,709015	21,25521378
1596,538026	24,55946226
1568,411317	28,04904519
1538,403021	31,69925131
1506,597865	35,49066463
1473,082336	39,40210407
1437,948219	43,40885837
1401,292595	47,48974645
1363,214309	51,62182214
1323,8175	55,78213927
1283,211605	59,94598658
1241,507823	64,09218299
1198,820887	68,19248706
1155,265526	72,22218753
1110,965297	76,15833823
1066,036696	79,97093263
1020,605045	83,63525947
974,7956638	87,12131222
928,7338751	90,40084944
882,545	93,4438646
836,3561249	96,22388135
790,2943362	98,70912807
744,4849555	100,8713633
699,053304	102,6841108
654,1247031	104,120894
609,8244743	105,1552368
566,2691134	105,7659579
523,5821769	105,9318764
481,8783955	105,6371063
441,2725	104,8675271
401,8756912	103,6143132
363,7974046	101,8704043
327,1417806	99,63403523
292,0076642	96,90697118
258,4921352	93,69627247
226,6869785	90,01252964
196,6786834	85,86809832
168,5519743	81,28062941
142,3809849	76,27130399

118,2380838	70,85953805
96,19210973	65,07357303
76,29954543	58,93459001
58,6186389	52,46906534
43,19528248	45,70347537
30,07183833	38,66253136
19,28537334	31,3656493
10,86589404	23,83401027
4,83458151	16,08703026
1,20908665	8,13882999
0	0
1,20908665	-8,13882999
4,83458151	-16,08703026
10,86589404	-23,83401027
19,28537334	-31,3656493
30,07183833	-38,66253136
43,19528248	-45,70347537
58,6186389	-52,46906534
76,29954543	-58,93459001
96,19210973	-65,07357303
118,2380838	-70,85953805
142,3809849	-76,27130399
168,5519743	-81,28062941
196,6786834	-85,86809832
226,6869785	-90,01252964
258,4921352	-93,69627247
292,0076642	-96,90697118
327,1417806	-99,63403523
363,7974046	-101,8704043
401,8756912	-103,6143132
441,2725	-104,8675271
481,8783955	-105,6371063
523,5821769	-105,9318764
566,2691134	-105,7659579
609,8244743	-105,1552368
654,1247031	-104,120894
699,053304	-102,6841108
744,4849555	-100,8713633
790,2943362	-98,70912807
836,3561249	-96,22388135
882,545	-93,4438646
928,7338751	-90,40084944
974,7956638	-87,12131222
1020,605045	-83,63525947
1066,036696	-79,97093263
1110,965297	-76,15833823
1155,265526	-72,22218753
1198,820887	-68,19248706
1241,507823	-64,09218299
1283,211605	-59,94598658

1323,8175	-	55,78213927
1363,214309	-	51,62182214
1401,292595	-	47,48974645
1437,948219	-	43,40885837
1473,082336	-	39,40210407
1506,597865	-	35,49066463
1538,403021	-	31,69925131
1568,411317	-	28,04904519
1596,538026	-	24,55946226
1622,709015	-	21,25521378
1646,851916	-	18,15571574
1668,89789	-	15,28214922
1688,790455	-	12,65216512
1706,471361	-	10,28341434
1721,894718	-8,19354778	
1735,018162	-6,40021634	
1745,804627	-4,91224547	
1754,224106	-3,7419908	
1760,255418	-2,90180796	
1763,880913	-2,39346204	
1765,09	-2,2240134	

ZHMEIA X-Y NACA 0012 PART 8

1759,43	2,2168818
1758,22479	2,38578708
1754,610921	2,89250292
1748,598949	3,7299916
1740,206468	4,89649369
1729,454591	6,37969318
1716,373229	8,16727406
1700,99933	10,25043918
1683,375119	12,61159424
1663,546343	15,23314494
1641,571063	18,09749698
1617,505579	21,18705606
1591,41851	24,48070902
1563,381993	27,95910213
1533,469924	31,59760337
1501,766755	35,37685901
1468,358698	39,27575589
1433,337244	43,26966199
1396,799161	47,33746415
1358,842978	51,45628978
1319,5725	55,60326629
1279,096813	59,75376166
1237,52676	63,88666273
1194,976705	67,97381862
1151,56101	71,99059731
1107,402836	75,91412621
1062,618305	79,71449501
1017,332336	83,36707169
971,6698495	86,84194594
925,7557642	90,11096688
879,715	93,1442242
833,6742358	95,91532645
787,7601505	98,39260389
742,0976637	100,5479056
696,8116949	102,3548403
652,0271637	103,7870163
607,8689896	104,8180423
564,4532949	105,426805
521,9032398	105,5921915
480,3331872	105,2983666
439,8575	104,5312552
400,5870224	103,2820599
362,630839	101,543743
326,0927562	99,31454521
291,0713021	96,59622586
257,6632452	93,39582269
225,960076	89,72389228
196,0480066	85,59275064
168,0114896	81,01999207
141,924421	76,02672973

117,8589374	70,63231735
95,88365671	64,86490581
76,05488061	58,74560827
58,4306703	52,30081618
43,05677096	45,55692099
29,97540891	38,53855472
19,22353218	31,2650711
10,83105108	23,75758329
4,81907877	16,03544502
1,20520955	8,11273173
0	0
1,20520955	-8,11273173
4,81907877	-16,03544502
10,83105108	-23,75758329
19,22353218	-31,2650711
29,97540891	-38,53855472
43,05677096	-45,55692099
58,4306703	-52,30081618
76,05488061	-58,74560827
95,88365671	-64,86490581
117,8589374	-70,63231735
141,924421	-76,02672973
168,0114896	-81,01999207
196,0480066	-85,59275064
225,960076	-89,72389228
257,6632452	-93,39582269
291,0713021	-96,59622586
326,0927562	-99,31454521
362,630839	-101,543743
400,5870224	-103,2820599
439,8575	-104,5312552
480,3331872	-105,2983666
521,9032398	-105,5921915
564,4532949	-105,426805
607,8689896	-104,8180423
652,0271637	-103,7870163
696,8116949	-102,3548403
742,0976637	-100,5479056
787,7601505	-98,39260389
833,6742358	-95,91532645
879,715	-93,1442242
925,7557642	-90,11096688
971,6698495	-86,84194594
1017,332336	-83,36707169
1062,618305	-79,71449501
1107,402836	-75,91412621
1151,56101	-71,99059731
1194,976705	-67,97381862
1237,52676	-63,88666273
1279,096813	-59,75376166

1319,5725	-
	55,60326629
1358,842978	-
	51,45628978
1396,799161	-
	47,33746415
1433,337244	-
	43,26966199
1468,358698	-
	39,27575589
1501,766755	-
	35,37685901
1533,469924	-
	31,59760337
1563,381993	-
	27,95910213
1591,41851	-
	24,48070902
1617,505579	-
	21,18705606
1641,571063	-
	18,09749698
1663,546343	-
	15,23314494
1683,375119	-
	12,61159424
1700,99933	-
	10,25043918
1716,373229	-8,16727406
1729,454591	-6,37969318
1740,206468	-4,89649369
1748,598949	-3,7299916
1754,610921	-2,89250292
1758,22479	-2,38578708
1759,43	-2,2168818

ZHMEIA X-Y NACA 0012 PART 9

1849,63	2,3305338
1848,363003	2,50809828
1844,563863	3,04079172
1838,243678	3,9212156
1829,420943	5,14752029
1818,117854	6,70675838
1804,365855	8,58598246
1788,203788	10,77594438
1769,676044	13,25814784
1748,830714	16,01409654
1725,728835	19,02529418
1700,429596	22,27324446
1673,005132	25,73575182
1643,531278	29,39247033
1612,085718	33,21750517
1578,757235	37,19051041
1543,636461	41,28929049
1506,819576	45,48795059
1468,40831	49,76429515
1428,506242	54,09427898
1387,2225	58,45385689
1344,671762	62,81713406
1300,970554	67,16191493
1256,239102	71,45860542
1210,597632	75,68131071
1164,175618	79,80598561
1117,095136	83,80118641
1069,48751	87,64101829
1021,484062	91,29403754
973,2161178	94,73065008
924,815	97,9194122
876,4138822	100,8325795
828,1459377	103,4368585
780,1424903	105,7026552
732,5348637	107,6022253
685,4543817	109,1078241
639,032368	110,1917073
593,3908981	110,8316792
548,6594462	111,0055445
504,9582382	110,6966562
462,4075	109,8902176
421,1237584	108,5769803
381,2216904	106,7495458
342,8104242	104,4060646
305,9935391	101,5483863
270,8727646	98,18390929
237,5442816	94,32373148
206,098722	89,98080024
176,624868	85,17361187
149,200404	79,92436193

123,9011648	74,25339635
100,7992861	68,19030921
79,95395601	61,75729607
61,4262123	54,98210138
45,26414536	47,89246959
31,51214631	40,51429552
20,20905738	32,8679251
11,38632228	24,97555389
5,06613657	16,85752782
1,26699655	8,52864393
0	0
1,26699655	-8,52864393
5,06613657	-16,85752782
11,38632228	-24,97555389
20,20905738	-32,8679251
31,51214631	-40,51429552
45,26414536	-47,89246959
61,4262123	-54,98210138
79,95395601	-61,75729607
100,7992861	-68,19030921
123,9011648	-74,25339635
149,200404	-79,92436193
176,624868	-85,17361187
206,098722	-89,98080024
237,5442816	-94,32373148
270,8727646	-98,18390929
305,9935391	-101,5483863
342,8104242	-104,4060646
381,2216904	-106,7495458
421,1237584	-108,5769803
462,4075	-109,8902176
504,9582382	-110,6966562
548,6594462	-111,0055445
593,3908981	-110,8316792
639,032368	-110,1917073
685,4543817	-109,1078241
732,5348637	-107,6022253
780,1424903	-105,7026552
828,1459377	-103,4368585
876,4138822	-100,8325795
924,815	-97,9194122
973,2161178	-94,73065008
1021,484062	-91,29403754
1069,48751	-87,64101829
1117,095136	-83,80118641
1164,175618	-79,80598561
1210,597632	-75,68131071
1256,239102	-71,45860542
1300,970554	-67,16191493
1344,671762	-62,81713406

1387,2225	-	58,45385689
1428,506242	-	54,09427898
1468,40831	-	49,76429515
1506,819576	-	45,48795059
1543,636461	-	41,28929049
1578,757235	-	37,19051041
1612,085718	-	33,21750517
1643,531278	-	29,39247033
1673,005132	-	25,73575182
1700,429596	-	22,27324446
1725,728835	-	19,02529418
1748,830714	-	16,01409654
1769,676044	-	13,25814784
1788,203788	-	10,77594438
1804,365855	-	8,58598246
1818,117854	-	6,70675838
1829,420943	-	5,14752029
1838,243678	-	3,9212156
1844,563863	-	3,04079172
1848,363003	-	2,50809828
1849,63	-	2,3305338

ZHMEIA X-Y NACA 0012 PART 9

1844,88	2,3245488
1843,616257	2,50165728
1839,826874	3,03298272
1833,522919	3,9111456
1824,722841	5,13430104
1813,448779	6,68953488
1799,732097	8,56393296
1783,611535	10,74827088
1765,131372	13,22409984
1744,339575	15,97297104
1721,297023	18,97643568
1696,062755	22,21604496
1668,708719	25,66966032
1639,310556	29,31698808
1607,945751	33,13219992
1574,702859	37,09500216
1539,672277	41,18325624
1502,949941	45,37113384
1464,637318	49,6364964
1424,837722	53,95536048
1383,66	58,30374264
1341,218536	62,65581456
1297,629556	66,98943768
1253,012978	71,27509392
1207,488719	75,48695496
1161,185921	79,60103736
1114,226345	83,58597816
1066,740979	87,41594904
1018,860808	91,05958704
970,7168198	94,48737408
922,44	97,6679472
874,1631802	100,5736332
826,0191917	103,1712242
778,139021	105,4312022
730,6536547	107,325894
683,6940792	108,8276263
637,391281	109,908726
591,8670221	110,5470545
547,2504442	110,7204732
503,6614644	110,4123782
461,22	109,6080106
420,0422784	108,2981458
380,2426822	106,4754043
341,9300592	104,1379414
305,2077228	101,2876018
270,1771414	97,93176504
236,9342486	94,08150048
205,5694438	89,74972224
176,171281	84,95487912
148,8172452	79,71910968

123,5829766	74,0627076
100,5404254	68,01519096
79,74862776	61,59869832
61,2684648	54,84090288
45,14790336	47,76947784
31,43122056	40,41025152
20,15715888	32,7835176
11,35708128	24,91141464
5,05312632	16,81423632
1,2637428	8,50674168
0	0
1,2637428	-8,50674168
5,05312632	-16,81423632
11,35708128	-24,91141464
20,15715888	-32,7835176
31,43122056	-40,41025152
45,14790336	-47,76947784
61,2684648	-54,84090288
79,74862776	-61,59869832
100,5404254	-68,01519096
123,5829766	-74,0627076
148,8172452	-79,71910968
176,171281	-84,95487912
205,5694438	-89,74972224
236,9342486	-94,08150048
270,1771414	-97,93176504
305,2077228	-101,2876018
341,9300592	-104,1379414
380,2426822	-106,4754043
420,0422784	-108,2981458
461,22	-109,6080106
503,6614644	-110,4123782
547,2504442	-110,7204732
591,8670221	-110,5470545
637,391281	-109,908726
683,6940792	-108,8276263
730,6536547	-107,325894
778,139021	-105,4312022
826,0191917	-103,1712242
874,1631802	-100,5736332
922,44	-97,6679472
970,7168198	-94,48737408
1018,860808	-91,05958704
1066,740979	-87,41594904
1114,226345	-83,58597816
1161,185921	-79,60103736
1207,488719	-75,48695496
1253,012978	-71,27509392
1297,629556	-66,98943768
1341,218536	-62,65581456

1383,66	-	58,30374264
1424,837722	-	53,95536048
1464,637318	-49,6364964	
1502,949941	-	45,37113384
1539,672277	-	41,18325624
1574,702859	-	37,09500216
1607,945751	-	33,13219992
1639,310556	-	29,31698808
1668,708719	-	25,66966032
1696,062755	-	22,21604496
1721,297023	-	18,97643568
1744,339575	-	15,97297104
1765,131372	-	13,22409984
1783,611535	-	10,74827088
1799,732097	-8,56393296	
1813,448779	-6,68953488	
1824,722841	-5,13430104	
1833,522919	-3,9111456	
1839,826874	-3,03298272	
1843,616257	-2,50165728	
1844,88	-2,3245488	

ZHMEIA X-Y NACA 0012 PART 10

1936	2,43936
1934,67384	2,625216
1930,697296	3,182784
1924,081984	4,10432
1914,847264	5,387888
1903,016368	7,019936
1888,622208	8,986912
1871,70544	11,279136
1852,312528	13,877248
1830,493808	16,761888
1806,313168	19,913696
1779,83256	23,313312
1751,127488	26,937504
1720,277328	30,764976
1687,363392	34,768624
1652,478608	38,927152
1615,71784	43,217328
1577,18176	47,612048
1536,976848	52,08808
1495,21152	56,620256
1452	61,183408
1407,46232	65,750432
1361,720448	70,298096
1314,900224	74,795424
1267,127488	79,215312
1218,53776	83,532592
1169,258816	87,714352
1119,428112	91,733488
1069,183104	95,557088
1018,661248	99,154176
968	102,49184
917,338752	105,54104
866,816896	108,266928
816,571888	110,638528
766,741184	112,6268
717,46224	114,202704
668,872512	115,3372
621,099776	116,007056
574,279552	116,18904
528,53768	115,865728
484	115,021632
440,78848	113,647072
399,023152	111,734304
358,81824	109,281392
320,28216	106,290272
283,521392	102,768688
248,636608	98,728256
215,722672	94,182528
184,872512	89,150864
156,16744	83,656496

129,686832	77,72072
105,506192	71,374512
83,687472	64,641104
64,29456	57,549536
47,377792	50,128848
32,983632	42,406144
21,152736	34,40272
11,918016	26,141808
5,302704	17,644704
1,32616	8,926896
0	0
1,32616	-8,926896
5,302704	-17,644704
11,918016	-26,141808
21,152736	-34,40272
32,983632	-42,406144
47,377792	-50,128848
64,29456	-57,549536
83,687472	-64,641104
105,506192	-71,374512
129,686832	-77,72072
156,16744	-83,656496
184,872512	-89,150864
215,722672	-94,182528
248,636608	-98,728256
283,521392	-102,768688
320,28216	-106,290272
358,81824	-109,281392
399,023152	-111,734304
440,78848	-113,647072
484	-115,021632
528,53768	-115,865728
574,279552	-116,18904
621,099776	-116,007056
668,872512	-115,3372
717,46224	-114,202704
766,741184	-112,6268
816,571888	-110,638528
866,816896	-108,266928
917,338752	-105,54104
968	-102,49184
1018,661248	-99,154176
1069,183104	-95,557088
1119,428112	-91,733488
1169,258816	-87,714352
1218,53776	-83,532592
1267,127488	-79,215312
1314,900224	-74,795424
1361,720448	-70,298096
1407,46232	-65,750432

1452	-61,183408
1495,21152	-56,620256
1536,976848	-52,08808
1577,18176	-47,612048
1615,71784	-43,217328
1652,478608	-38,927152
1687,363392	-34,768624
1720,277328	-30,764976
1751,127488	-26,937504
1779,83256	-23,313312
1806,313168	-19,913696
1830,493808	-16,761888
1852,312528	-13,877248
1871,70544	-11,279136
1888,622208	-8,986912
1903,016368	-7,019936
1914,847264	-5,387888
1924,081984	-4,10432
1930,697296	-3,182784
1934,67384	-2,625216
1936	-2,43936

ZHMEIA X-Y NACA 0012 PART 10

1934,34	2,4372684
1933,014977	2,62296504
1929,041843	3,18005496
1922,432203	4,1008008
1913,205401	5,38326822
1901,384649	7,01391684
1887,002832	8,97920628
1870,100569	11,26946484
1850,724285	13,86534912
1828,924273	16,74751572
1804,764366	19,89662124
1778,306464	23,29332228
1749,626005	26,91440676
1718,802297	30,73859694
1685,916582	34,73881206
1651,06171	38,89377438
1614,332462	43,18027182
1575,829424	47,57122362
1535,658986	52,0434177
1493,929469	56,57170764
1450,755	61,13094702
1406,255508	65,69405508
1360,552857	70,23781974
1313,772779	74,73129156
1266,041005	79,14738978
1217,492939	83,46096798
1168,256249	87,63914238
1118,468272	91,65483222
1068,266346	95,47515372
1017,787809	99,06915744
967,17	102,4039596
916,5521909	105,4505451
866,0736542	108,1740958
815,8717282	110,5436623
766,083751	112,5302295
716,8470606	114,1047823
668,2989953	115,2383055
620,5672214	115,9075871
573,7871429	116,0894151
528,0844917	115,7663803
483,585	114,9230081
440,4105312	113,5496267
398,6810144	111,6384988
358,5105756	109,18769
320,0075379	106,1991347
283,27829	102,6805702
248,4234175	98,64360264
215,5377032	94,10177232
184,7139953	89,07442266
156,0335361	83,58476574

129,5756336	77,6540793
105,415727	71,31331278
83,61571518	64,58567826
64,2394314	57,50019084
47,33716848	50,08586562
32,95535058	42,36978336
21,13459884	34,3732218
11,90779704	26,11939302
5,29815726	17,62957476
1,3250229	8,91924174
0	0
1,3250229	-8,91924174
5,29815726	-17,62957476
11,90779704	-26,11939302
21,13459884	-34,3732218
32,95535058	-42,36978336
47,33716848	-50,08586562
64,2394314	-57,50019084
83,61571518	-64,58567826
105,415727	-71,31331278
129,5756336	-77,6540793
156,0335361	-83,58476574
184,7139953	-89,07442266
215,5377032	-94,10177232
248,4234175	-98,64360264
283,27829	-102,6805702
320,0075379	-106,1991347
358,5105756	-109,18769
398,6810144	-111,6384988
440,4105312	-113,5496267
483,585	-114,9230081
528,0844917	-115,7663803
573,7871429	-116,0894151
620,5672214	-115,9075871
668,2989953	-115,2383055
716,8470606	-114,1047823
766,083751	-112,5302295
815,8717282	-110,5436623
866,0736542	-108,1740958
916,5521909	-105,4505451
967,17	-102,4039596
1017,787809	-99,06915744
1068,266346	-95,47515372
1118,468272	-91,65483222
1168,256249	-87,63914238
1217,492939	-83,46096798
1266,041005	-79,14738978
1313,772779	-74,73129156
1360,552857	-70,23781974
1406,255508	-65,69405508

1450,755	-	61,13094702
1493,929469	-	56,57170764
1535,658986	-52,0434177	
1575,829424	-	47,57122362
1614,332462	-	43,18027182
1651,06171	-	38,89377438
1685,916582	-	34,73881206
1718,802297	-	30,73859694
1749,626005	-	26,91440676
1778,306464	-	23,29332228
1804,764366	-	19,89662124
1828,924273	-	16,74751572
1850,724285	-	13,86534912
1870,100569	-	11,26946484
1887,002832	-8,97920628	
1901,384649	-7,01391684	
1913,205401	-5,38326822	
1922,432203	-4,1008008	
1929,041843	-3,18005496	
1933,014977	-2,62296504	
1934,34	-2,4372684	

ΣΗΜΕΙΑ X-Y NACA 0025 PART 1

1161	3.047625
1160.205	3.279825
1157.82	3.975264
1153.853	5.129298
1148.315	6.730317
1141.22	8.769033
1132.588	11.22919
1122.443	14.09222
1110.813	17.33721
1097.729	20.94096
1083.228	24.88023
1067.348	29.12717
1050.134	33.65507
1031.633	38.43491
1011.895	43.43882
990.975	48.63429
968.93	53.99347
945.8203	59.485
921.7098	65.07637
896.6635	70.73973
870.75	76.44024
844.0412	82.14656
816.6102	87.82617
788.5326	93.44541
759.8838	98.96945
730.745	104.3623
701.1929	109.5868
671.3099	114.6081
641.1785	119.3845
610.881	123.8787
580.5	128.049
550.119	131.8571
519.8215	135.2635
489.6901	138.2275
459.8071	140.7109
430.255	142.6788
401.1162	144.0964
372.4674	144.9334
344.3898	145.161
316.9588	144.7581
290.25	143.7039
264.3365	141.9857
239.2902	139.5963
215.1797	136.5313
192.07	132.7952
170.025	128.395
149.1049	123.3458
129.3667	117.6674
110.8662	111.3805
93.65207	104.5155

77.77191	97.1014
63.27102	89.17061
50.18655	80.75916
38.55681	71.90073
28.41199	62.62898
19.77996	52.97875
12.68509	42.98022
7.147116	32.66125
3.179979	22.04507
0.795285	11.15373
0	0
0.795285	-11.1537
3.179979	-22.0451
7.147116	-32.6613
12.68509	-42.9802
19.77996	-52.9788
28.41199	-62.629
38.55681	-71.9007
50.18655	-80.7592
63.27102	-89.1706
77.77191	-97.1014
93.65207	-104.516
110.8662	-111.381
129.3667	-117.667
149.1049	-123.346
170.025	-128.395
192.07	-132.795
215.1797	-136.531
239.2902	-139.596
264.3365	-141.986
290.25	-143.704
316.9588	-144.758
344.3898	-145.161
372.4674	-144.933
401.1162	-144.096
430.255	-142.679
459.8071	-140.711
489.6901	-138.227
519.8215	-135.263
550.119	-131.857
580.5	-128.049
610.881	-123.879
641.1785	-119.384
671.3099	-114.608
701.1929	-109.587
730.745	-104.362
759.8838	-98.9694
788.5326	-93.4454
816.6102	-87.8262
844.0412	-82.1466

870.75	-76.4402
896.6635	-70.7397
921.7098	-65.0764
945.8203	-59.485
968.93	-53.9935
990.975	-48.6343
1011.895	-43.4388
1031.633	-38.4349
1050.134	-33.6551
1067.348	-29.1272
1083.228	-24.8802
1097.729	-20.941
1110.813	-17.3372
1122.443	-14.0922
1132.588	-11.2292
1141.22	-8.76903
1148.315	-6.73032
1153.853	-5.1293
1157.82	-3.97526
1160.205	-3.27983
1161	-3.04763

ΣΗΜΕΙΑ X-Y NACA 0025 PART 1

1166.6	3.062325
1165.801	3.295645
1163.405	3.994438
1159.418	5.154039
1153.854	6.76278
1146.725	8.81133
1138.051	11.28336
1127.857	14.16019
1116.171	17.42084
1103.024	21.04196
1088.453	25.00024
1072.496	29.26766
1055.199	33.8174
1036.609	38.62029
1016.776	43.64834
995.7549	48.86887
973.6035	54.2539
950.3824	59.77192
926.1556	65.39026
900.9885	71.08094
874.95	76.80894
848.1124	82.54278
820.5491	88.24979
792.3361	93.89613
763.549	99.44682
734.2697	104.8657
704.5751	110.1154
674.548	115.1609
644.2712	119.9603
613.8276	124.4762
583.3	128.6666
552.7724	132.4931
522.3288	135.9159
492.052	138.8942
462.0249	141.3896
432.3303	143.367
403.051	144.7914
374.2639	145.6325
346.0509	145.8612
318.4876	145.4564
291.65	144.3971
265.6115	142.6705
240.4444	140.2697
216.2176	137.1898
192.9965	133.4357
170.8451	129.0143
149.8241	123.9408
129.9907	118.2349
111.401	111.9178
94.10379	105.0197

78.14703	97.56976
63.5762	89.60071
50.42862	81.1487
38.74279	72.24754
28.54904	62.93107
19.87536	53.23429
12.74627	43.18753
7.18159	32.81879
3.195317	22.1514
0.799121	11.20753
0	0
0.799121	-11.2075
3.195317	-22.1514
7.18159	-32.8188
12.74627	-43.1875
19.87536	-53.2343
28.54904	-62.9311
38.74279	-72.2475
50.42862	-81.1487
63.5762	-89.6007
78.14703	-97.5698
94.10379	-105.02
111.401	-111.918
129.9907	-118.235
149.8241	-123.941
170.8451	-129.014
192.9965	-133.436
216.2176	-137.19
240.4444	-140.27
265.6115	-142.671
291.65	-144.397
318.4876	-145.456
346.0509	-145.861
374.2639	-145.633
403.051	-144.791
432.3303	-143.367
462.0249	-141.39
492.052	-138.894
522.3288	-135.916
552.7724	-132.493
583.3	-128.667
613.8276	-124.476
644.2712	-119.96
674.548	-115.161
704.5751	-110.115
734.2697	-104.866
763.549	-99.4468
792.3361	-93.8961
820.5491	-88.2498
848.1124	-82.5428

874.95	-76.8089
900.9885	-71.0809
926.1556	-65.3903
950.3824	-59.7719
973.6035	-54.2539
995.7549	-48.8689
1016.776	-43.6483
1036.609	-38.6203
1055.199	-33.8174
1072.496	-29.2677
1088.453	-25.0002
1103.024	-21.042
1116.171	-17.4208
1127.857	-14.1602
1138.051	-11.2834
1146.725	-8.81133
1153.854	-6.76278
1159.418	-5.15404
1163.405	-3.99444
1165.801	-3.29565
1166.6	-3.06233

ΣΗΜΕΙΑ X-Y NACA 0025 PART 2

1246.45	3.271931
1245.596	3.521221
1243.036	4.267845
1238.777	5.506816
1232.831	7.225671
1225.214	9.414437
1215.947	12.05566
1205.055	15.12941
1192.57	18.61324
1178.522	22.48222
1162.954	26.71142
1145.905	31.27094
1127.424	36.13209
1107.562	41.26373
1086.371	46.63593
1063.911	52.21379
1040.244	57.9674
1015.433	63.86311
989.5479	69.86602
962.6583	75.9462
934.8375	82.06627
906.1629	88.19257
876.713	94.2902
846.5689	100.323
815.8115	106.2536
784.5281	112.0434
752.801	117.6524
720.7186	123.0433
688.3695	128.1712
655.8421	132.9962
623.225	137.4735
590.6079	141.5618
558.0805	145.2189
525.7314	148.4011
493.649	151.0672
461.9219	153.18
430.6385	154.7019
399.8811	155.6006
369.737	155.8449
340.2871	155.4124
311.6125	154.2806
283.7917	152.4358
256.9021	149.8707
231.017	146.58
206.2065	142.569
182.5389	137.8449
160.0791	132.4241
138.8882	126.3277
119.026	119.5782
100.5449	112.2079

83.49595	104.2481
67.92779	95.73359
53.88029	86.70306
41.3946	77.19265
30.50312	67.2385
21.23577	56.87801
13.61871	46.14358
7.673146	35.06513
3.414027	23.66759
0.853818	11.97465
0	0
0.853818	-11.9746
3.414027	-23.6676
7.673146	-35.0651
13.61871	-46.1436
21.23577	-56.878
30.50312	-67.2385
41.3946	-77.1926
53.88029	-86.7031
67.92779	-95.7336
83.49595	-104.248
100.5449	-112.208
119.026	-119.578
138.8882	-126.328
160.0791	-132.424
182.5389	-137.845
206.2065	-142.569
231.017	-146.58
256.9021	-149.871
283.7917	-152.436
311.6125	-154.281
340.2871	-155.412
369.737	-155.845
399.8811	-155.601
430.6385	-154.702
461.9219	-153.18
493.649	-151.067
525.7314	-148.401
558.0805	-145.219
590.6079	-141.562
623.225	-137.473
655.8421	-132.996
688.3695	-128.171
720.7186	-123.043
752.801	-117.652
784.5281	-112.043
815.8115	-106.254
846.5689	-100.323
876.713	-94.2902
906.1629	-88.1926

934.8375	-82.0663
962.6583	-75.9462
989.5479	-69.866
1015.433	-63.8631
1040.244	-57.9674
1063.911	-52.2138
1086.371	-46.6359
1107.562	-41.2637
1127.424	-36.1321
1145.905	-31.2709
1162.954	-26.7114
1178.522	-22.4822
1192.57	-18.6132
1205.055	-15.1294
1215.947	-12.0557
1225.214	-9.41444
1232.831	-7.22567
1238.777	-5.50682
1243.036	-4.26784
1245.596	-3.52122
1246.45	-3.27193

ΣΗΜΕΙΑ X-Y NACA 0025 PART 2

1252.5	3.287813
1251.642	3.538313
1249.069	4.28856
1244.79	5.533545
1238.815	7.260743
1231.161	9.460133
1221.849	12.11418
1210.904	15.20285
1198.358	18.70358
1184.243	22.59134
1168.599	26.84108
1151.467	31.42272
1132.896	36.30747
1112.938	41.46401
1091.644	46.86229
1069.075	52.46723
1045.293	58.24877
1020.362	64.17309
994.351	70.20513
967.3308	76.31483
939.375	82.4646
910.5612	88.62064
880.9684	94.74787
850.678	100.81
819.7713	106.7694
788.336	112.5872
756.4549	118.2235
724.2168	123.6405
691.7107	128.7933
659.0254	133.6418
626.25	138.1407
593.4746	142.2489
560.7893	145.9238
528.2832	149.1214
496.0451	151.8005
464.164	153.9235
432.7287	155.4528
401.822	156.3558
371.5316	156.6013
341.9388	156.1667
313.125	155.0294
285.1692	153.1757
258.149	150.5981
232.1384	147.2915
207.2073	143.261
183.4249	138.514
160.8561	133.0669
139.5623	126.9409
119.6037	120.1586
101.0329	112.7526

83.90122	104.7541
68.25749	96.19826
54.14182	87.1239
41.59553	77.56733
30.65118	67.56486
21.33884	57.15408
13.68482	46.36755
7.71039	35.23533
3.430598	23.78247
0.857963	12.03277
0	0
0.857963	-12.0328
3.430598	-23.7825
7.71039	-35.2353
13.68482	-46.3676
21.33884	-57.1541
30.65118	-67.5649
41.59553	-77.5673
54.14182	-87.1239
68.25749	-96.1983
83.90122	-104.754
101.0329	-112.753
119.6037	-120.159
139.5623	-126.941
160.8561	-133.067
183.4249	-138.514
207.2073	-143.261
232.1384	-147.291
258.149	-150.598
285.1692	-153.176
313.125	-155.029
341.9388	-156.167
371.5316	-156.601
401.822	-156.356
432.7287	-155.453
464.164	-153.923
496.0451	-151.8
528.2832	-149.121
560.7893	-145.924
593.4746	-142.249
626.25	-138.141
659.0254	-133.642
691.7107	-128.793
724.2168	-123.641
756.4549	-118.223
788.336	-112.587
819.7713	-106.769
850.678	-100.81
880.9684	-94.7479
910.5612	-88.6206

939.375	-82.4646
967.3308	-76.3148
994.351	-70.2051
1020.362	-64.1731
1045.293	-58.2488
1069.075	-52.4672
1091.644	-46.8623
1112.938	-41.464
1132.896	-36.3075
1151.467	-31.4227
1168.599	-26.8411
1184.243	-22.5913
1198.358	-18.7036
1210.904	-15.2028
1221.849	-12.1142
1231.161	-9.46013
1238.815	-7.26074
1244.79	-5.53355
1249.069	-4.28856
1251.642	-3.53831
1252.5	-3.28781

ΣΗΜΕΙΑ X-Y NACA 0025 PART 3

1332	3.4965
1331.088	3.7629
1328.352	4.560768
1323.8	5.884776
1317.447	7.721604
1309.307	10.0606
1299.403	12.8831
1287.764	16.16782
1274.422	19.89076
1259.41	24.02528
1242.773	28.54476
1224.554	33.41722
1204.805	38.61202
1183.579	44.09586
1160.934	49.83678
1136.933	55.79748
1111.641	61.94599
1085.127	68.24635
1057.465	74.66126
1028.73	81.15876
999	87.69888
968.3573	94.24566
936.8862	100.7618
904.6731	107.2087
871.8047	113.5463
838.3741	119.7335
804.4694	125.7275
770.185	131.4884
735.6156	136.9682
700.8558	142.1244
666	146.9089
631.1442	151.2779
596.3844	155.186
561.815	158.5866
527.5306	161.4357
493.6259	163.6935
460.1953	165.3198
427.3269	166.2802
395.1138	166.5413
363.6427	166.0791
333	164.8696
303.2698	162.8983
274.5345	160.157
246.8729	156.6405
220.3594	152.3542
195.0674	147.3059
171.0661	141.513
148.4208	134.9982
127.1953	127.7854
107.4458	119.9093

89.22668	111.4032
72.59	102.3043
57.57836	92.65392
44.23572	82.49076
32.5967	71.85341
22.69328	60.78182
14.55343	49.31064
8.199792	37.47182
3.648348	25.29202
0.91242	12.79652
0	0
0.91242	-12.7965
3.648348	-25.292
8.199792	-37.4718
14.55343	-49.3106
22.69328	-60.7818
32.5967	-71.8534
44.23572	-82.4908
57.57836	-92.6539
72.59	-102.304
89.22668	-111.403
107.4458	-119.909
127.1953	-127.785
148.4208	-134.998
171.0661	-141.513
195.0674	-147.306
220.3594	-152.354
246.8729	-156.641
274.5345	-160.157
303.2698	-162.898
333	-164.87
363.6427	-166.079
395.1138	-166.541
427.3269	-166.28
460.1953	-165.32
493.6259	-163.693
527.5306	-161.436
561.815	-158.587
596.3844	-155.186
631.1442	-151.278
666	-146.909
700.8558	-142.124
735.6156	-136.968
770.185	-131.488
804.4694	-125.727
838.3741	-119.733
871.8047	-113.546
904.6731	-107.209
936.8862	-100.762
968.3573	-94.2457

999	-87.6989
1028.73	-81.1588
1057.465	-74.6613
1085.127	-68.2464
1111.641	-61.946
1136.933	-55.7975
1160.934	-49.8368
1183.579	-44.0959
1204.805	-38.612
1224.554	-33.4172
1242.773	-28.5448
1259.41	-24.0253
1274.422	-19.8908
1287.764	-16.1678
1299.403	-12.8831
1309.307	-10.0606
1317.447	-7.7216
1323.8	-5.88478
1328.352	-4.56077
1331.088	-3.7629
1332	-3.4965

ΣΗΜΕΙΑ X-Y NACA 0025 PART 3

1337.7	3.511463
1336.784	3.779003
1334.036	4.580285
1329.465	5.909959
1323.084	7.754647
1314.91	10.10365
1304.964	12.93823
1293.275	16.237
1279.875	19.97587
1264.799	24.12809
1248.091	28.66691
1229.794	33.56022
1209.96	38.77725
1188.644	44.28456
1165.902	50.05005
1141.798	56.03625
1116.398	62.21108
1089.771	68.5384
1061.991	74.98076
1033.132	81.50606
1003.275	88.07417
972.5012	94.64896
940.8954	101.193
908.5444	107.6675
875.5354	114.0322
841.9618	120.2459
807.9119	126.2655
773.4809	132.0511
738.7636	137.5544
703.8549	142.7326
668.85	147.5376
633.8451	151.9253
598.9364	155.8501
564.2191	159.2652
529.7881	162.1266
495.7382	164.394
462.1646	166.0273
429.1556	166.9918
396.8046	167.254
365.1988	166.7898
334.425	165.5752
304.5675	163.5954
275.7093	160.8424
247.9293	157.3108
221.3024	153.0061
195.9022	147.9362
171.7981	142.1186
149.0559	135.5759
127.7396	128.3322
107.9056	120.4224

89.60851	111.8799
72.90064	102.742
57.82476	93.05041
44.42502	82.84376
32.73619	72.16089
22.79039	61.04193
14.61571	49.52165
8.234881	37.63218
3.66396	25.40025
0.916325	12.85128
0	0
0.916325	-12.8513
3.66396	-25.4002
8.234881	-37.6322
14.61571	-49.5217
22.79039	-61.0419
32.73619	-72.1609
44.42502	-82.8438
57.82476	-93.0504
72.90064	-102.742
89.60851	-111.88
107.9056	-120.422
127.7396	-128.332
149.0559	-135.576
171.7981	-142.119
195.9022	-147.936
221.3024	-153.006
247.9293	-157.311
275.7093	-160.842
304.5675	-163.595
334.425	-165.575
365.1988	-166.79
396.8046	-167.254
429.1556	-166.992
462.1646	-166.027
495.7382	-164.394
529.7881	-162.127
564.2191	-159.265
598.9364	-155.85
633.8451	-151.925
668.85	-147.538
703.8549	-142.733
738.7636	-137.554
773.4809	-132.051
807.9119	-126.266
841.9618	-120.246
875.5354	-114.032
908.5444	-107.667
940.8954	-101.193
972.5012	-94.649

1003.275	-88.0742
1033.132	-81.5061
1061.991	-74.9808
1089.771	-68.5384
1116.398	-62.2111
1141.798	-56.0363
1165.902	-50.05
1188.644	-44.2846
1209.96	-38.7772
1229.794	-33.5602
1248.091	-28.6669
1264.799	-24.1281
1279.875	-19.9759
1293.275	-16.237
1304.964	-12.9382
1314.91	-10.1036
1323.084	-7.75465
1329.465	-5.90996
1334.036	-4.58028
1336.784	-3.779
1337.7	-3.51146

ΣΗΜΕΙΑ X-Y NACA 0025 PART 4

1417.5	3.720938
1416.529	4.004438
1413.617	4.85352
1408.774	6.262515
1402.012	8.217248
1393.35	10.70638
1382.811	13.71006
1370.425	17.20562
1356.226	21.16753
1340.251	25.56745
1322.546	30.37703
1303.157	35.56224
1282.14	41.09049
1259.552	46.92634
1235.453	53.03576
1209.911	59.37908
1182.996	65.92226
1154.781	72.62703
1125.343	79.45371
1094.764	86.36828
1063.125	93.3282
1030.515	100.2952
997.0241	107.2296
962.7433	114.0903
927.7651	120.8348
892.1887	127.4191
856.1076	133.7978
819.6226	139.9285
782.8342	145.7601
745.8431	151.2473
708.75	156.3389
671.6569	160.9883
634.6658	165.1473
597.8774	168.7661
561.3924	171.7982
525.3113	174.2008
489.7349	175.9316
454.7567	176.9536
420.4759	177.2314
386.9846	176.7396
354.375	175.4525
322.7364	173.3546
292.1567	170.4374
262.7195	166.6952
234.5041	162.1337
207.5886	156.7613
182.0467	150.5966
157.9478	143.6636
135.3599	135.9879
114.3426	127.6062

94.95407	118.554
77.2495	108.8711
61.27427	98.6013
47.07518	87.78578
34.68906	76.46562
24.14995	64.68336
15.48761	52.47585
8.72613	39.87711
3.882533	26.91549
0.970988	13.61792
0	0
0.970988	-13.6179
3.882533	-26.9155
8.72613	-39.8771
15.48761	-52.4759
24.14995	-64.6834
34.68906	-76.4656
47.07518	-87.7858
61.27427	-98.6013
77.2495	-108.871
94.95407	-118.554
114.3426	-127.606
135.3599	-135.988
157.9478	-143.664
182.0467	-150.597
207.5886	-156.761
234.5041	-162.134
262.7195	-166.695
292.1567	-170.437
322.7364	-173.355
354.375	-175.452
386.9846	-176.74
420.4759	-177.231
454.7567	-176.954
489.7349	-175.932
525.3113	-174.201
561.3924	-171.798
597.8774	-168.766
634.6658	-165.147
671.6569	-160.988
708.75	-156.339
745.8431	-151.247
782.8342	-145.76
819.6226	-139.929
856.1076	-133.798
892.1887	-127.419
927.7651	-120.835
962.7433	-114.09
997.0241	-107.23
1030.515	-100.295

1063.125	-93.3282
1094.764	-86.3683
1125.343	-79.4537
1154.781	-72.627
1182.996	-65.9223
1209.911	-59.3791
1235.453	-53.0358
1259.552	-46.9263
1282.14	-41.0905
1303.157	-35.5622
1322.546	-30.377
1340.251	-25.5674
1356.226	-21.1675
1370.425	-17.2056
1382.811	-13.7101
1393.35	-10.7064
1402.012	-8.21725
1408.774	-6.26252
1413.617	-4.85352
1416.529	-4.00444
1417.5	-3.72094

ΣΗΜΕΙΑ X-Y NACA 0025 PART 4

1423.15	3.735769
1422.175	4.020399
1419.252	4.872866
1414.389	6.287477
1407.601	8.250001
1398.904	10.74905
1388.323	13.76471
1375.887	17.27419
1361.631	21.2519
1345.593	25.66936
1327.817	30.4981
1308.352	35.70399
1287.251	41.25427
1264.573	47.11338
1240.378	53.24716
1214.734	59.61575
1187.711	66.18501
1159.383	72.91651
1129.829	79.7704
1099.127	86.71253
1067.363	93.7002
1034.623	100.695
1000.998	107.657
966.5807	114.5451
931.4631	121.3164
895.7448	127.927
859.52	134.3311
822.8895	140.4863
785.9545	146.3411
748.816	151.8501
711.575	156.9621
674.334	161.63
637.1955	165.8055
600.2605	169.4388
563.63	172.4829
527.4052	174.8952
491.6869	176.6328
456.5693	177.6589
422.1518	177.9379
388.5271	177.444
355.7875	176.1518
324.0228	174.0456
293.3212	171.1167
263.7666	167.3596
235.4388	162.7799
208.416	157.3862
182.7723	151.1969
158.5773	144.2363
135.8994	136.5299
114.7984	128.1148

95.33255	119.0266
77.55741	109.305
61.51851	98.99431
47.26281	88.13568
34.82733	76.7704
24.24621	64.94118
15.54934	52.68501
8.760911	40.03606
3.898008	27.02277
0.974858	13.6722
0	0
0.974858	-13.6722
3.898008	-27.0228
8.760911	-40.0361
15.54934	-52.685
24.24621	-64.9412
34.82733	-76.7704
47.26281	-88.1357
61.51851	-98.9943
77.55741	-109.305
95.33255	-119.027
114.7984	-128.115
135.8994	-136.53
158.5773	-144.236
182.7723	-151.197
208.416	-157.386
235.4388	-162.78
263.7666	-167.36
293.3212	-171.117
324.0228	-174.046
355.7875	-176.152
388.5271	-177.444
422.1518	-177.938
456.5693	-177.659
491.6869	-176.633
527.4052	-174.895
563.63	-172.483
600.2605	-169.439
637.1955	-165.806
674.334	-161.63
711.575	-156.962
748.816	-151.85
785.9545	-146.341
822.8895	-140.486
859.52	-134.331
895.7448	-127.927
931.4631	-121.316
966.5807	-114.545
1000.998	-107.657
1034.623	-100.695

1067.363	-93.7002
1099.127	-86.7125
1129.829	-79.7704
1159.383	-72.9165
1187.711	-66.185
1214.734	-59.6158
1240.378	-53.2472
1264.573	-47.1134
1287.251	-41.2543
1308.352	-35.704
1327.817	-30.4981
1345.593	-25.6694
1361.631	-21.2519
1375.887	-17.2742
1388.323	-13.7647
1398.904	-10.7491
1407.601	-8.25
1414.389	-6.28748
1419.252	-4.87287
1422.175	-4.0204
1423.15	-3.73577

ΣΗΜΕΙΑ X-Y NACA 0025 PART 5

1503	3.945375
1501.97	4.245975
1498.883	5.146272
1493.748	6.640254
1486.578	8.712891
1477.393	11.35216
1466.219	14.53702
1453.085	18.24341
1438.03	22.4443
1421.091	27.10961
1402.319	32.20929
1381.761	37.70726
1359.476	43.56896
1335.525	49.75682
1309.973	56.23475
1282.89	62.96067
1254.351	69.89852
1224.434	77.00771
1193.221	84.24616
1160.797	91.57779
1127.25	98.95752
1092.673	106.3448
1057.162	113.6974
1020.814	120.972
983.7255	128.1232
946.0032	135.1047
907.7459	141.8682
869.0602	148.3686
830.0528	154.552
790.8305	160.3701
751.5	165.7689
712.1695	170.6987
672.9472	175.1085
633.9398	178.9457
595.2541	182.1606
556.9968	184.7082
519.2745	186.5433
482.1864	187.627
445.8379	187.9216
410.3265	187.4001
375.75	186.0353
342.203	183.8109
309.7788	180.7177
278.566	176.7498
248.6488	171.9131
220.1098	166.2168
193.0273	159.6802
167.4748	152.3291
143.5245	144.1903
121.2395	135.3031

100.6815	125.7049
81.90899	115.4379
64.97018	104.5487
49.91463	93.08079
36.78142	81.07783
25.60661	68.5849
16.42178	55.64106
9.252468	42.2824
4.116717	28.53896
1.029555	14.43932
0	0
1.029555	-14.4393
4.116717	-28.539
9.252468	-42.2824
16.42178	-55.6411
25.60661	-68.5849
36.78142	-81.0778
49.91463	-93.0808
64.97018	-104.549
81.90899	-115.438
100.6815	-125.705
121.2395	-135.303
143.5245	-144.19
167.4748	-152.329
193.0273	-159.68
220.1098	-166.217
248.6488	-171.913
278.566	-176.75
309.7788	-180.718
342.203	-183.811
375.75	-186.035
410.3265	-187.4
445.8379	-187.922
482.1864	-187.627
519.2745	-186.543
556.9968	-184.708
595.2541	-182.161
633.9398	-178.946
672.9472	-175.109
712.1695	-170.699
751.5	-165.769
790.8305	-160.37
830.0528	-154.552
869.0602	-148.369
907.7459	-141.868
946.0032	-135.105
983.7255	-128.123
1020.814	-120.972
1057.162	-113.697
1092.673	-106.345

1127.25	-98.9575
1160.797	-91.5778
1193.221	-84.2462
1224.434	-77.0077
1254.351	-69.8985
1282.89	-62.9607
1309.973	-56.2347
1335.525	-49.7568
1359.476	-43.569
1381.761	-37.7073
1402.319	-32.2093
1421.091	-27.1096
1438.03	-22.4443
1453.085	-18.2434
1466.219	-14.537
1477.393	-11.3522
1486.578	-8.71289
1493.748	-6.64025
1498.883	-5.14627
1501.97	-4.24598
1503	-3.94538

ΣΗΜΕΙΑ X-Y NACA 0025 PART 5

1508.6	3.960075
1507.567	4.261795
1504.468	5.165446
1499.313	6.664995
1492.117	8.745354
1482.898	11.39446
1471.682	14.59118
1458.499	18.31139
1443.388	22.52792
1426.386	27.21062
1407.543	32.3293
1386.909	37.84776
1364.541	43.7313
1340.501	49.9422
1314.854	56.44427
1287.67	63.19525
1259.025	70.15895
1228.996	77.29463
1197.667	84.56005
1165.122	91.919
1131.45	99.32622
1096.745	106.741
1061.101	114.1211
1024.617	121.4227
987.3908	128.6006
949.5279	135.6081
911.128	142.3968
872.2982	148.9214
833.1455	155.1278
793.777	160.9676
754.3	166.3865
714.823	171.3347
675.4545	175.761
636.3018	179.6124
597.472	182.8393
559.0721	185.3964
521.2092	187.2384
483.983	188.3261
447.499	188.6218
411.8553	188.0983
377.15	186.7285
343.478	184.4957
310.933	181.391
279.6039	177.4083
249.5752	172.5537
220.9299	166.8361
193.7465	160.2752
168.0988	152.8966
144.0592	144.7275
121.6912	135.8072

101.0566	126.1733
82.21417	115.868
65.21225	104.9382
50.10061	93.4276
36.91846	81.37992
25.70202	68.84044
16.48296	55.84837
9.286942	42.43994
4.132055	28.6453
1.033391	14.49312
0	0
1.033391	-14.4931
4.132055	-28.6453
9.286942	-42.4399
16.48296	-55.8484
25.70202	-68.8404
36.91846	-81.3799
50.10061	-93.4276
65.21225	-104.938
82.21417	-115.868
101.0566	-126.173
121.6912	-135.807
144.0592	-144.728
168.0988	-152.897
193.7465	-160.275
220.9299	-166.836
249.5752	-172.554
279.6039	-177.408
310.933	-181.391
343.478	-184.496
377.15	-186.728
411.8553	-188.098
447.499	-188.622
483.983	-188.326
521.2092	-187.238
559.0721	-185.396
597.472	-182.839
636.3018	-179.612
675.4545	-175.761
714.823	-171.335
754.3	-166.387
793.777	-160.968
833.1455	-155.128
872.2982	-148.921
911.128	-142.397
949.5279	-135.608
987.3908	-128.601
1024.617	-121.423
1061.101	-114.121
1096.745	-106.741

1131.45	-99.3262
1165.122	-91.919
1197.667	-84.56
1228.996	-77.2946
1259.025	-70.159
1287.67	-63.1953
1314.854	-56.4443
1340.501	-49.9422
1364.541	-43.7313
1386.909	-37.8478
1407.543	-32.3293
1426.386	-27.2106
1443.388	-22.5279
1458.499	-18.3114
1471.682	-14.5912
1482.898	-11.3945
1492.117	-8.74535
1499.313	-6.66499
1504.468	-5.16545
1507.567	-4.2618
1508.6	-3.96008

ΣΗΜΕΙΑ X-Y NACA 0025 PART 6

1588.5	4.169813
1587.412	4.487513
1584.149	5.439024
1578.721	7.017993
1571.144	9.208535
1561.437	11.99794
1549.626	15.36397
1535.746	19.28121
1519.834	23.72107
1501.932	28.65177
1482.091	34.04156
1460.364	39.85229
1436.811	46.04744
1411.498	52.58729
1384.492	59.43373
1355.869	66.54227
1325.707	73.87478
1294.087	81.38839
1261.099	89.0386
1226.83	96.78731
1191.375	104.5868
1154.832	112.3943
1117.3	120.1653
1078.884	127.8536
1039.686	135.4117
999.8178	142.7903
959.3841	149.9385
918.4977	156.8088
877.2714	163.3439
835.8179	169.493
794.25	175.1988
752.6821	180.4091
711.2286	185.0698
670.0023	189.1252
629.1159	192.523
588.6822	195.2155
548.814	197.1551
509.6162	198.3004
471.1999	198.6117
433.6684	198.0605
397.125	196.6182
361.6697	194.2672
327.401	190.9981
294.4126	186.8044
262.7935	181.6926
232.6311	175.6722
204.0079	168.7638
177.0018	160.9945
151.689	152.3927
128.1364	142.9999

106.4088	132.8558
86.56848	122.0047
68.66609	110.4961
52.75409	98.37581
38.87377	85.69004
27.06327	72.48643
17.35595	58.80627
9.778806	44.68768
4.350902	30.16244
1.088123	15.26072
0	0
1.088123	-15.2607
4.350902	-30.1624
9.778806	-44.6877
17.35595	-58.8063
27.06327	-72.4864
38.87377	-85.69
52.75409	-98.3758
68.66609	-110.496
86.56848	-122.005
106.4088	-132.856
128.1364	-143
151.689	-152.393
177.0018	-160.994
204.0079	-168.764
232.6311	-175.672
262.7935	-181.693
294.4126	-186.804
327.401	-190.998
361.6697	-194.267
397.125	-196.618
433.6684	-198.061
471.1999	-198.612
509.6162	-198.3
548.814	-197.155
588.6822	-195.216
629.1159	-192.523
670.0023	-189.125
711.2286	-185.07
752.6821	-180.409
794.25	-175.199
835.8179	-169.493
877.2714	-163.344
918.4977	-156.809
959.3841	-149.939
999.8178	-142.79
1039.686	-135.412
1078.884	-127.854
1117.3	-120.165
1154.832	-112.394

1191.375	-104.587
1226.83	-96.7873
1261.099	-89.0386
1294.087	-81.3884
1325.707	-73.8748
1355.869	-66.5423
1384.492	-59.4337
1411.498	-52.5873
1436.811	-46.0474
1460.364	-39.8523
1482.091	-34.0416
1501.932	-28.6518
1519.834	-23.7211
1535.746	-19.2812
1549.626	-15.364
1561.437	-11.9979
1571.144	-9.20853
1578.721	-7.01799
1584.149	-5.43902
1587.412	-4.48751
1588.5	-4.16981

ΣΗΜΕΙΑ X-Y NACA 0025 PART 6

1594.2	4.184775
1593.108	4.503615
1589.833	5.458541
1584.386	7.043176
1576.782	9.241577
1567.04	12.04099
1555.187	15.4191
1541.257	19.3504
1525.288	23.80619
1507.321	28.75459
1487.409	34.16371
1465.604	39.99529
1441.967	46.21267
1416.563	52.77599
1389.46	59.64699
1360.734	66.78104
1330.464	74.13987
1298.731	81.68043
1265.624	89.3581
1231.233	97.13461
1195.65	104.9621
1158.975	112.7976
1121.309	120.5964
1082.755	128.3124
1043.417	135.8976
1003.405	143.3026
962.8267	150.4765
921.7935	157.3715
880.4193	163.93
838.817	170.1011
797.1	175.8275
755.383	181.0565
713.7807	185.7339
672.4065	189.8039
631.3733	193.2139
590.7946	195.916
550.7833	197.8625
511.4449	199.012
472.8907	199.3244
435.2246	198.7712
398.55	197.3237
362.9675	194.9643
328.5758	191.6834
295.469	187.4747
263.7365	182.3446
233.4658	176.3026
204.7399	169.3694
177.6369	161.5722
152.2333	152.9396
128.5961	143.5131

106.7907	133.3325
86.87912	122.4425
68.91248	110.8926
52.94338	98.72881
39.01326	85.99752
27.16039	72.74653
17.41823	59.01728
9.813895	44.84803
4.366514	30.27067
1.092027	15.31548
0	0
1.092027	-15.3155
4.366514	-30.2707
9.813895	-44.848
17.41823	-59.0173
27.16039	-72.7465
39.01326	-85.9975
52.94338	-98.7288
68.91248	-110.893
86.87912	-122.443
106.7907	-133.333
128.5961	-143.513
152.2333	-152.94
177.6369	-161.572
204.7399	-169.369
233.4658	-176.303
263.7365	-182.345
295.469	-187.475
328.5758	-191.683
362.9675	-194.964
398.55	-197.324
435.2246	-198.771
472.8907	-199.324
511.4449	-199.012
550.7833	-197.863
590.7946	-195.916
631.3733	-193.214
672.4065	-189.804
713.7807	-185.734
755.383	-181.056
797.1	-175.828
838.817	-170.101
880.4193	-163.93
921.7935	-157.371
962.8267	-150.477
1003.405	-143.303
1043.417	-135.898
1082.755	-128.312
1121.309	-120.596
1158.975	-112.798

1195.65	-104.962
1231.233	-97.1346
1265.624	-89.3581
1298.731	-81.6804
1330.464	-74.1399
1360.734	-66.781
1389.46	-59.647
1416.563	-52.776
1441.967	-46.2127
1465.604	-39.9953
1487.409	-34.1637
1507.321	-28.7546
1525.288	-23.8062
1541.257	-19.3504
1555.187	-15.4191
1567.04	-12.041
1576.782	-9.24158
1584.386	-7.04318
1589.833	-5.45854
1593.108	-4.50362
1594.2	-4.18478

ΣΗΜΕΙΑ X-Y NACA 0025 PART 7

1674	4.39425
1672.853	4.72905
1669.415	5.731776
1663.695	7.395732
1655.71	9.704178
1645.48	12.64372
1633.034	16.19093
1618.406	20.31901
1601.638	24.99784
1582.772	30.19394
1561.864	35.87382
1538.967	41.99731
1514.146	48.52591
1487.471	55.41777
1459.012	62.63271
1428.848	70.12386
1397.062	77.85104
1363.741	85.76906
1328.977	93.83105
1292.864	101.9968
1255.5	110.2162
1216.99	118.4439
1177.438	126.6331
1136.954	134.7352
1095.646	142.7001
1053.632	150.4759
1011.022	158.0089
967.9353	165.2489
924.4899	172.1357
880.8052	178.6158
837	184.6288
793.1948	190.1195
749.5101	195.031
706.0647	199.3048
662.9777	202.8855
620.3677	205.7229
578.3536	207.7668
537.046	208.9738
496.562	209.3019
457.0104	208.721
418.5	207.201
381.1363	204.7235
345.0231	201.2784
310.2592	196.8591
276.9382	191.4721
245.1523	185.1277
214.9885	177.8474
186.5288	169.6599
159.8536	160.5952
135.0332	150.6968

112.1362	140.0067
91.22798	128.5716
72.362	116.4434
55.59354	103.6708
40.96613	90.30226
28.51994	76.38797
18.29012	61.97148
10.30514	47.09297
4.585086	31.78591
1.14669	16.08212
0	0
1.14669	-16.0821
4.585086	-31.7859
10.30514	-47.093
18.29012	-61.9715
28.51994	-76.388
40.96613	-90.3023
55.59354	-103.671
72.362	-116.443
91.22798	-128.572
112.1362	-140.007
135.0332	-150.697
159.8536	-160.595
186.5288	-169.66
214.9885	-177.847
245.1523	-185.128
276.9382	-191.472
310.2592	-196.859
345.0231	-201.278
381.1363	-204.724
418.5	-207.201
457.0104	-208.721
496.562	-209.302
537.046	-208.974
578.3536	-207.767
620.3677	-205.723
662.9777	-202.885
706.0647	-199.305
749.5101	-195.031
793.1948	-190.12
837	-184.629
880.8052	-178.616
924.4899	-172.136
967.9353	-165.249
1011.022	-158.009
1053.632	-150.476
1095.646	-142.7
1136.954	-134.735
1177.438	-126.633
1216.99	-118.444

1255.5	-110.216
1292.864	-101.997
1328.977	-93.831
1363.741	-85.7691
1397.062	-77.851
1428.848	-70.1239
1459.012	-62.6327
1487.471	-55.4178
1514.146	-48.5259
1538.967	-41.9973
1561.864	-35.8738
1582.772	-30.1939
1601.638	-24.9978
1618.406	-20.319
1633.034	-16.1909
1645.48	-12.6437
1655.71	-9.70418
1663.695	-7.39573
1669.415	-5.73178
1672.853	-4.72905
1674	-4.39425

ΣΗΜΕΙΑ X-Y NACA 0025 PART 7

1679.65	4.409081
1678.499	4.745011
1675.049	5.751122
1669.31	7.420694
1661.298	9.736931
1651.034	12.6864
1638.546	16.24557
1623.869	20.38759
1607.044	25.08221
1588.114	30.29585
1567.135	35.9949
1544.161	42.13906
1519.257	48.68969
1492.492	55.60481
1463.936	62.8441
1433.67	70.36054
1401.777	78.1138
1368.344	86.05855
1333.462	94.14774
1297.227	102.3411
1259.738	110.5882
1221.097	118.8436
1181.412	127.0605
1140.791	135.19
1099.344	143.1818
1057.189	150.9837
1014.435	158.5422
971.2022	165.8066
927.6102	172.7167
883.7781	179.2187
839.825	185.252
795.8719	190.7612
752.0398	195.6893
708.4478	199.9774
665.2153	203.5702
622.4615	206.4172
580.3056	208.4681
538.8586	209.6791
498.2379	210.0083
458.5528	209.4255
419.9125	207.9004
382.4227	205.4145
346.1876	201.9578
311.3063	197.5235
277.8729	192.1184
245.9797	185.7525
215.7141	178.4477
187.1584	170.2325
160.3931	161.1372
135.489	151.2055

112.5147	140.4792
91.53589	129.0055
72.60623	116.8365
55.78118	104.0207
41.10439	90.60704
28.6162	76.64579
18.35186	62.18064
10.33993	47.25191
4.600561	31.89319
1.15056	16.1364
0	0
1.15056	-16.1364
4.600561	-31.8932
10.33993	-47.2519
18.35186	-62.1806
28.6162	-76.6458
41.10439	-90.607
55.78118	-104.021
72.60623	-116.836
91.53589	-129.006
112.5147	-140.479
135.489	-151.205
160.3931	-161.137
187.1584	-170.233
215.7141	-178.448
245.9797	-185.752
277.8729	-192.118
311.3063	-197.523
346.1876	-201.958
382.4227	-205.414
419.9125	-207.9
458.5528	-209.425
498.2379	-210.008
538.8586	-209.679
580.3056	-208.468
622.4615	-206.417
665.2153	-203.57
708.4478	-199.977
752.0398	-195.689
795.8719	-190.761
839.825	-185.252
883.7781	-179.219
927.6102	-172.717
971.2022	-165.807
1014.435	-158.542
1057.189	-150.984
1099.344	-143.182
1140.791	-135.19
1181.412	-127.06
1221.097	-118.844

1259.738	-110.588
1297.227	-102.341
1333.462	-94.1477
1368.344	-86.0585
1401.777	-78.1138
1433.67	-70.3605
1463.936	-62.8441
1492.492	-55.6048
1519.257	-48.6897
1544.161	-42.1391
1567.135	-35.9949
1588.114	-30.2958
1607.044	-25.0822
1623.869	-20.3876
1638.546	-16.2456
1651.034	-12.6864
1661.298	-9.73693
1669.31	-7.42069
1675.049	-5.75112
1678.499	-4.74501
1679.65	-4.40908

ZHMEIA X-Y NACA 0025 PART 8

1759.45	4.618556
1758.245	4.970446
1754.631	6.024357
1748.619	7.77325
1740.226	10.19953
1729.474	13.28913
1716.393	17.0174
1701.019	21.3562
1683.394	26.27387
1663.565	31.7352
1641.59	37.70501
1617.524	44.14108
1591.437	51.00294
1563.4	58.24659
1533.487	65.82982
1501.784	73.70336
1468.375	81.82498
1433.354	90.14718
1396.815	98.62069
1358.858	107.2033
1319.588	115.8422
1279.111	124.4899
1237.541	133.0971
1194.99	141.6129
1151.574	149.9843
1107.415	158.157
1062.63	166.0745
1017.344	173.6841
971.6809	180.9225
925.7663	187.7333
879.725	194.0533
833.6837	199.8243
787.7691	204.9865
742.1061	209.4784
696.8196	213.2418
652.0346	216.2241
607.8759	218.3724
564.4597	219.6409
521.9092	219.9858
480.3386	219.3753
439.8625	217.7777
400.5916	215.1737
362.635	211.5527
326.0965	206.9078
291.0746	201.2459
257.6662	194.5776
225.9626	186.9257
196.0502	178.3203
168.0134	168.7928
141.926	158.3892

117.8603	147.1534
95.88475	135.1346
76.05575	122.3873
58.43133	108.9627
43.05726	94.91177
29.97575	80.28722
19.22375	65.13484
10.83117	49.49685
4.819134	33.40844
1.205223	16.90304
0	0
1.205223	-16.903
4.819134	-33.4084
10.83117	-49.4968
19.22375	-65.1348
29.97575	-80.2872
43.05726	-94.9118
58.43133	-108.963
76.05575	-122.387
95.88475	-135.135
117.8603	-147.153
141.926	-158.389
168.0134	-168.793
196.0502	-178.32
225.9626	-186.926
257.6662	-194.578
291.0746	-201.246
326.0965	-206.908
362.635	-211.553
400.5916	-215.174
439.8625	-217.778
480.3386	-219.375
521.9092	-219.986
564.4597	-219.641
607.8759	-218.372
652.0346	-216.224
696.8196	-213.242
742.1061	-209.478
787.7691	-204.986
833.6837	-199.824
879.725	-194.053
925.7663	-187.733
971.6809	-180.922
1017.344	-173.684
1062.63	-166.074
1107.415	-158.157
1151.574	-149.984
1194.99	-141.613
1237.541	-133.097
1279.111	-124.49

1319.588	-115.842
1358.858	-107.203
1396.815	-98.6207
1433.354	-90.1472
1468.375	-81.825
1501.784	-73.7034
1533.487	-65.8298
1563.4	-58.2466
1591.437	-51.0029
1617.524	-44.1411
1641.59	-37.705
1663.565	-31.7352
1683.394	-26.2739
1701.019	-21.3562
1716.393	-17.0174
1729.474	-13.2891
1740.226	-10.1995
1748.619	-7.77325
1754.631	-6.02436
1758.245	-4.97045
1759.45	-4.61856

ΣΗΜΕΙΑ X-Y NACA 0025 PART 8

1765.1	4.633388
1763.891	4.986408
1760.265	6.043702
1754.234	7.798212
1745.815	10.23228
1735.028	13.3318
1721.904	17.07205
1706.481	21.42478
1688.8	26.35824
1668.907	31.83711
1646.861	37.82609
1622.718	44.28283
1596.547	51.16672
1568.42	58.43364
1538.412	66.04122
1506.606	73.94004
1473.091	82.08774
1437.956	90.43666
1401.301	98.93739
1363.222	107.5475
1323.825	116.2142
1283.219	124.8897
1241.515	133.5245
1198.828	142.0676
1155.272	150.4659
1110.972	158.6648
1066.043	166.6078
1020.611	174.2418
974.8012	181.5035
928.7391	188.3362
882.55	194.6764
836.3609	200.4659
790.2988	205.6447
744.4892	210.151
699.0573	213.9266
654.1284	216.9184
609.8279	219.0736
566.2723	220.3463
523.5851	220.6922
481.8811	220.0797
441.275	218.477
401.878	215.8647
363.7995	212.2321
327.1436	207.5722
292.0093	201.8921
258.4936	195.2024
226.6883	187.526
196.6798	178.8929
168.5529	169.3349
142.3818	158.8978

118.2388	147.6259
96.19265	135.5685
76.29998	122.7804
58.61897	109.3126
43.19553	95.21655
30.07201	80.54504
19.28548	65.344
10.86596	49.65579
4.834609	33.51572
1.209094	16.95732
0	0
1.209094	-16.9573
4.834609	-33.5157
10.86596	-49.6558
19.28548	-65.344
30.07201	-80.545
43.19553	-95.2166
58.61897	-109.313
76.29998	-122.78
96.19265	-135.569
118.2388	-147.626
142.3818	-158.898
168.5529	-169.335
196.6798	-178.893
226.6883	-187.526
258.4936	-195.202
292.0093	-201.892
327.1436	-207.572
363.7995	-212.232
401.878	-215.865
441.275	-218.477
481.8811	-220.08
523.5851	-220.692
566.2723	-220.346
609.8279	-219.074
654.1284	-216.918
699.0573	-213.927
744.4892	-210.151
790.2988	-205.645
836.3609	-200.466
882.55	-194.676
928.7391	-188.336
974.8012	-181.503
1020.611	-174.242
1066.043	-166.608
1110.972	-158.665
1155.272	-150.466
1198.828	-142.068
1241.515	-133.525
1283.219	-124.89

1323.825	-116.214
1363.222	-107.548
1401.301	-98.9374
1437.956	-90.4367
1473.091	-82.0877
1506.606	-73.94
1538.412	-66.0412
1568.42	-58.4336
1596.547	-51.1667
1622.718	-44.2828
1646.861	-37.8261
1668.907	-31.8371
1688.8	-26.3582
1706.481	-21.4248
1721.904	-17.072
1735.028	-13.3318
1745.815	-10.2323
1754.234	-7.79821
1760.265	-6.0437
1763.891	-4.98641
1765.1	-4.63339

ΣΗΜΕΙΑ X-Y NACA 0025 PART 9

1844.9	4.842863
1843.636	5.211843
1839.847	6.316938
1833.543	8.150768
1824.743	10.69489
1813.468	13.93453
1799.752	17.84387
1783.631	22.3934
1765.151	27.54989
1744.358	33.27646
1721.316	39.53621
1696.081	46.28485
1668.727	53.47996
1639.328	61.07541
1607.963	69.02693
1574.72	77.28286
1539.689	85.79892
1502.966	94.5253
1464.653	103.4103
1424.853	112.4098
1383.675	121.4682
1341.233	130.5359
1297.644	139.5612
1253.027	148.4905
1207.502	157.2685
1161.199	165.8381
1114.238	174.1401
1066.753	182.1193
1018.872	189.7092
970.7273	196.8508
922.45	203.4777
874.1727	209.529
826.0281	214.9419
778.1475	219.6519
730.6616	223.5982
683.7015	226.7253
637.3982	228.9779
591.8734	230.3081
547.2564	230.6697
503.6669	230.0295
461.225	228.3543
420.0468	225.6239
380.2468	221.8271
341.9338	216.9566
305.211	211.0197
270.1801	204.0275
236.9368	196.004
205.5717	186.9806
176.1732	176.9905
148.8189	166.0816

123.5843	154.3001
100.5415	141.6975
79.74949	128.3312
61.26913	114.2547
45.14839	99.52129
31.43156	84.18648
20.15738	68.2982
11.3572	51.90073
5.053181	35.03096
1.263757	17.72395
0	0
1.263757	-17.724
5.053181	-35.031
11.3572	-51.9007
20.15738	-68.2982
31.43156	-84.1865
45.14839	-99.5213
61.26913	-114.255
79.74949	-128.331
100.5415	-141.698
123.5843	-154.3
148.8189	-166.082
176.1732	-176.99
205.5717	-186.981
236.9368	-196.004
270.1801	-204.027
305.211	-211.02
341.9338	-216.957
380.2468	-221.827
420.0468	-225.624
461.225	-228.354
503.6669	-230.03
547.2564	-230.67
591.8734	-230.308
637.3982	-228.978
683.7015	-226.725
730.6616	-223.598
778.1475	-219.652
826.0281	-214.942
874.1727	-209.529
922.45	-203.478
970.7273	-196.851
1018.872	-189.709
1066.753	-182.119
1114.238	-174.14
1161.199	-165.838
1207.502	-157.269
1253.027	-148.49
1297.644	-139.561
1341.233	-130.536

1383.675	-121.468
1424.853	-112.41
1464.653	-103.41
1502.966	-94.5253
1539.689	-85.7989
1574.72	-77.2829
1607.963	-69.0269
1639.328	-61.0754
1668.727	-53.48
1696.081	-46.2849
1721.316	-39.5362
1744.358	-33.2765
1765.151	-27.5499
1783.631	-22.3934
1799.752	-17.8439
1813.468	-13.9345
1824.743	-10.6949
1833.543	-8.15077
1839.847	-6.31694
1843.636	-5.21184
1844.9	-4.84286

ΣΗΜΕΙΑ X-Y NACA 0025 PART 9

1850.55	4.857694
1849.282	5.227804
1845.481	6.336283
1839.158	8.17573
1830.331	10.72764
1819.022	13.9772
1805.263	17.89852
1789.093	22.46198
1770.556	27.63426
1749.701	33.37837
1726.587	39.65729
1701.275	46.4266
1673.837	53.64374
1644.349	61.26246
1612.888	69.23833
1579.543	77.51954
1544.404	86.06168
1507.569	94.81478
1469.139	103.727
1429.217	112.754
1387.913	121.8402
1345.341	130.9357
1301.618	139.9886
1256.864	148.9452
1211.2	157.7501
1164.755	166.3459
1117.651	174.6734
1070.019	182.677
1021.992	190.2902
973.7002	197.4537
925.275	204.1009
876.8498	210.1707
828.5579	215.6002
780.5305	220.3246
732.8992	224.283
685.7953	227.4196
639.3502	229.6792
593.686	231.0134
548.9323	231.3761
505.2094	230.734
462.6375	229.0537
421.3332	226.3149
381.4113	222.5064
342.9809	217.621
306.1457	211.6659
271.0075	204.6523
237.6624	196.6043
206.2012	187.5532
176.7127	177.5325
149.2746	166.5902

123.9628	154.7726
100.8494	142.1315
79.99372	128.7243
61.45677	114.6046
45.28666	99.82607
31.52782	84.4443
20.21911	68.50736
11.39199	52.05967
5.068656	35.13824
1.267627	17.77823
0	0
1.267627	-17.7782
5.068656	-35.1382
11.39199	-52.0597
20.21911	-68.5074
31.52782	-84.4443
45.28666	-99.8261
61.45677	-114.605
79.99372	-128.724
100.8494	-142.131
123.9628	-154.773
149.2746	-166.59
176.7127	-177.533
206.2012	-187.553
237.6624	-196.604
271.0075	-204.652
306.1457	-211.666
342.9809	-217.621
381.4113	-222.506
421.3332	-226.315
462.6375	-229.054
505.2094	-230.734
548.9323	-231.376
593.686	-231.013
639.3502	-229.679
685.7953	-227.42
732.8992	-224.283
780.5305	-220.325
828.5579	-215.6
876.8498	-210.171
925.275	-204.101
973.7002	-197.454
1021.992	-190.29
1070.019	-182.677
1117.651	-174.673
1164.755	-166.346
1211.2	-157.75
1256.864	-148.945
1301.618	-139.989
1345.341	-130.936

1387.913	-121.84
1429.217	-112.754
1469.139	-103.727
1507.569	-94.8148
1544.404	-86.0617
1579.543	-77.5195
1612.888	-69.2383
1644.349	-61.2625
1673.837	-53.6437
1701.275	-46.4266
1726.587	-39.6573
1749.701	-33.3784
1770.556	-27.6343
1789.093	-22.462
1805.263	-17.8985
1819.022	-13.9772
1830.331	-10.7276
1839.158	-8.17573
1845.481	-6.33628
1849.282	-5.2278
1850.55	-4.85769

ΣΗΜΕΙΑ X-Y NACA 0025 PART 10

1930.34	5.067143
1929.018	5.453211
1925.053	6.609484
1918.457	8.528242
1909.249	11.19018
1897.453	14.57986
1883.101	18.67025
1866.233	23.43047
1846.897	28.82577
1825.142	34.81754
1801.032	41.36719
1774.629	48.42837
1746.008	55.9567
1715.248	63.90391
1682.43	72.22367
1647.647	80.86194
1610.994	89.77239
1572.571	98.9029
1532.483	108.1994
1490.84	117.6156
1447.755	127.0936
1403.348	136.5812
1357.739	146.0244
1311.056	155.3673
1263.423	164.5518
1214.975	173.5183
1165.84	182.2048
1116.155	190.5535
1066.057	198.4949
1015.683	205.9673
965.17	212.9011
914.6569	219.2326
864.2827	224.8962
814.1846	229.8244
764.4996	233.9533
715.3647	237.2253
666.917	239.5822
619.284	240.974
572.6006	241.3523
526.9925	240.6825
482.585	238.9298
439.4998	236.0729
397.8566	232.1002
357.7692	227.0041
319.3458	220.7923
282.6925	213.4763
247.9097	205.0813
215.092	195.64
184.332	185.1872
155.7109	173.7731

129.3077	161.4459
105.1977	148.2598
83.44281	134.2745
64.10659	119.546
47.23928	104.1303
32.8872	88.08527
21.09089	71.46119
11.88317	54.30432
5.287201	36.6533
1.322283	18.54478
0	0
1.322283	-18.5448
5.287201	-36.6533
11.88317	-54.3043
21.09089	-71.4612
32.8872	-88.0853
47.23928	-104.13
64.10659	-119.546
83.44281	-134.274
105.1977	-148.26
129.3077	-161.446
155.7109	-173.773
184.332	-185.187
215.092	-195.64
247.9097	-205.081
282.6925	-213.476
319.3458	-220.792
357.7692	-227.004
397.8566	-232.1
439.4998	-236.073
482.585	-238.93
526.9925	-240.683
572.6006	-241.352
619.284	-240.974
666.917	-239.582
715.3647	-237.225
764.4996	-233.953
814.1846	-229.824
864.2827	-224.896
914.6569	-219.233
965.17	-212.901
1015.683	-205.967
1066.057	-198.495
1116.155	-190.554
1165.84	-182.205
1214.975	-173.518
1263.423	-164.552
1311.056	-155.367
1357.739	-146.024
1403.348	-136.581

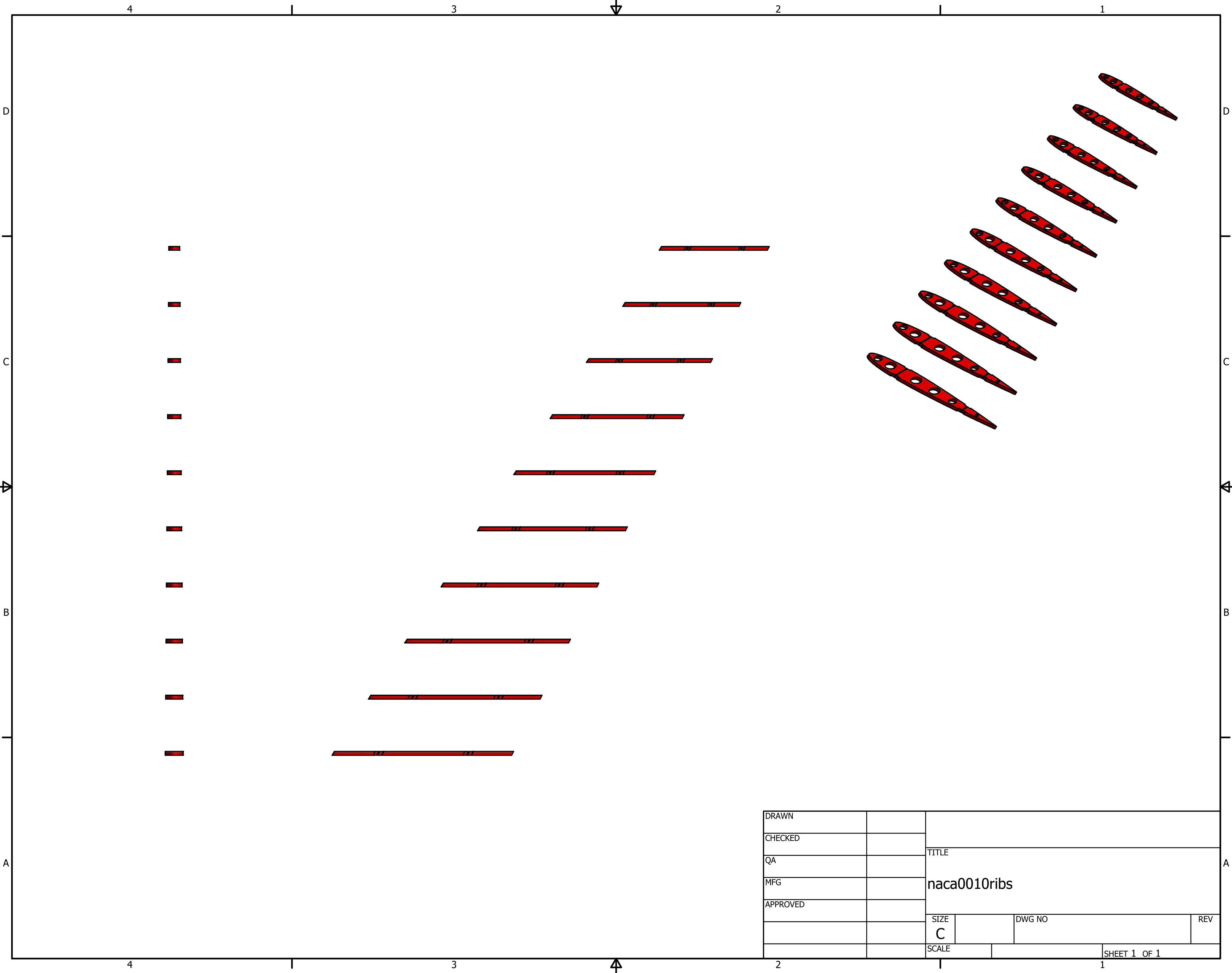
1447.755	-127.094
1490.84	-117.616
1532.483	-108.199
1572.571	-98.9029
1610.994	-89.7724
1647.647	-80.8619
1682.43	-72.2237
1715.248	-63.9039
1746.008	-55.9567
1774.629	-48.4284
1801.032	-41.3672
1825.142	-34.8175
1846.897	-28.8258
1866.233	-23.4305
1883.101	-18.6702
1897.453	-14.5799
1909.249	-11.1902
1918.457	-8.52824
1925.053	-6.60948
1929.018	-5.45321
1930.34	-5.06714

ΣΗΜΕΙΑ X-Y NACA 0025 PART 10

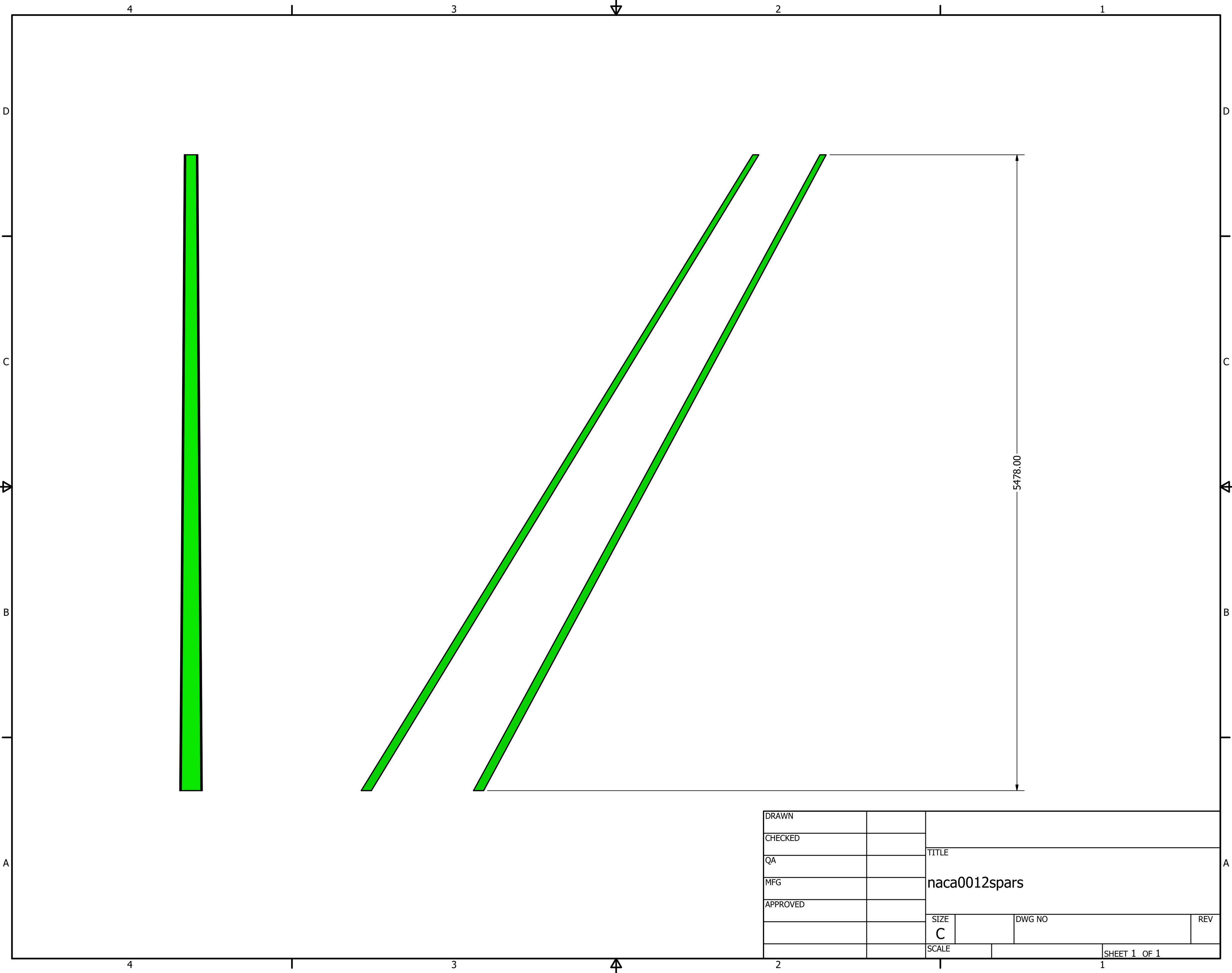
1936	5.082
1934.674	5.4692
1930.697	6.628864
1924.082	8.553248
1914.847	11.22299
1903.016	14.62261
1888.622	18.72499
1871.705	23.49917
1852.313	28.91029
1830.494	34.91963
1806.313	41.48848
1779.833	48.57037
1751.127	56.12077
1720.277	64.09128
1687.363	72.43544
1652.479	81.09904
1615.718	90.03562
1577.182	99.1929
1536.977	108.5167
1495.212	117.9605
1452	127.4662
1407.462	136.9817
1361.72	146.4526
1314.9	155.8228
1267.127	165.0343
1218.538	174.027
1169.259	182.739
1119.428	191.1122
1069.183	199.0769
1018.661	206.5712
968	213.5253
917.3388	219.8754
866.8169	225.5556
816.5719	230.4982
766.7412	234.6393
717.4622	237.9208
668.8725	240.2847
621.0998	241.6806
574.2796	242.06
528.5377	241.3882
484	239.6303
440.7885	236.7651
399.0232	232.7808
358.8182	227.6697
320.2822	221.4397
283.5214	214.1022
248.6366	205.6826
215.7227	196.2136
184.8725	185.7302
156.1674	174.2826

129.6868	161.9193
105.5062	148.6945
83.68747	134.6682
64.29456	119.8965
47.37779	104.4356
32.98363	88.34355
21.15274	71.67072
11.91802	54.46355
5.302704	36.76077
1.32616	18.59915
0	0
1.32616	-18.5992
5.302704	-36.7608
11.91802	-54.4636
21.15274	-71.6707
32.98363	-88.3436
47.37779	-104.436
64.29456	-119.896
83.68747	-134.668
105.5062	-148.694
129.6868	-161.919
156.1674	-174.283
184.8725	-185.73
215.7227	-196.214
248.6366	-205.683
283.5214	-214.102
320.2822	-221.44
358.8182	-227.67
399.0232	-232.781
440.7885	-236.765
484	-239.63
528.5377	-241.388
574.2796	-242.06
621.0998	-241.681
668.8725	-240.285
717.4622	-237.921
766.7412	-234.639
816.5719	-230.498
866.8169	-225.556
917.3388	-219.875
968	-213.525
1018.661	-206.571
1069.183	-199.077
1119.428	-191.112
1169.259	-182.739
1218.538	-174.027
1267.127	-165.034
1314.9	-155.823
1361.72	-146.453
1407.462	-136.982

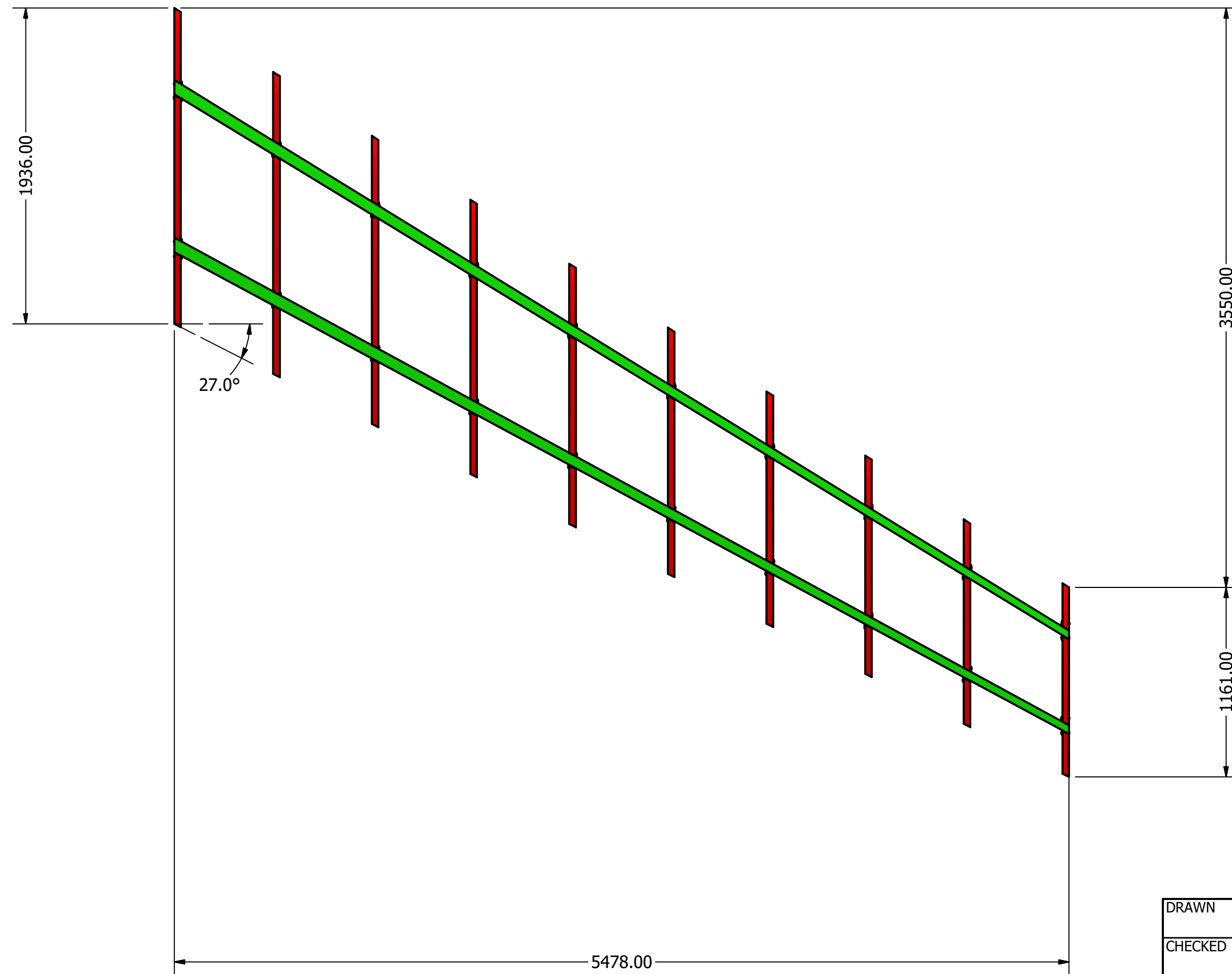
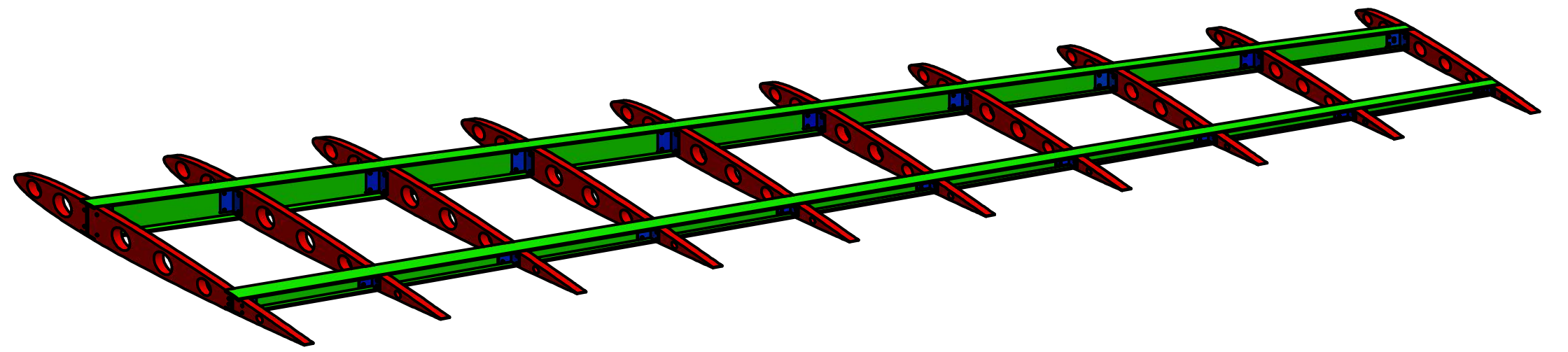
1452	-127.466
1495.212	-117.96
1536.977	-108.517
1577.182	-99.1929
1615.718	-90.0356
1652.479	-81.099
1687.363	-72.4354
1720.277	-64.0913
1751.127	-56.1208
1779.833	-48.5704
1806.313	-41.4885
1830.494	-34.9196
1852.313	-28.9103
1871.705	-23.4992
1888.622	-18.725
1903.016	-14.6226
1914.847	-11.223
1924.082	-8.55325
1930.697	-6.62886
1934.674	-5.4692
1936	-5.082



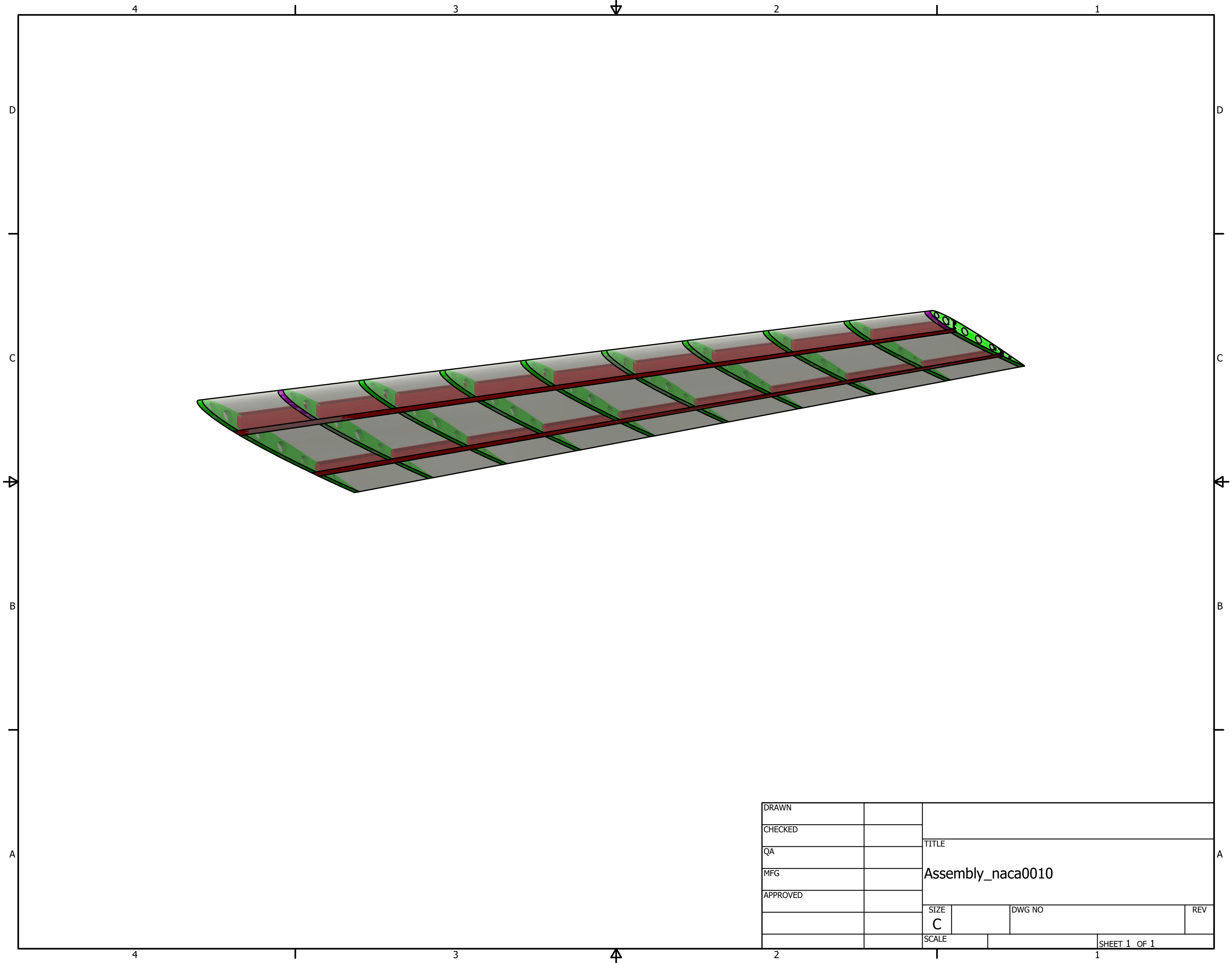
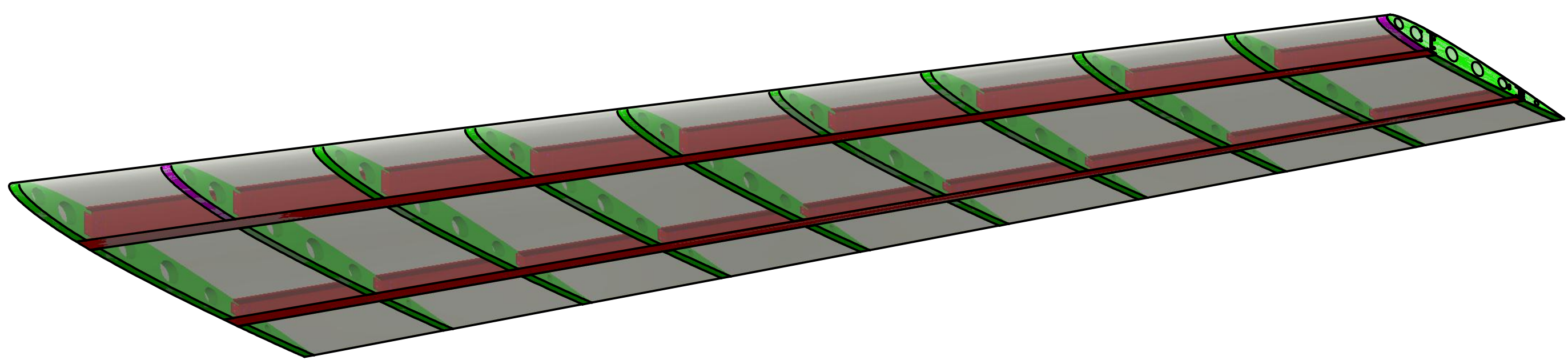
DRAWN		TITLE		
CHECKED		naca0010ribs		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



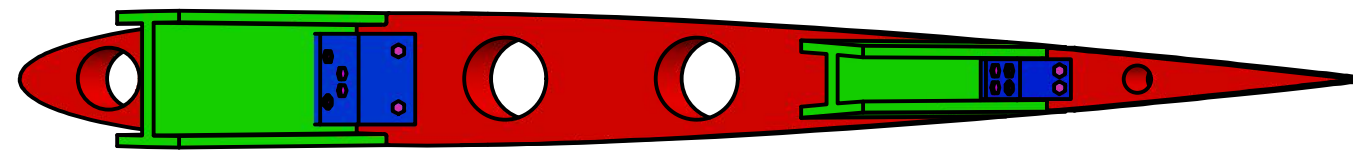
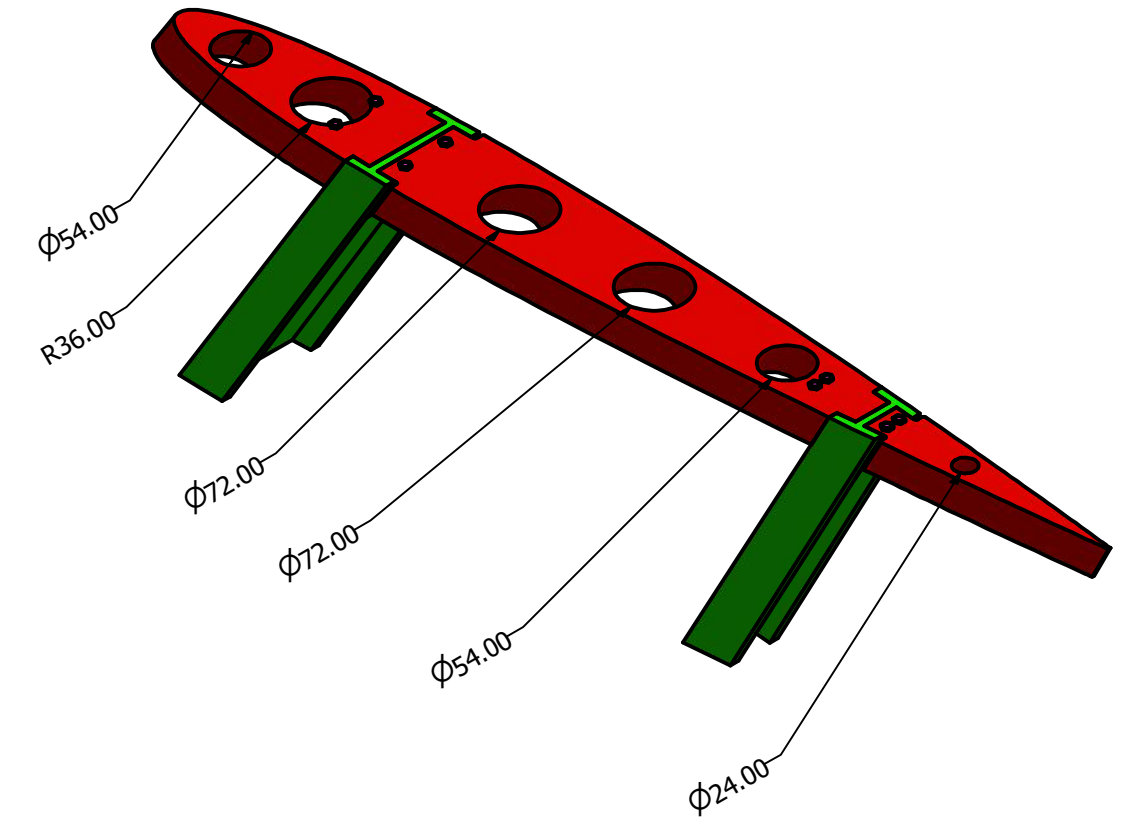
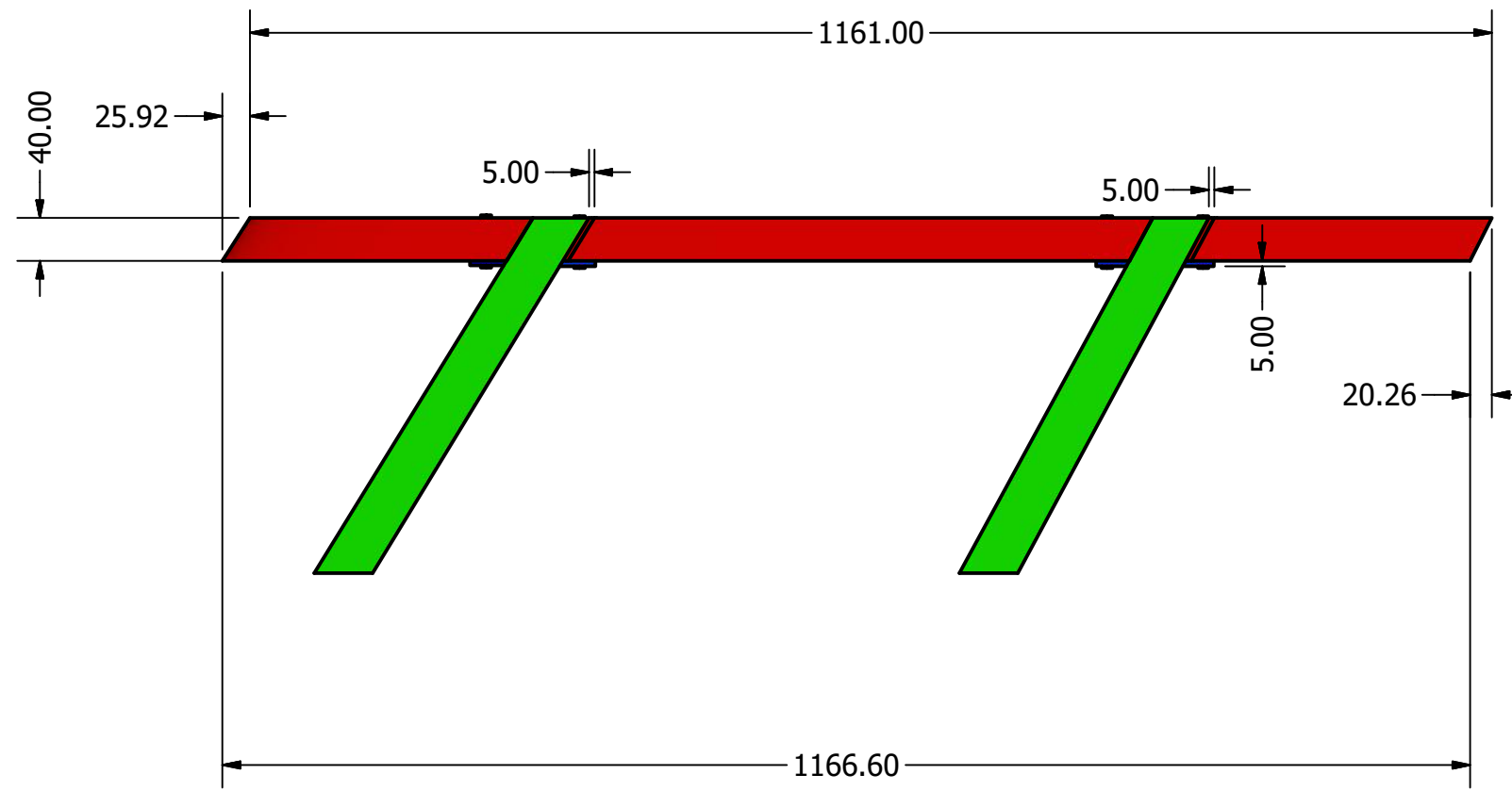
DRAWN		TITLE		
CHECKED		naca0012spars		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



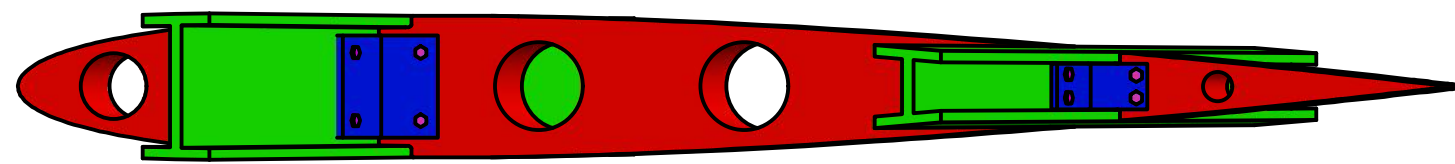
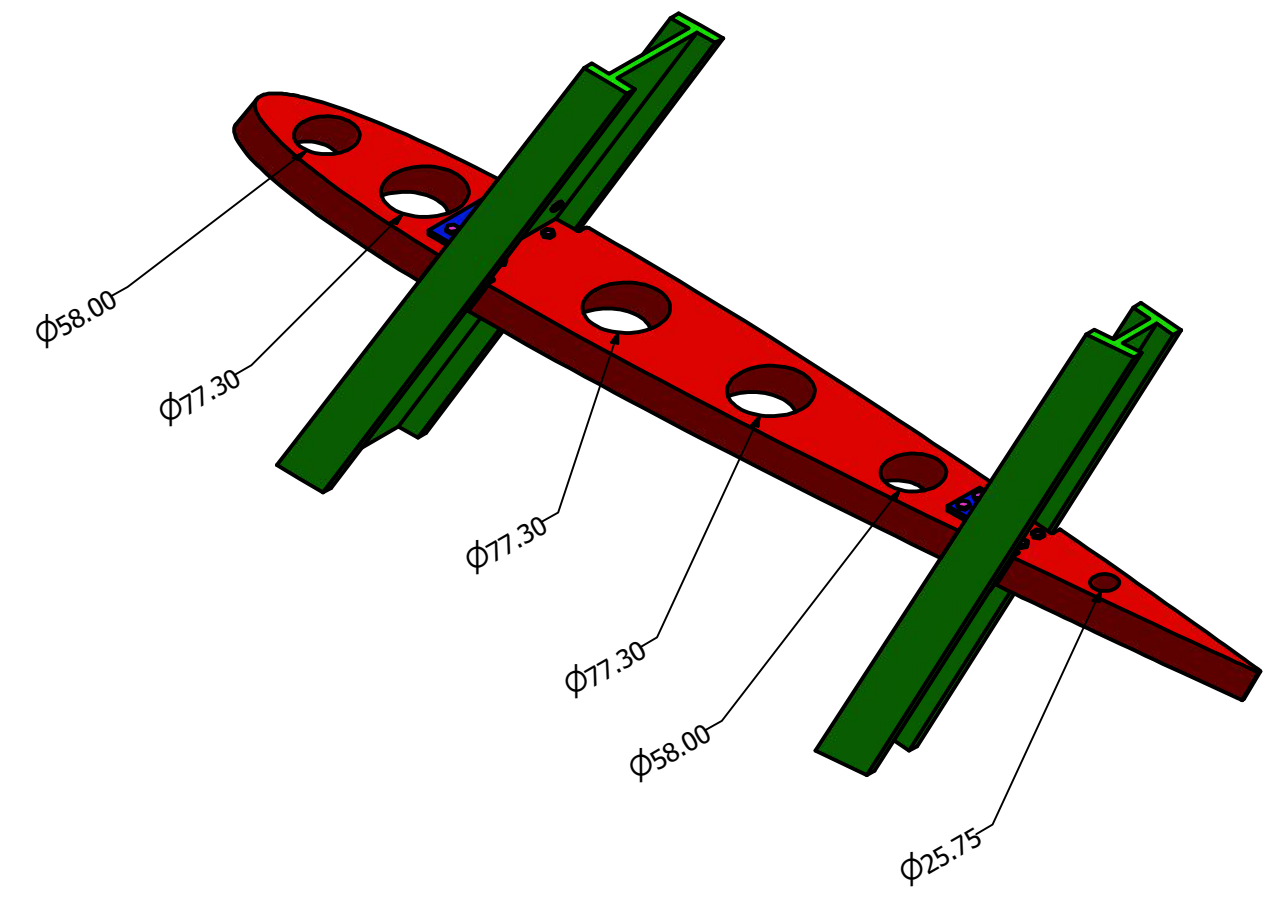
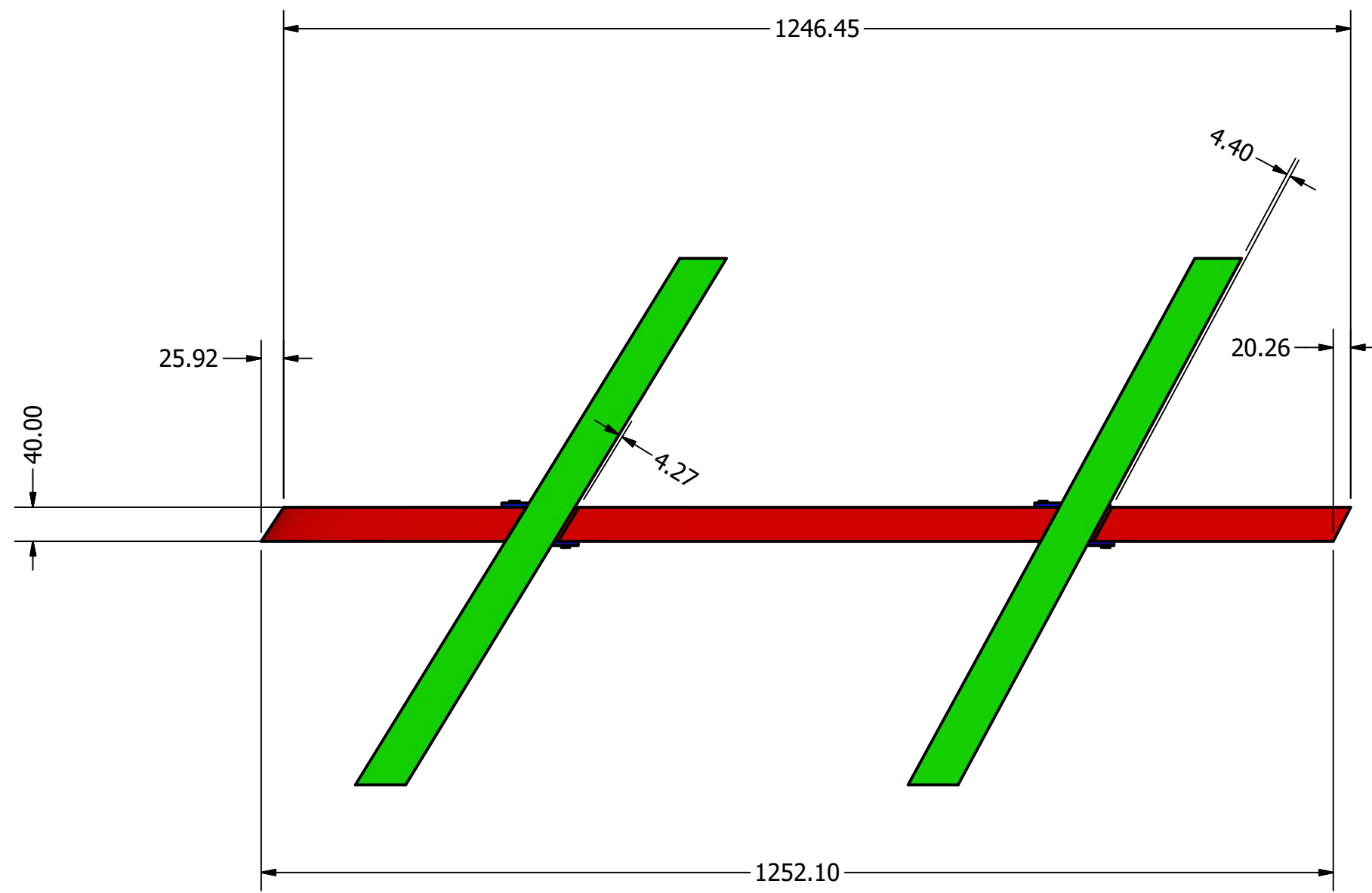
DRAWN		TITLE		
CHECKED		Assembly_naca0010.idw		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



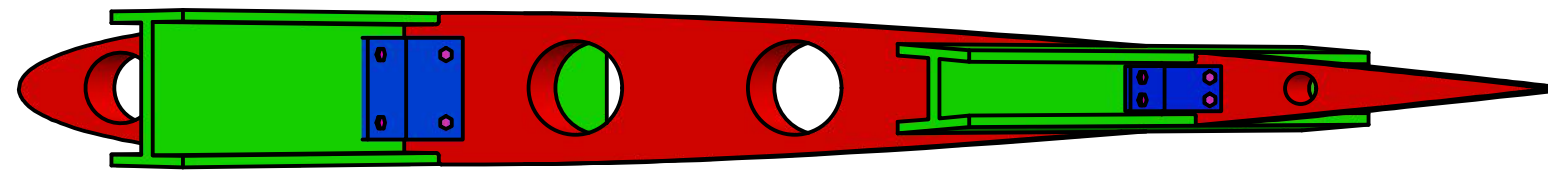
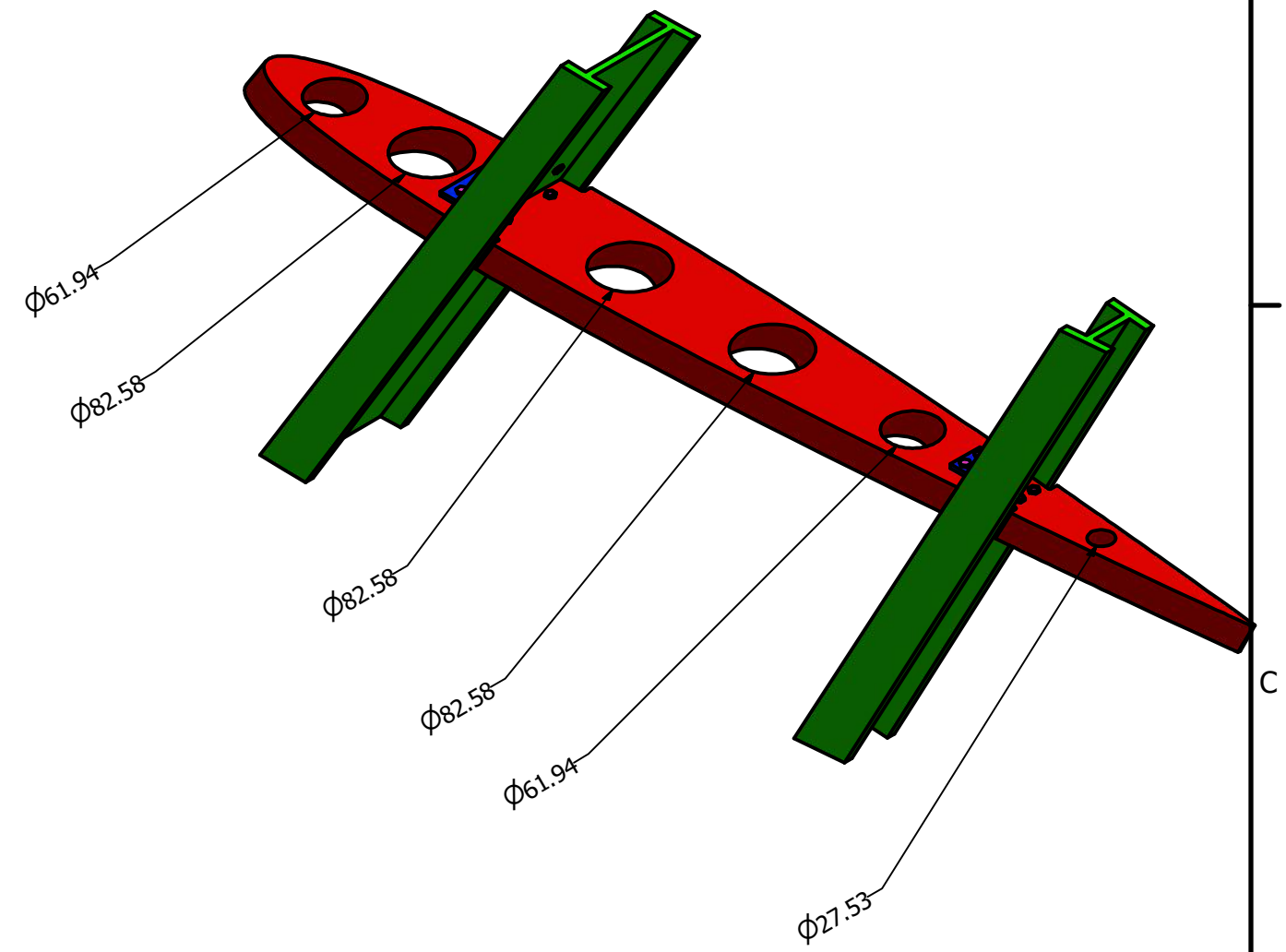
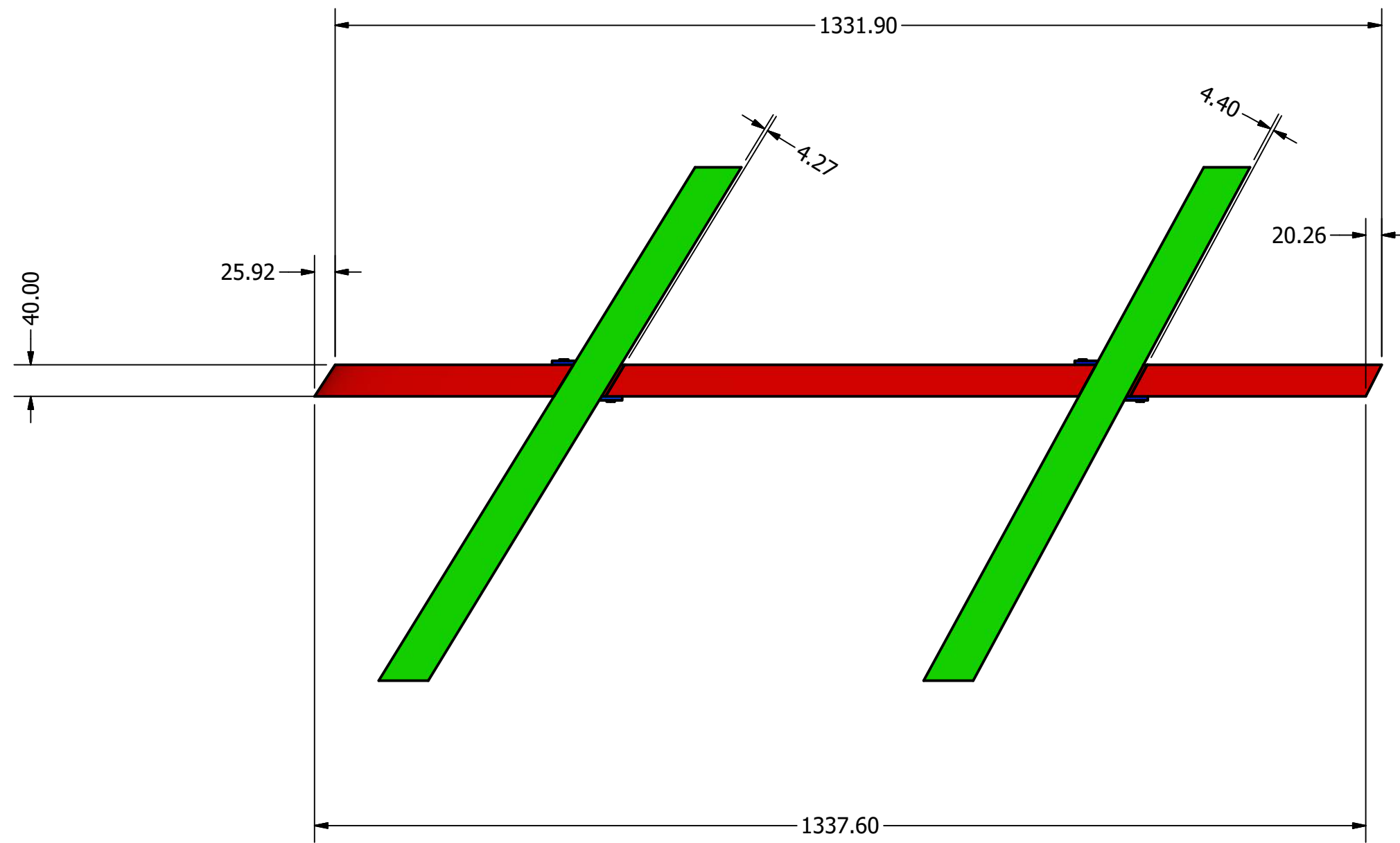
DRAWN		TITLE		
CHECKED		Assembly_naca0010		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



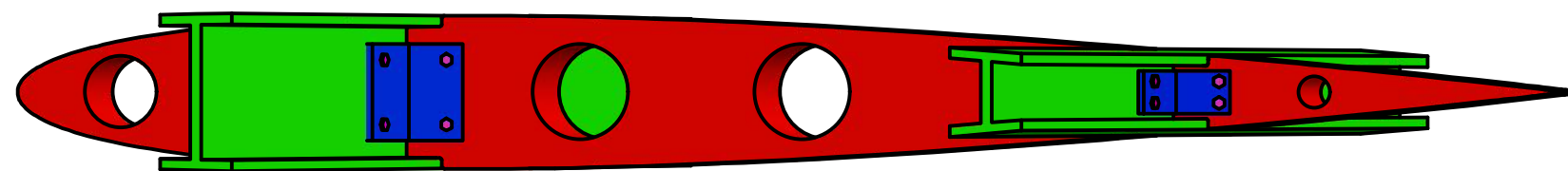
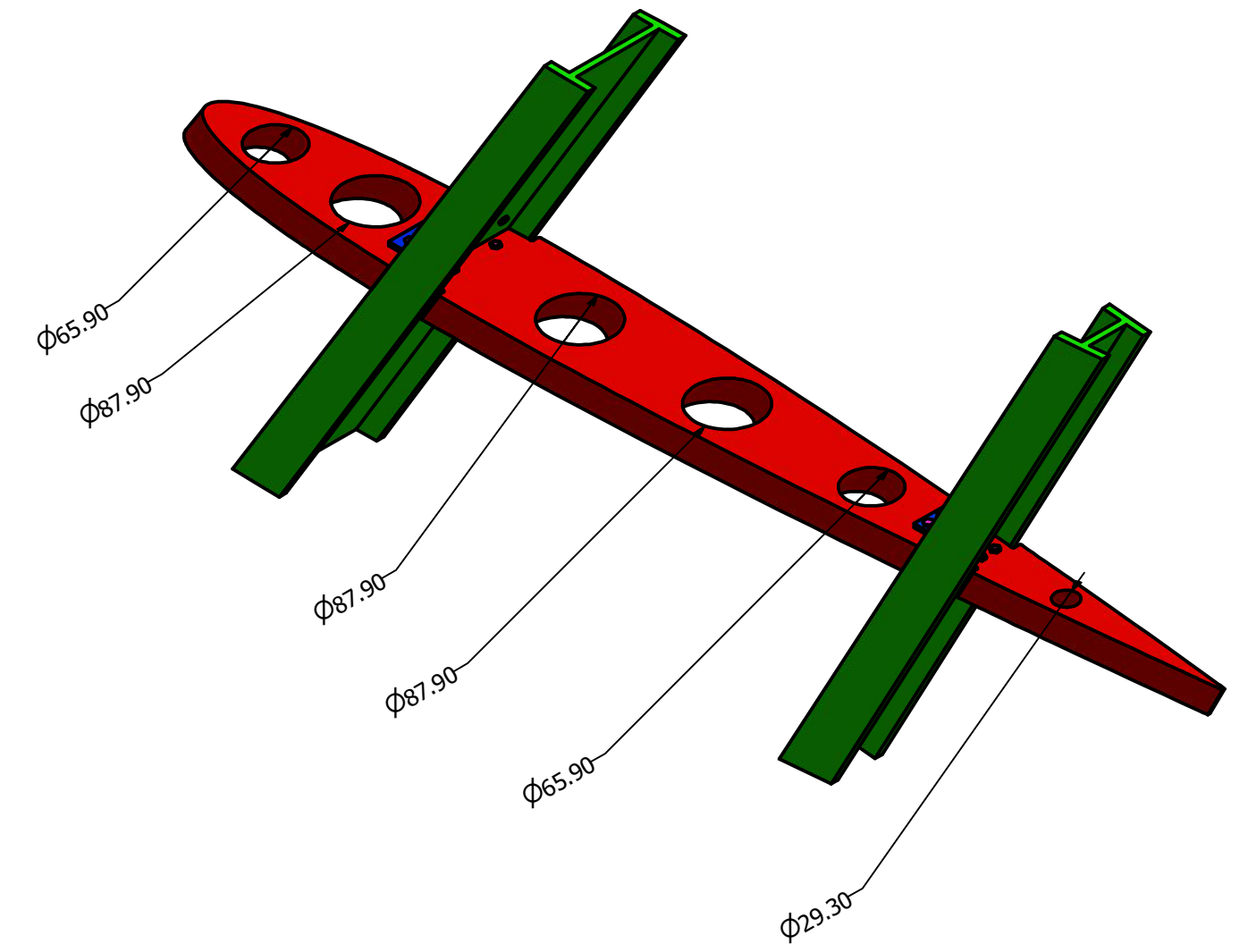
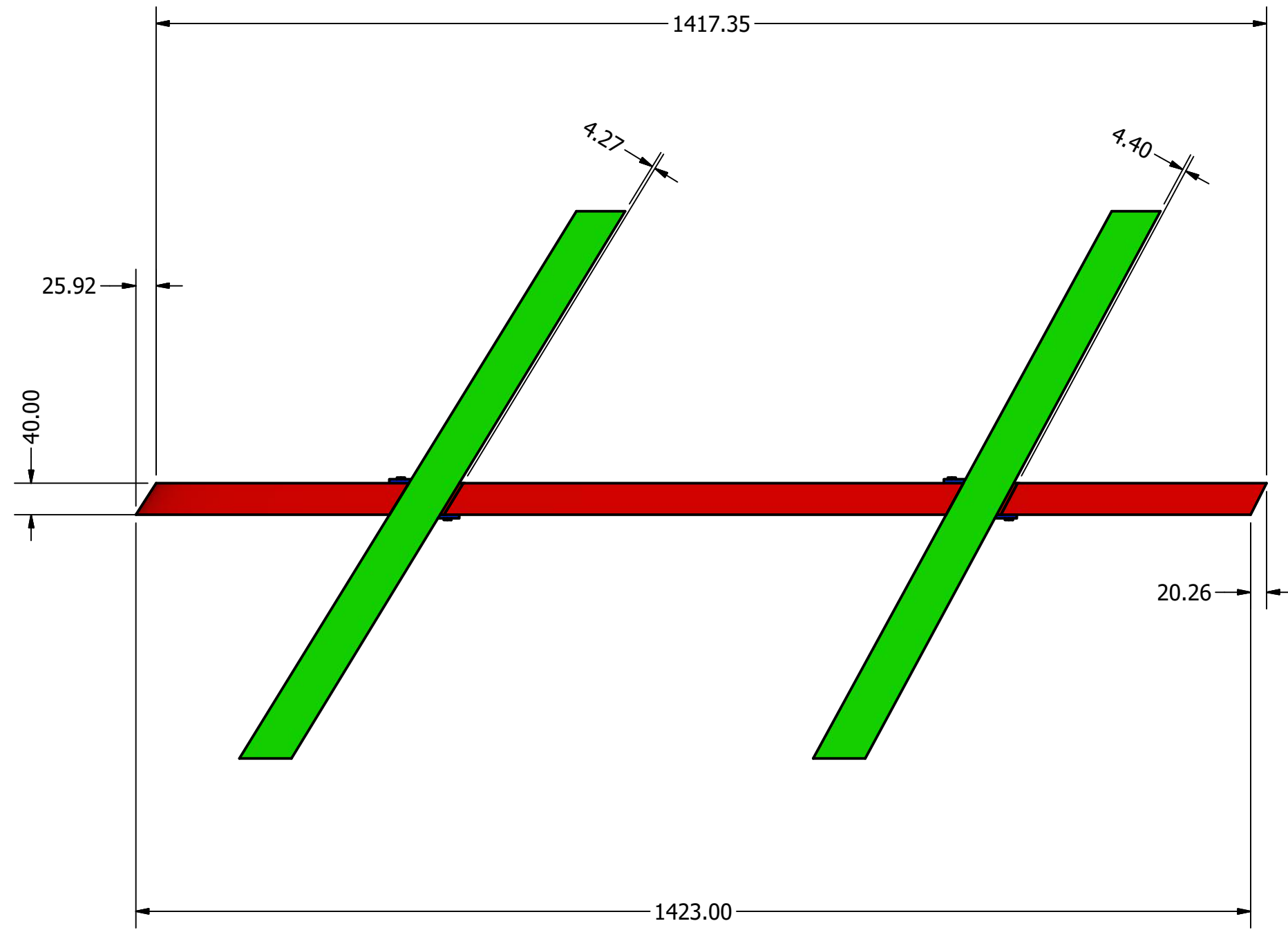
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



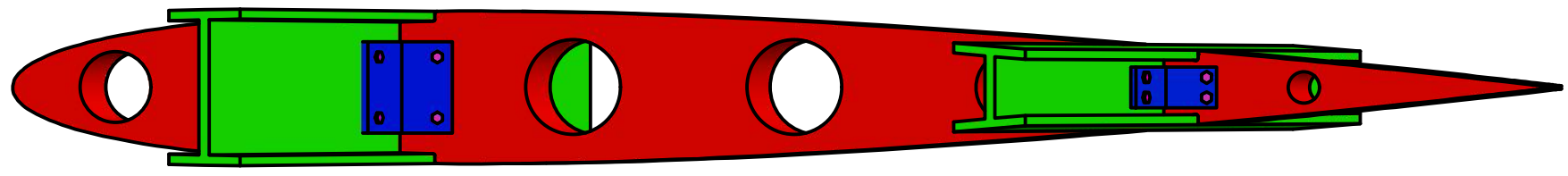
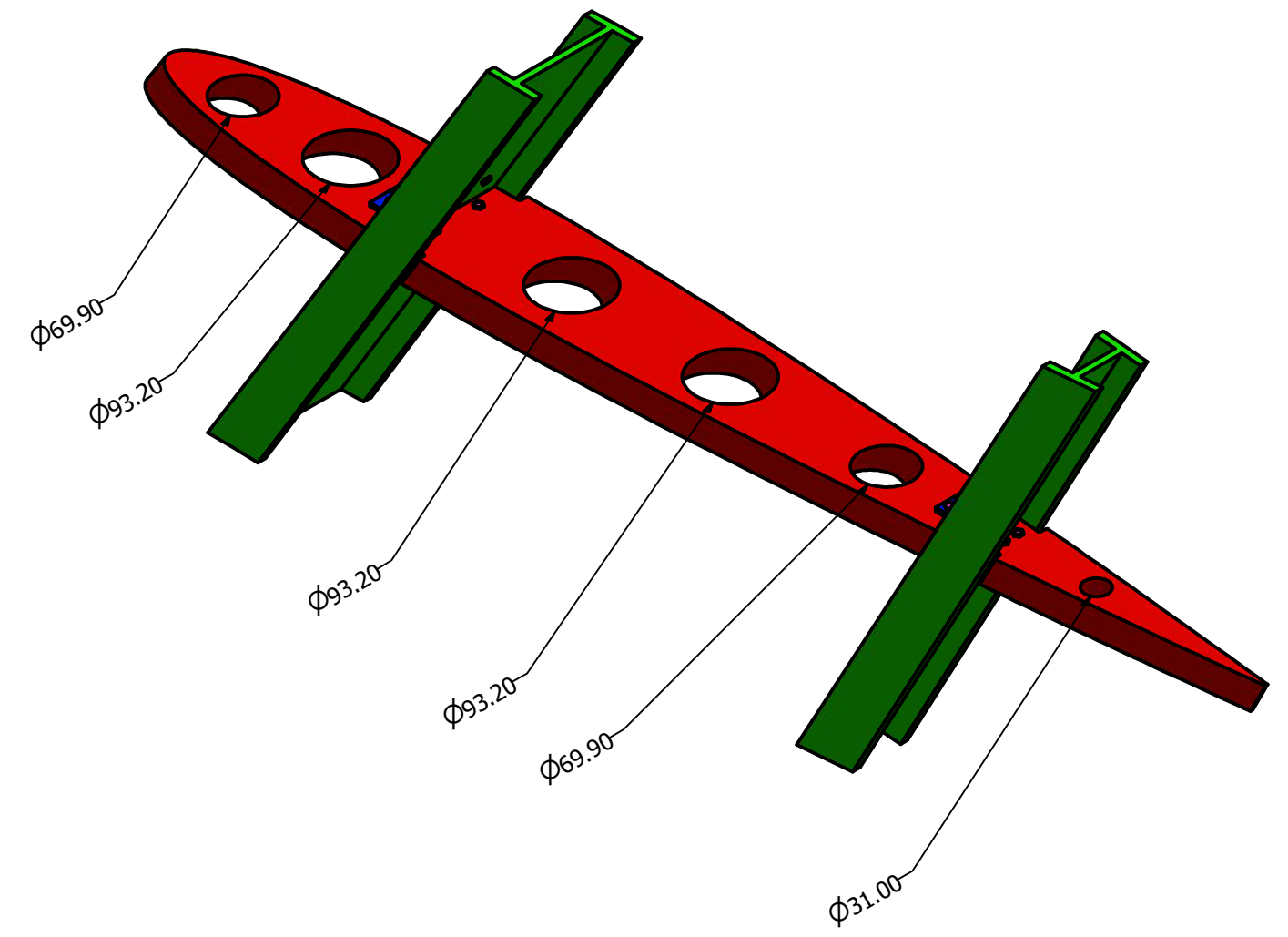
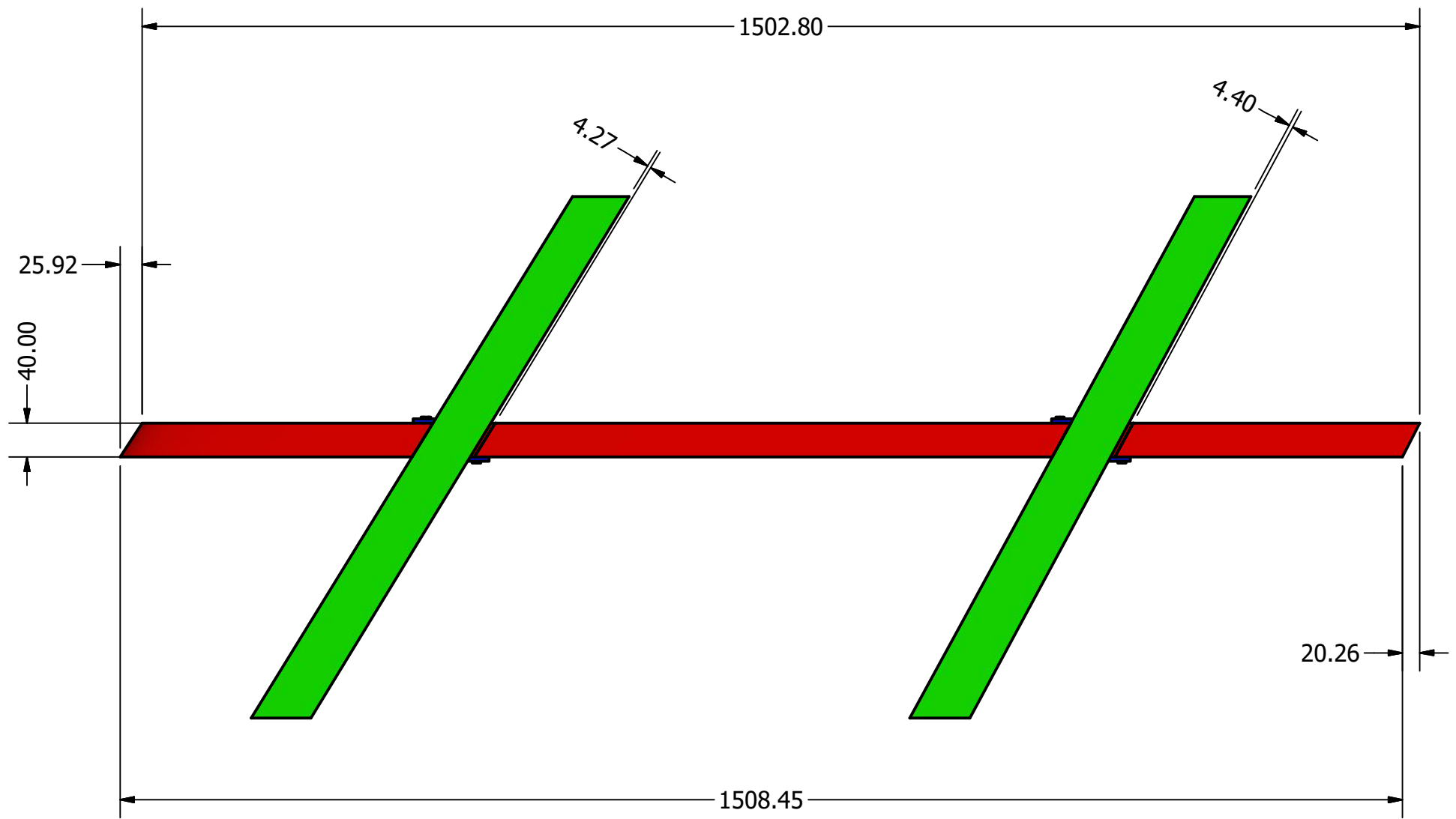
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



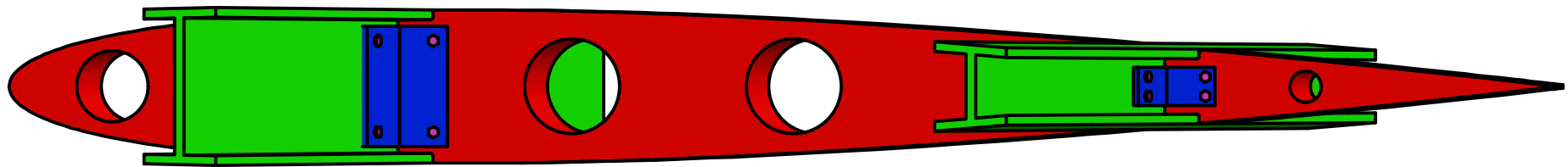
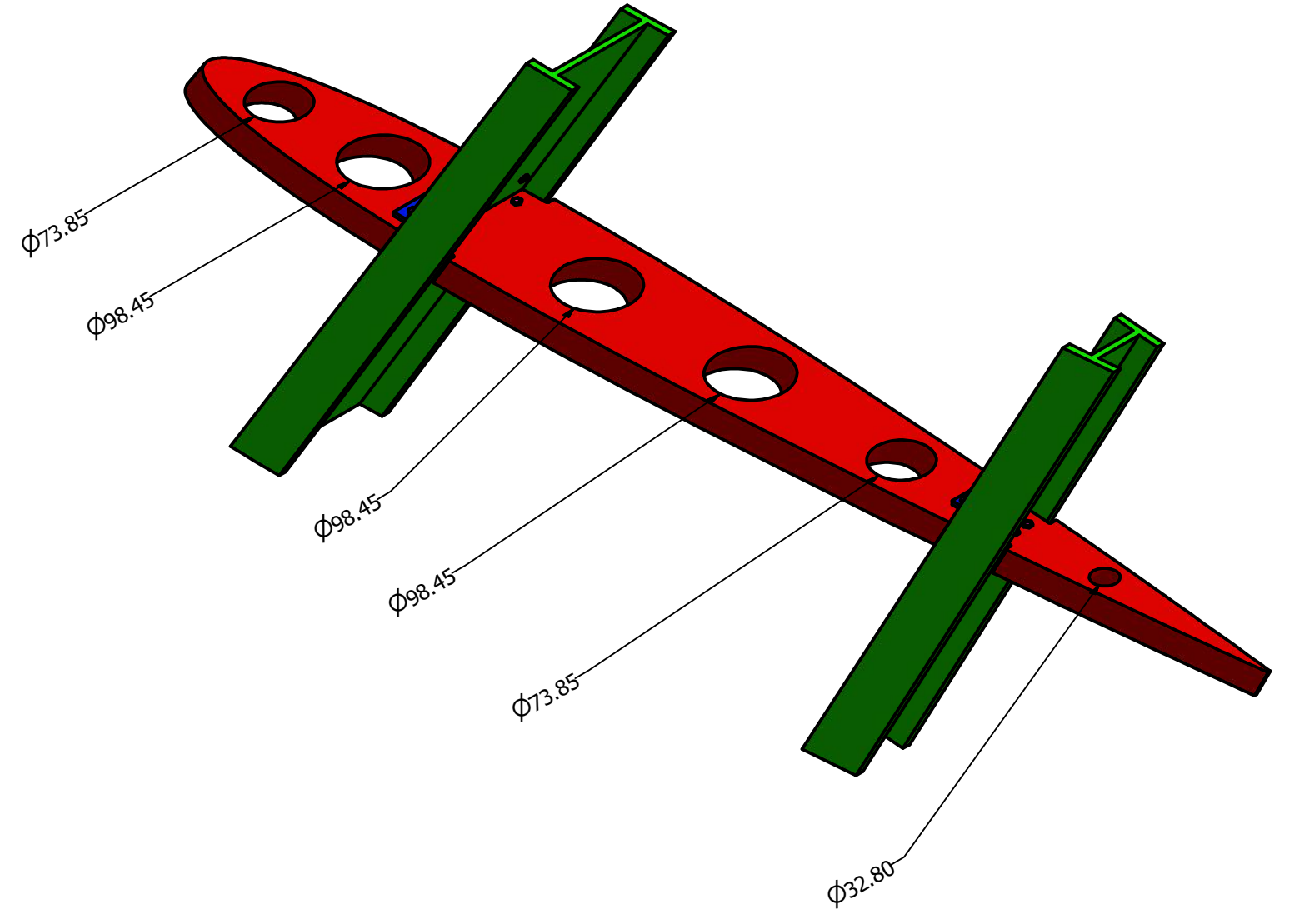
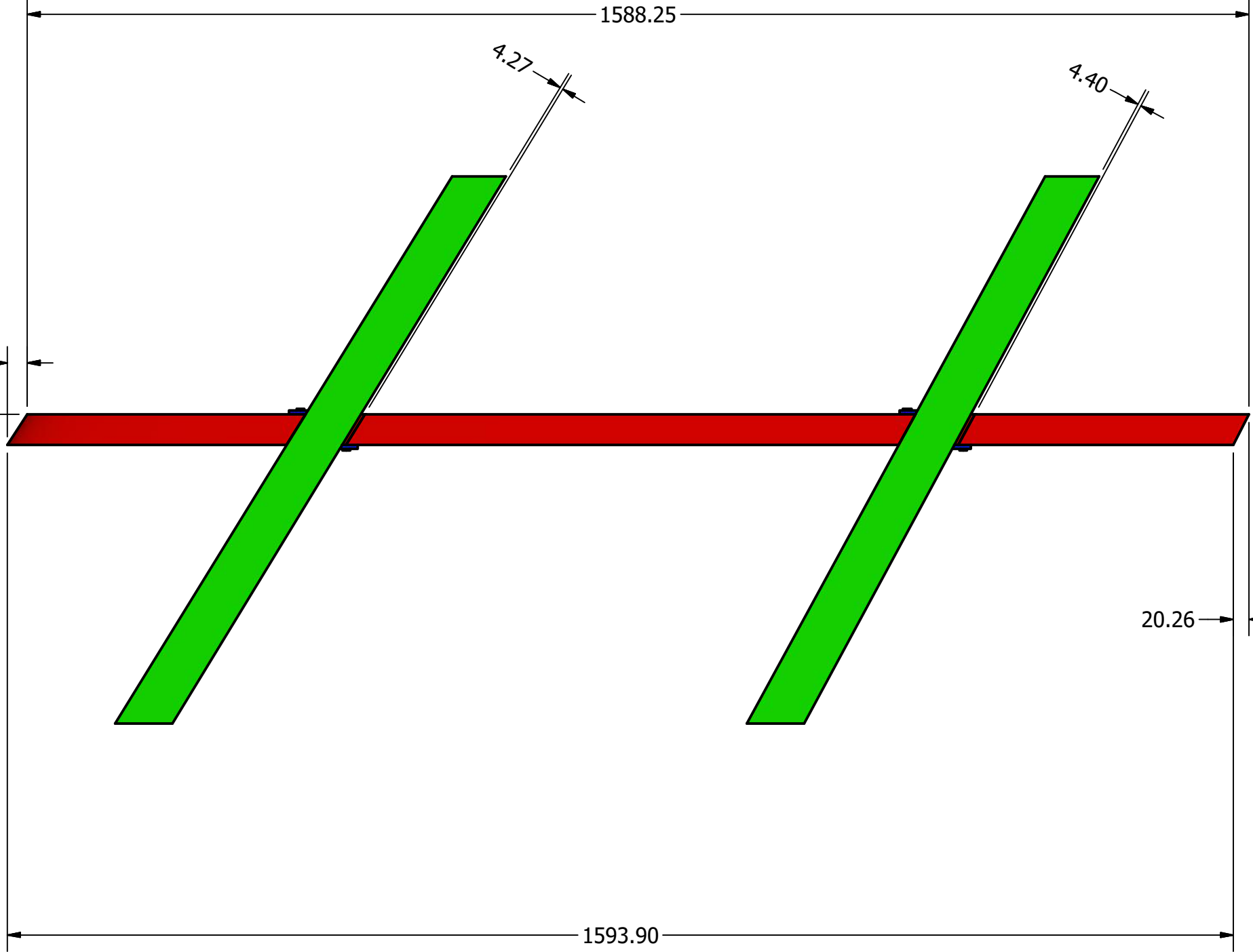
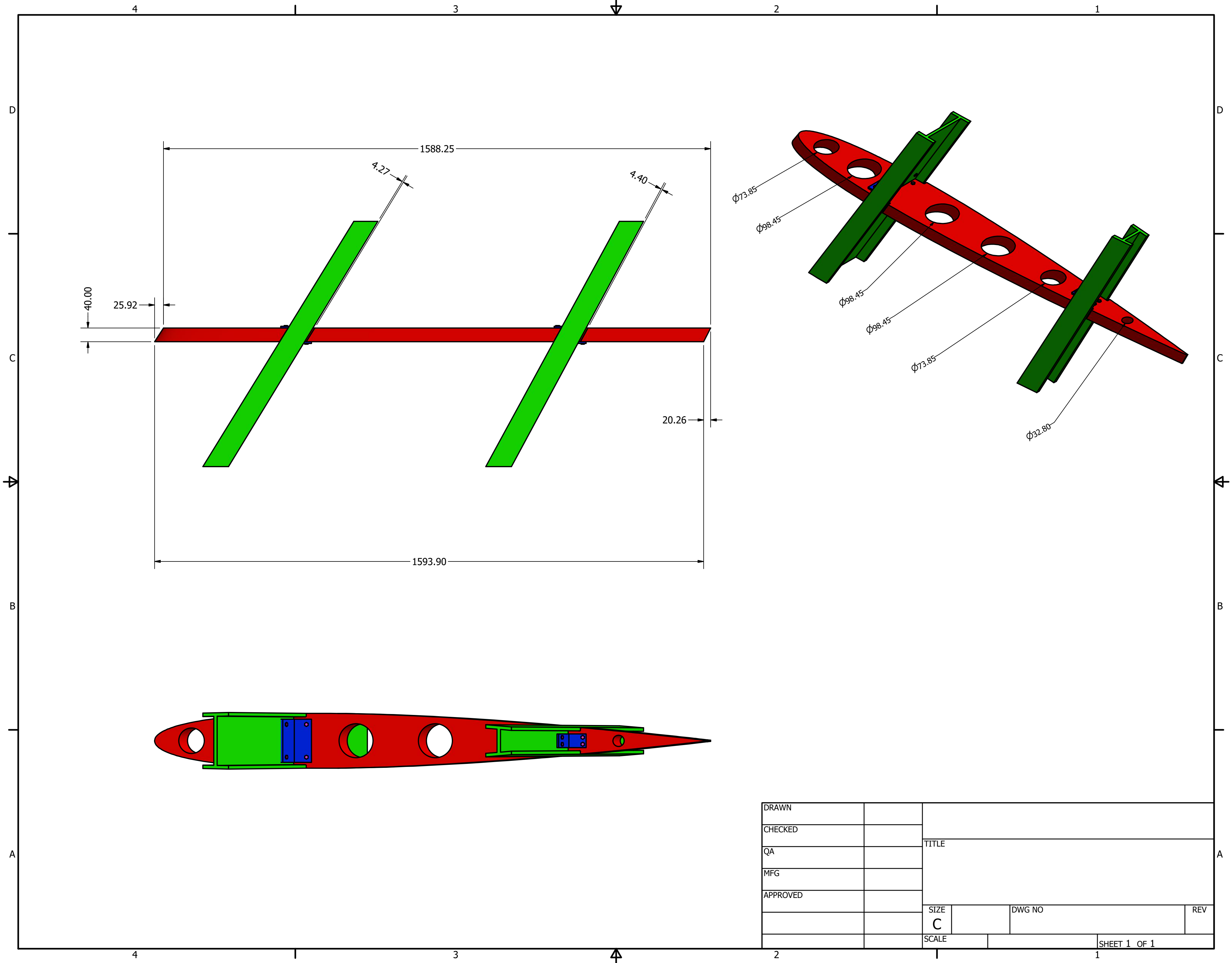
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



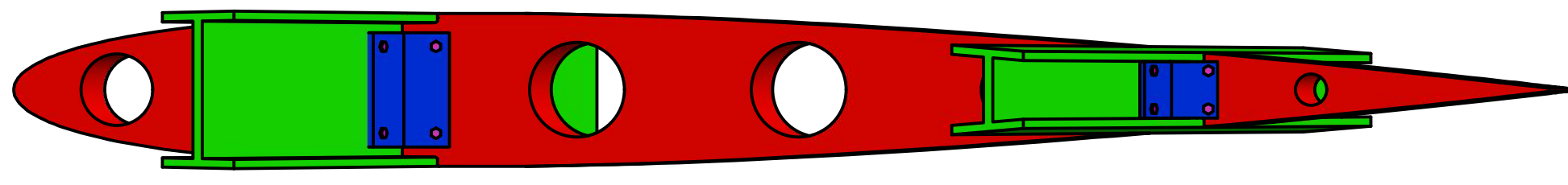
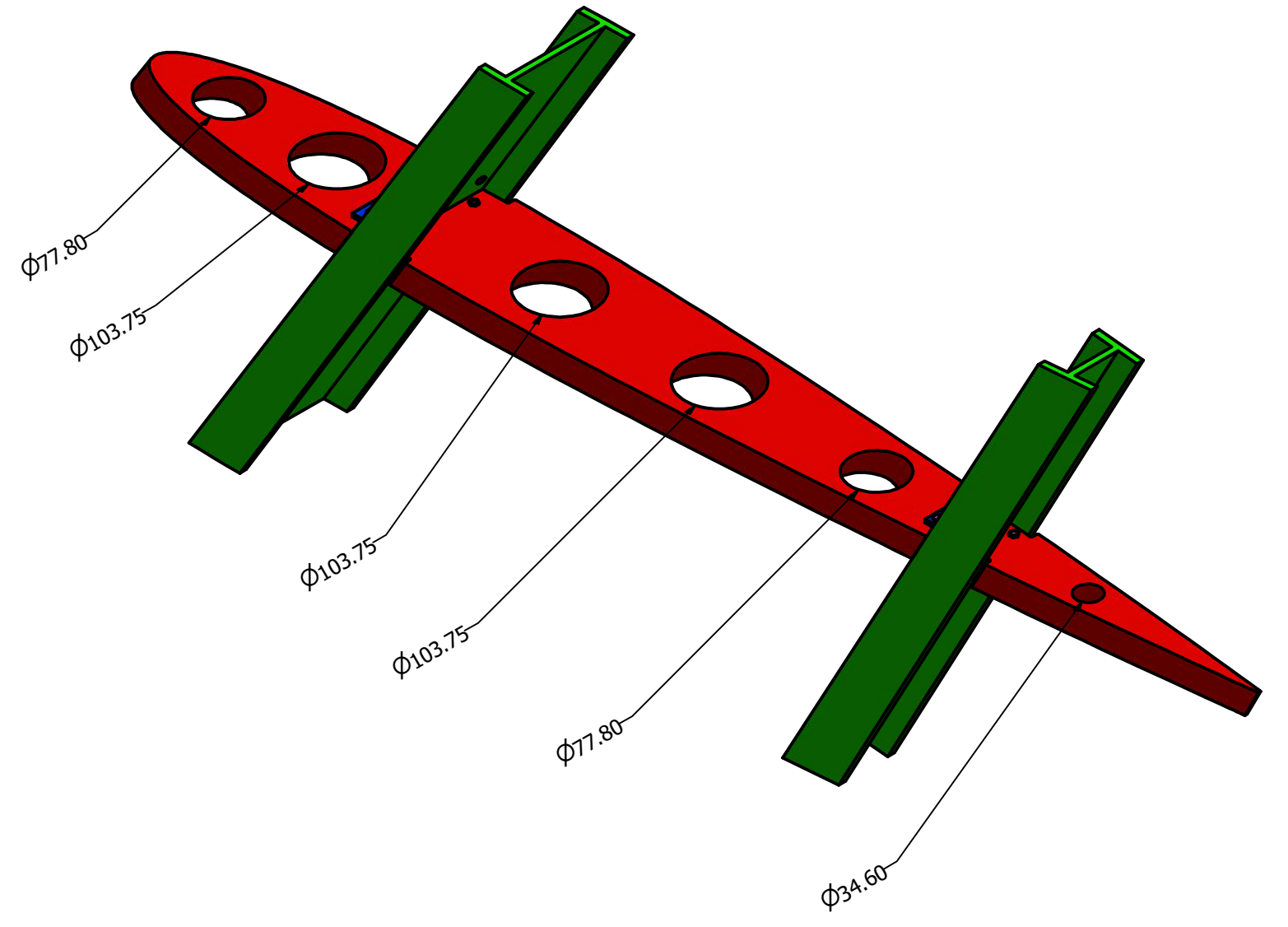
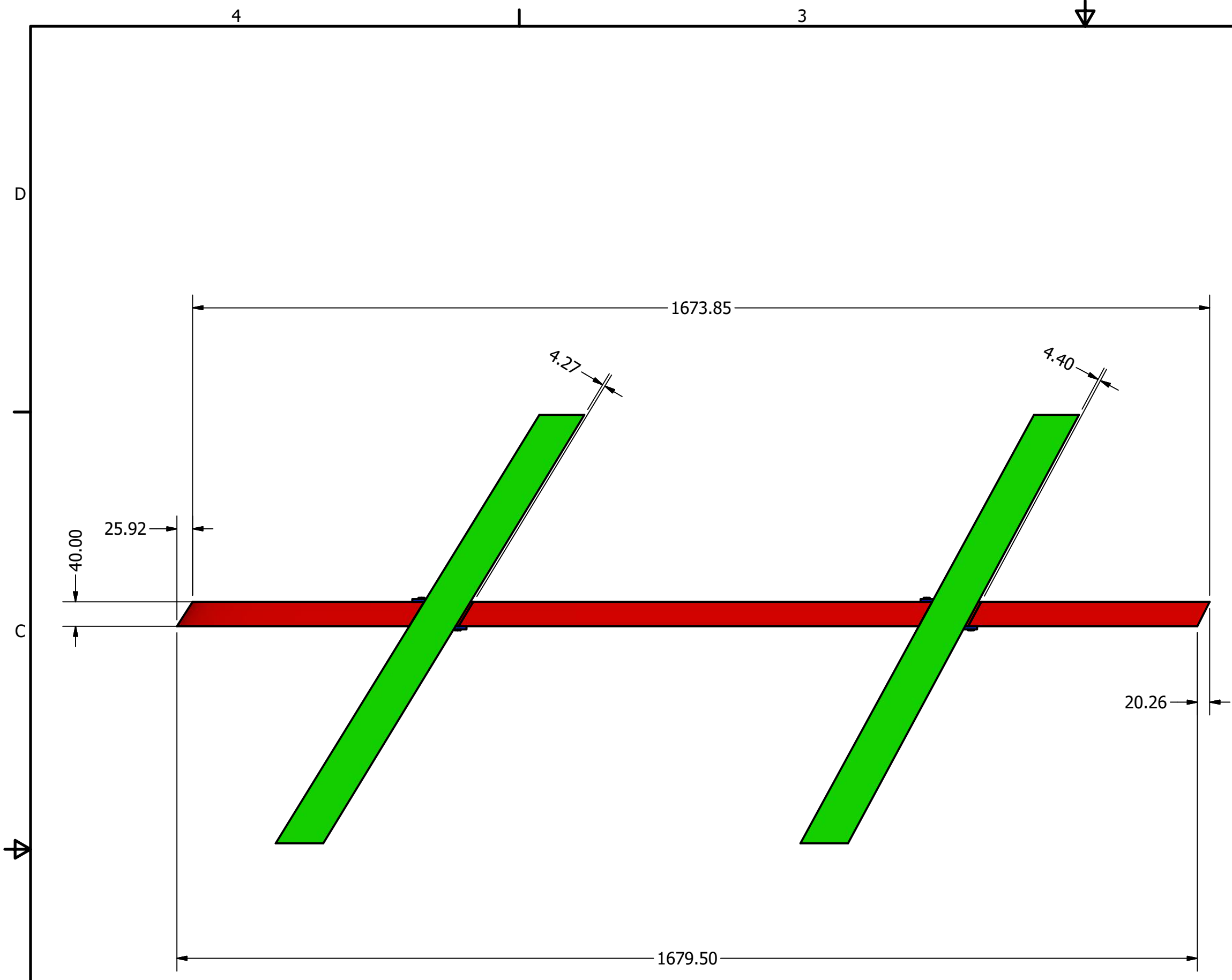
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



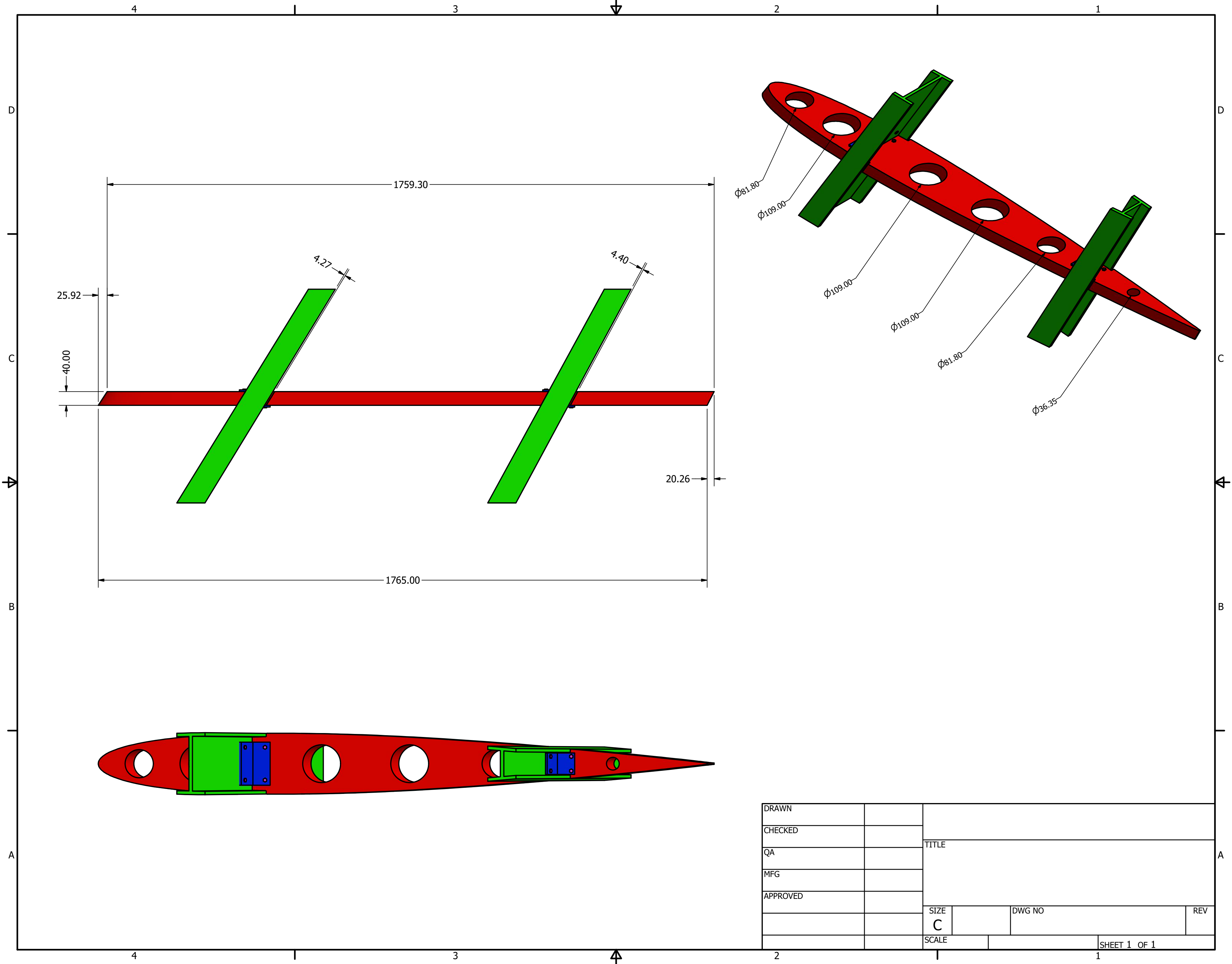
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



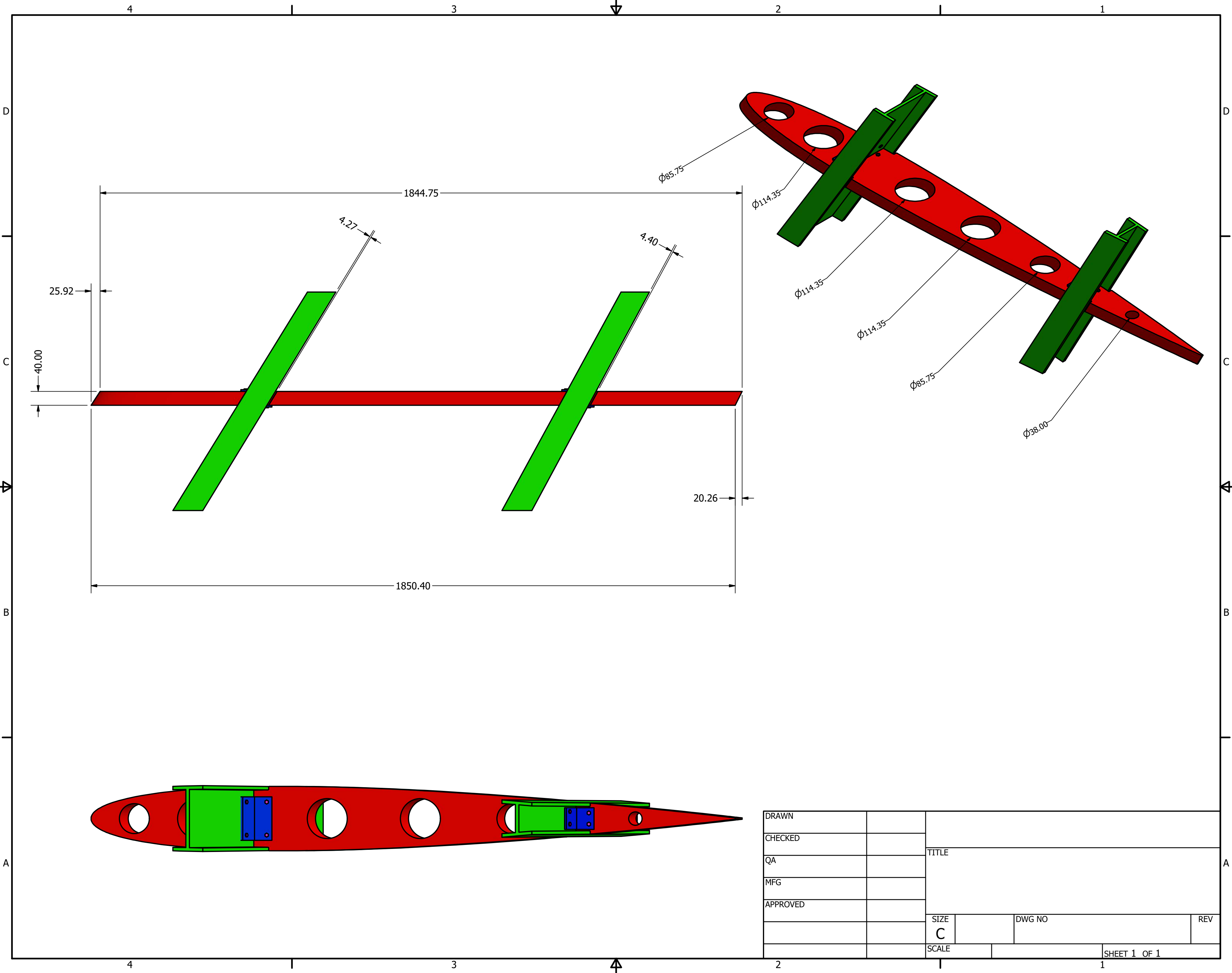
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



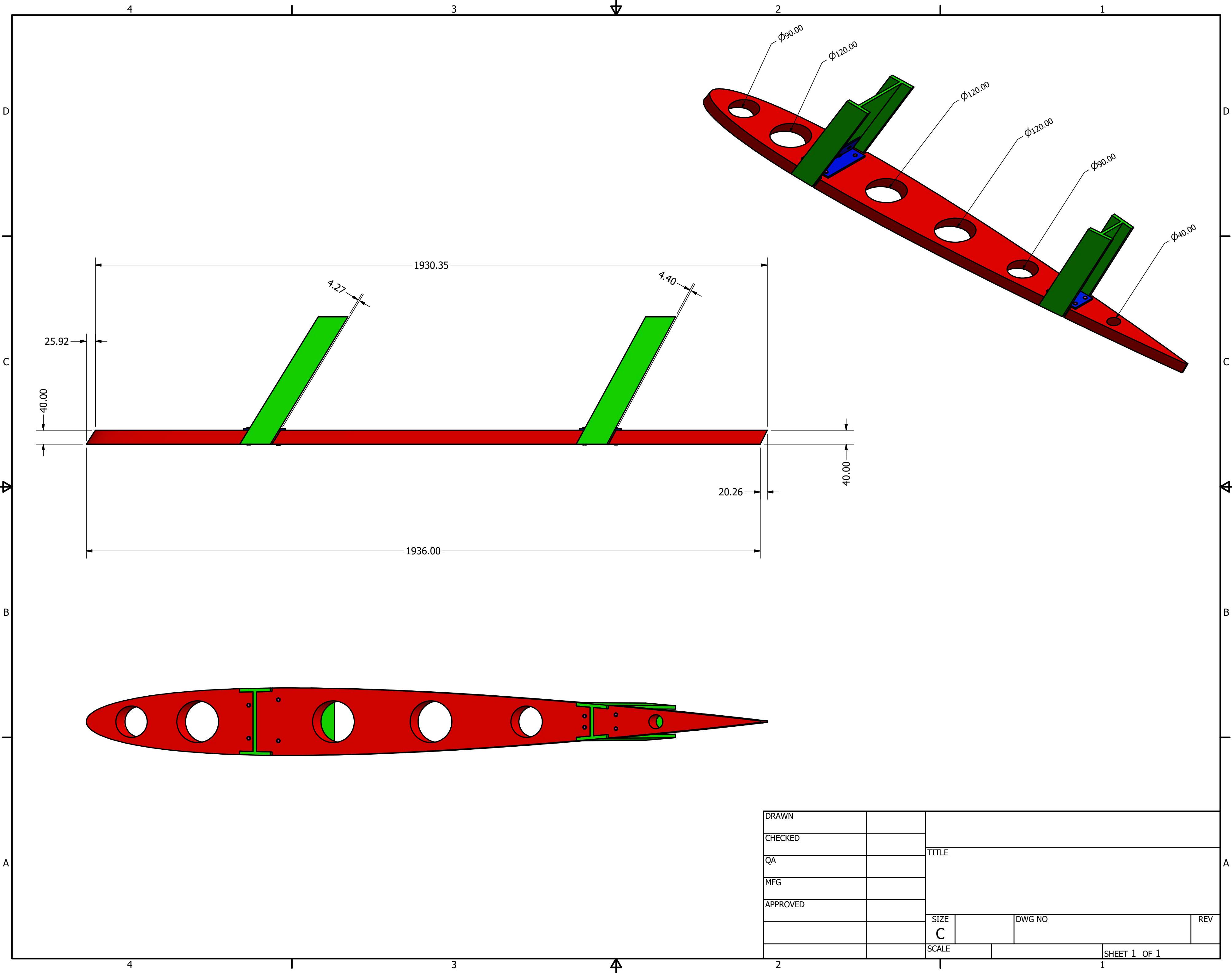
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



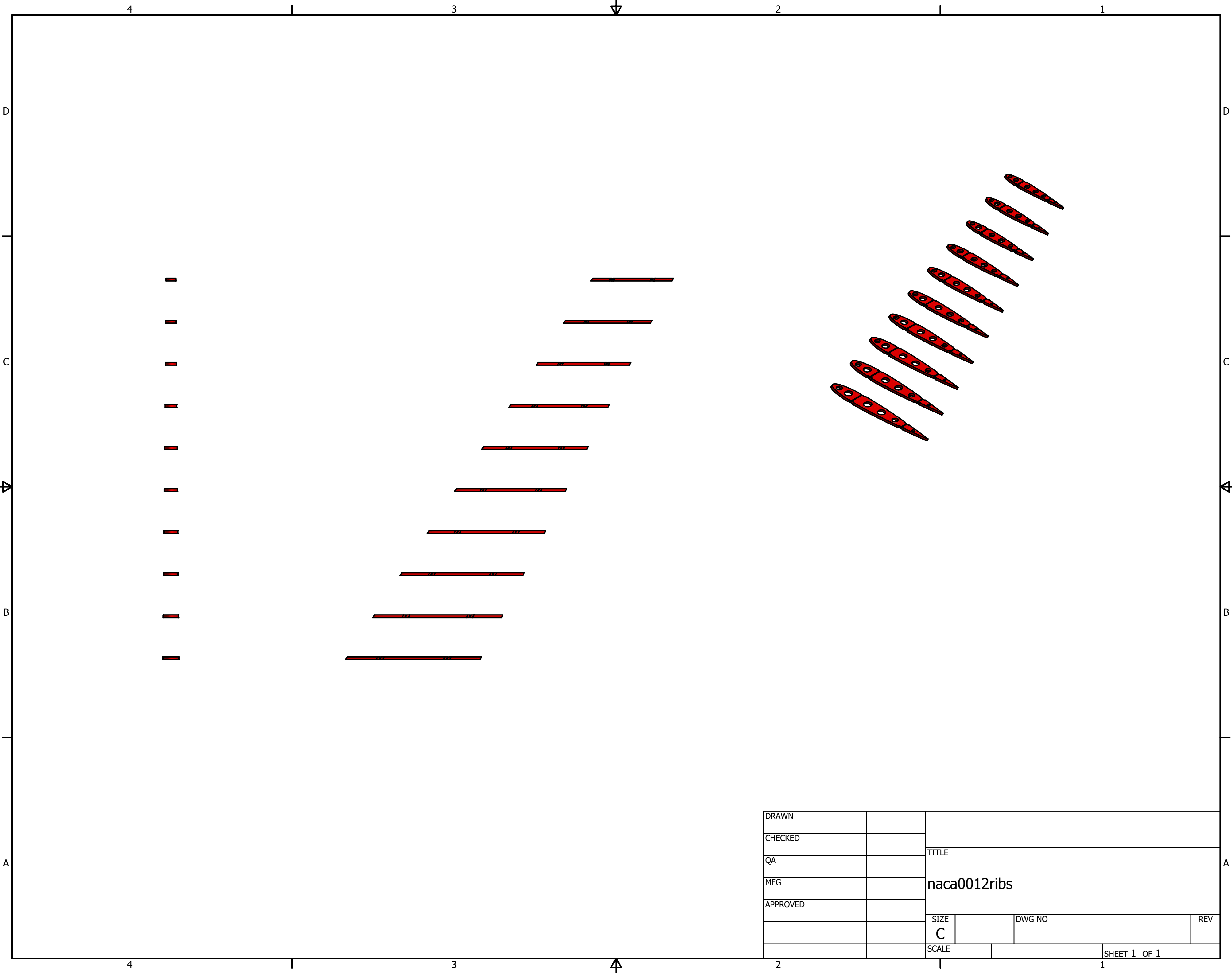
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



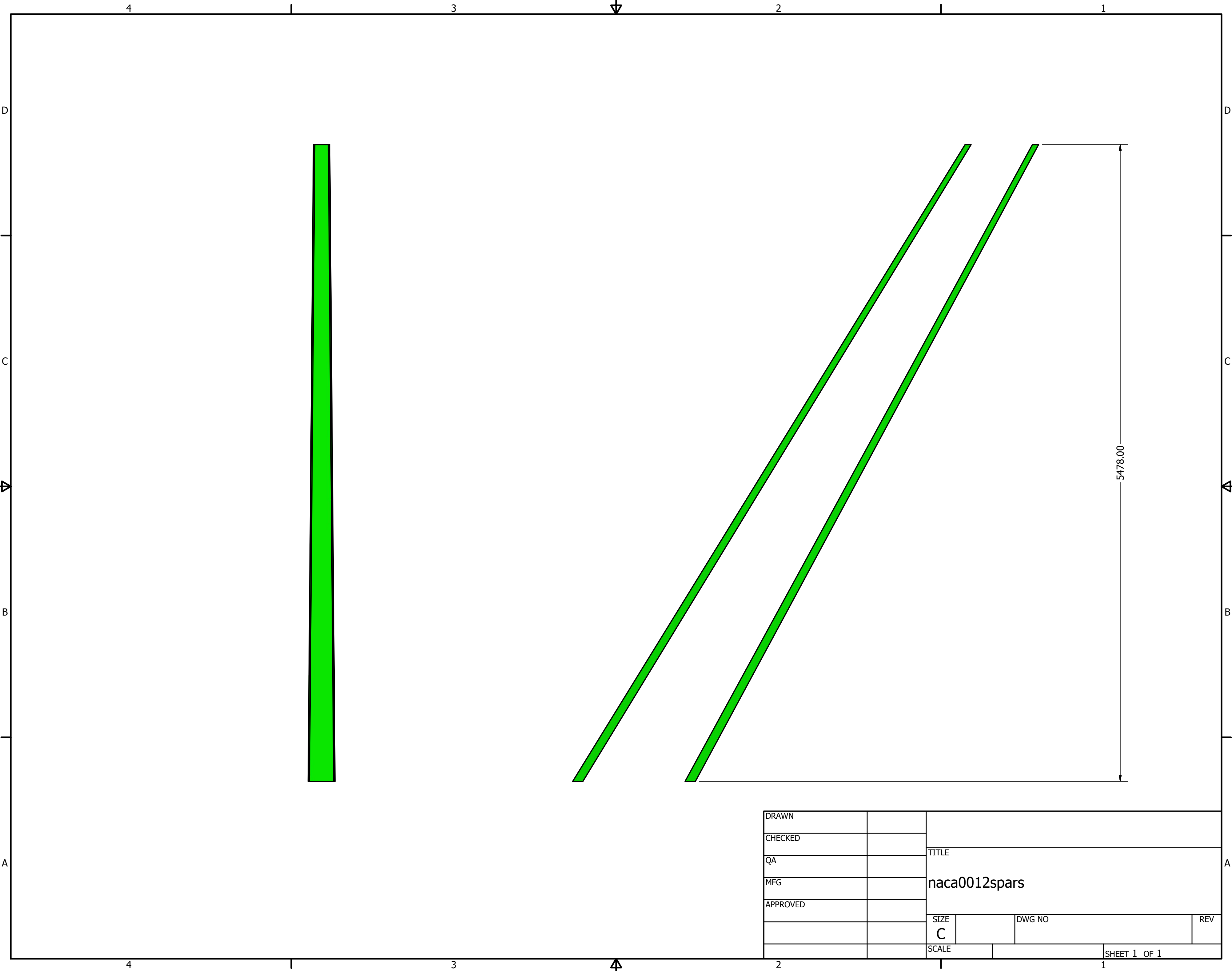
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



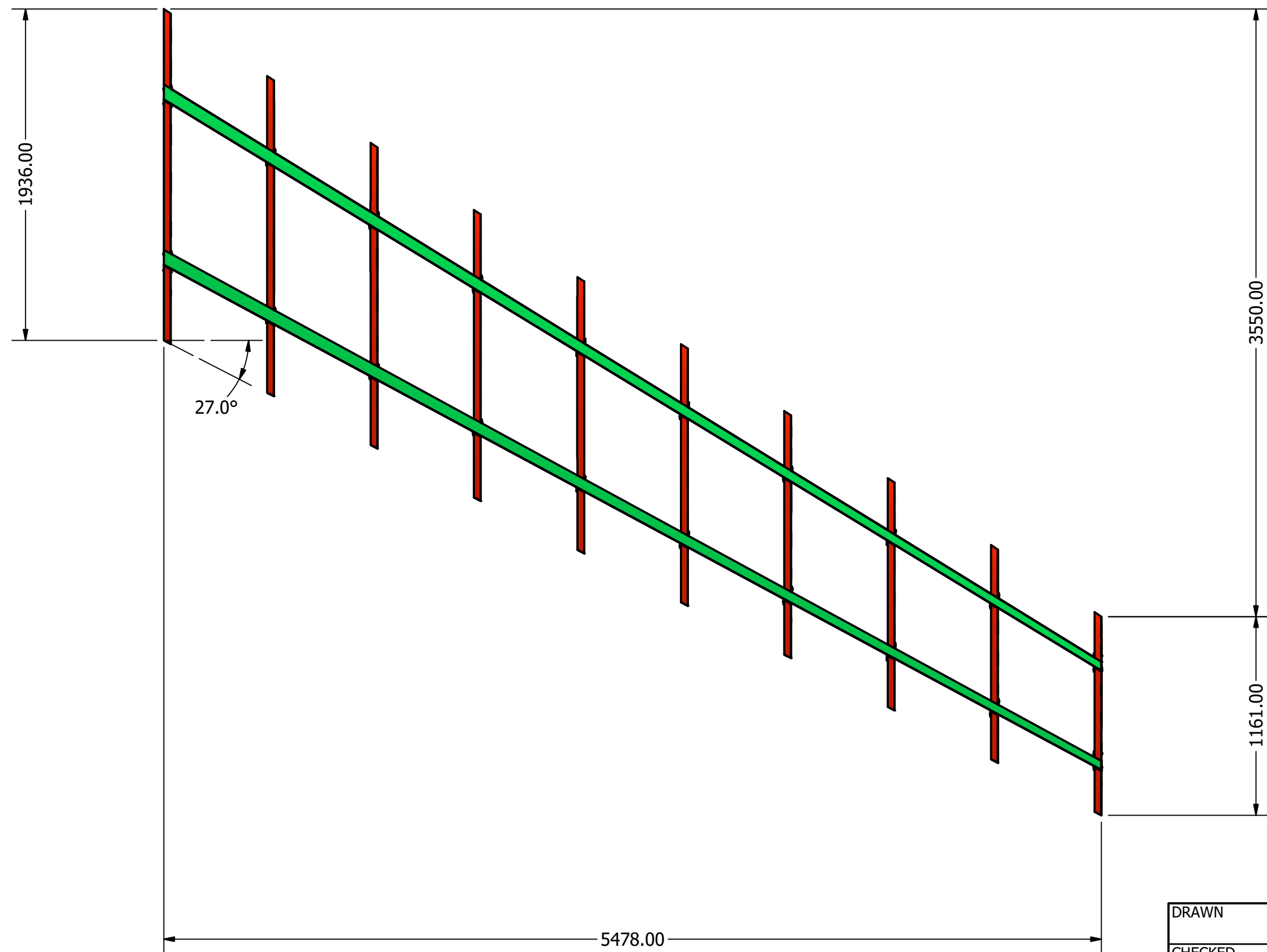
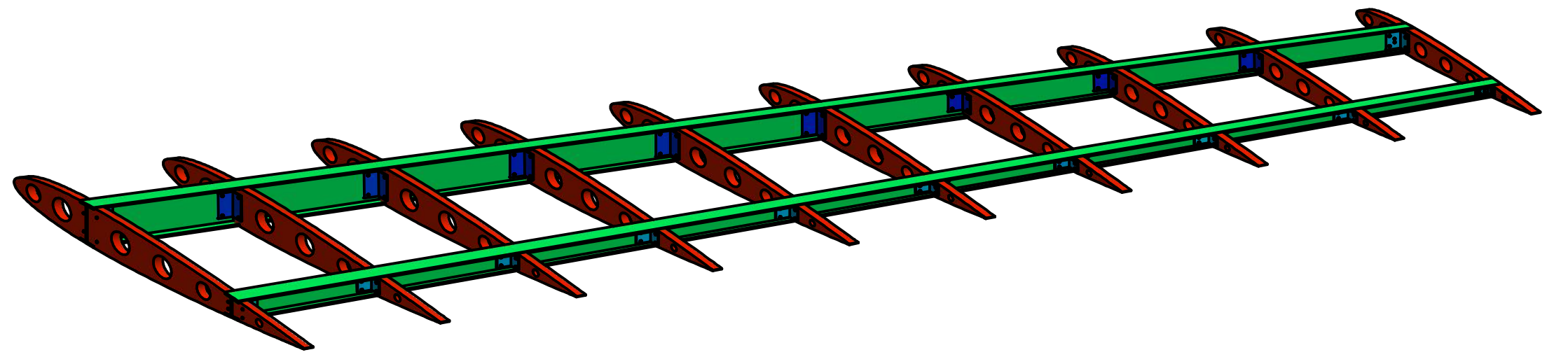
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C		
		SCALE	SHEET 1 OF 1	



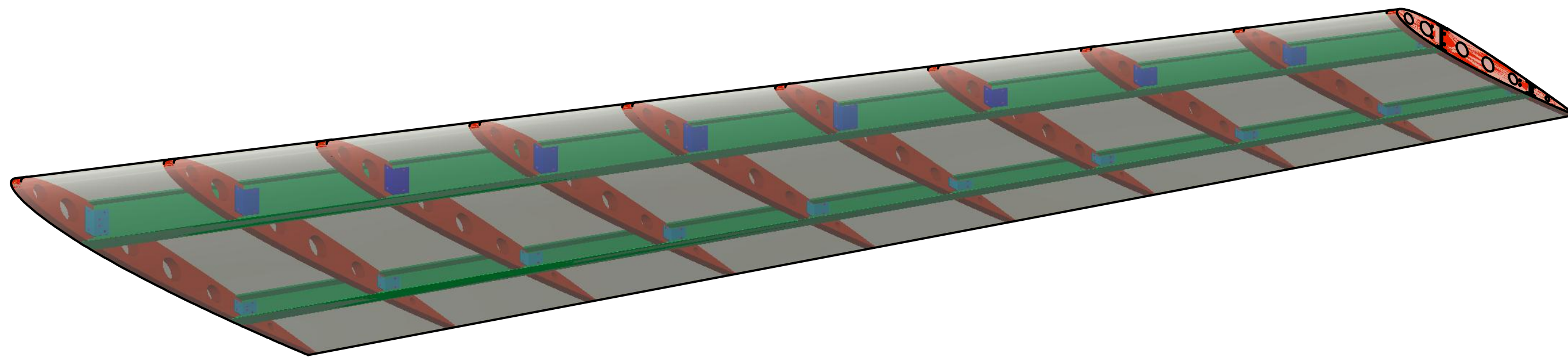
DRAWN		TITLE		
CHECKED		naca0012ribs		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



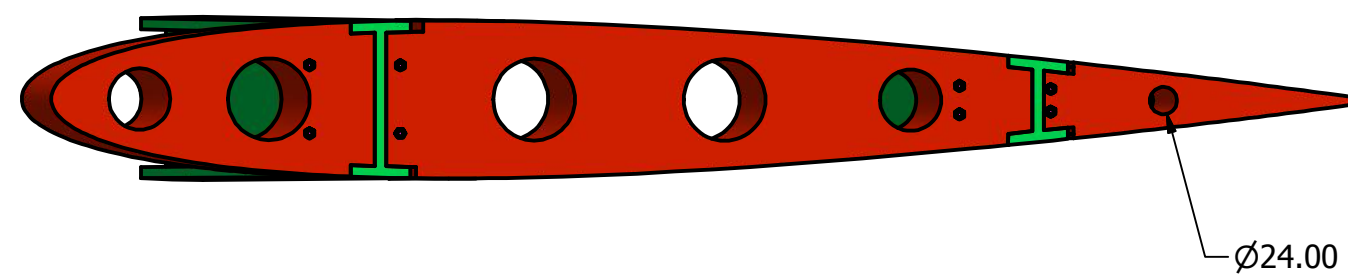
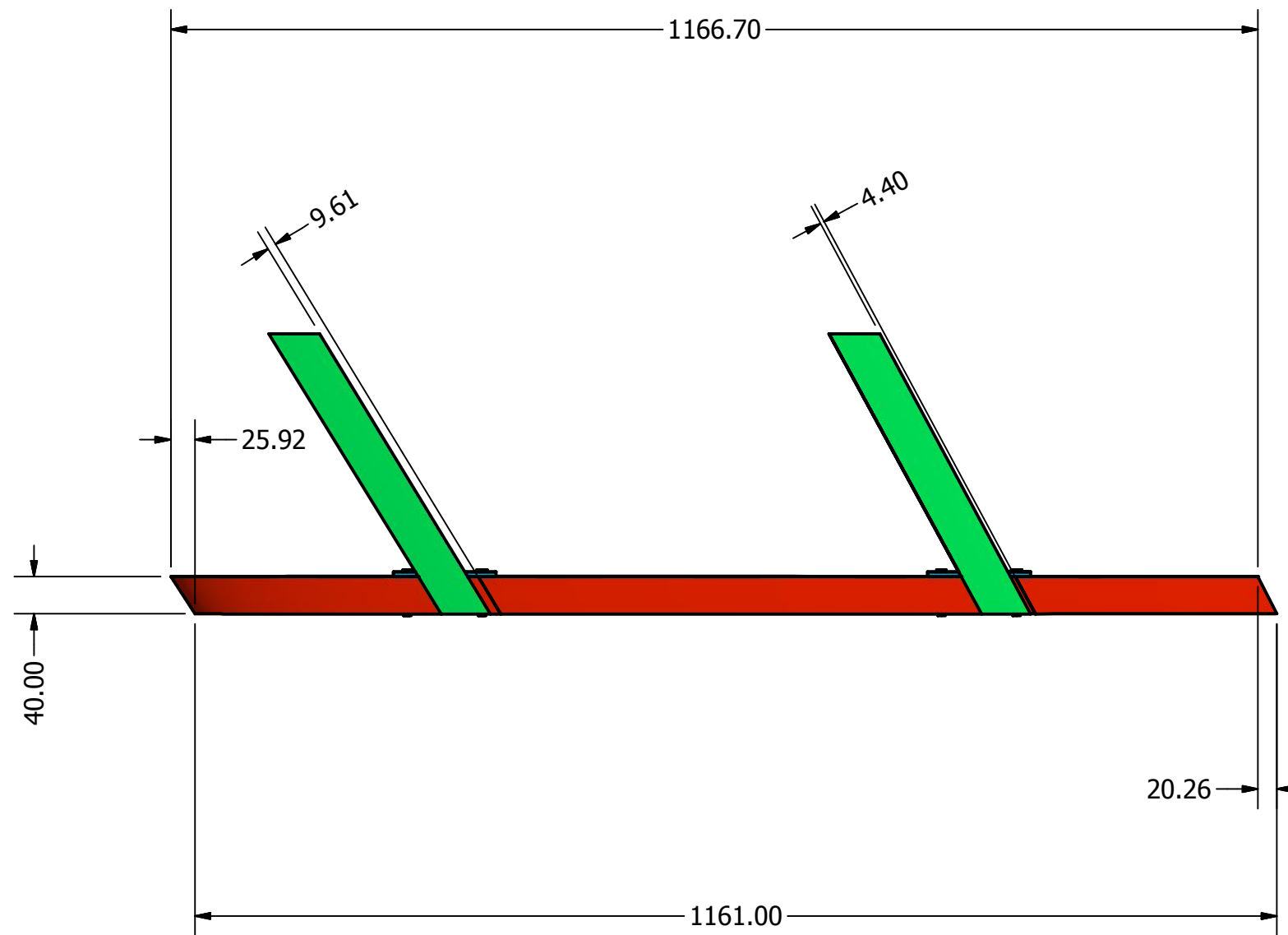
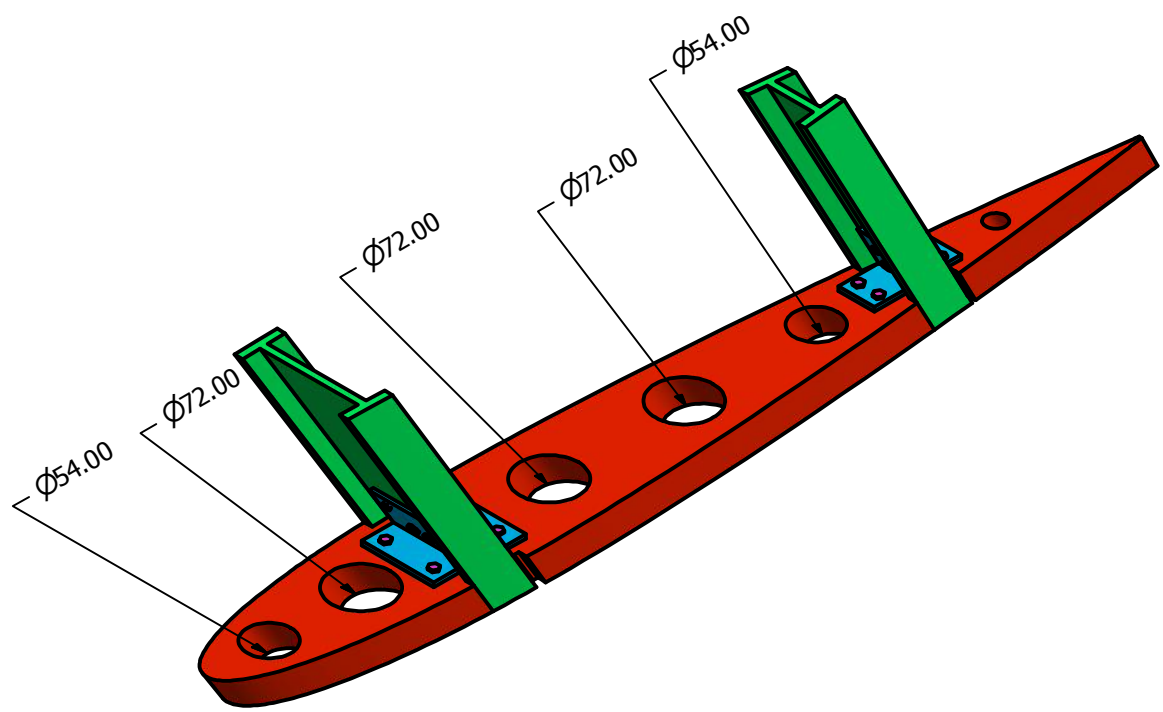
DRAWN		TITLE		
CHECKED		naca0012spars		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



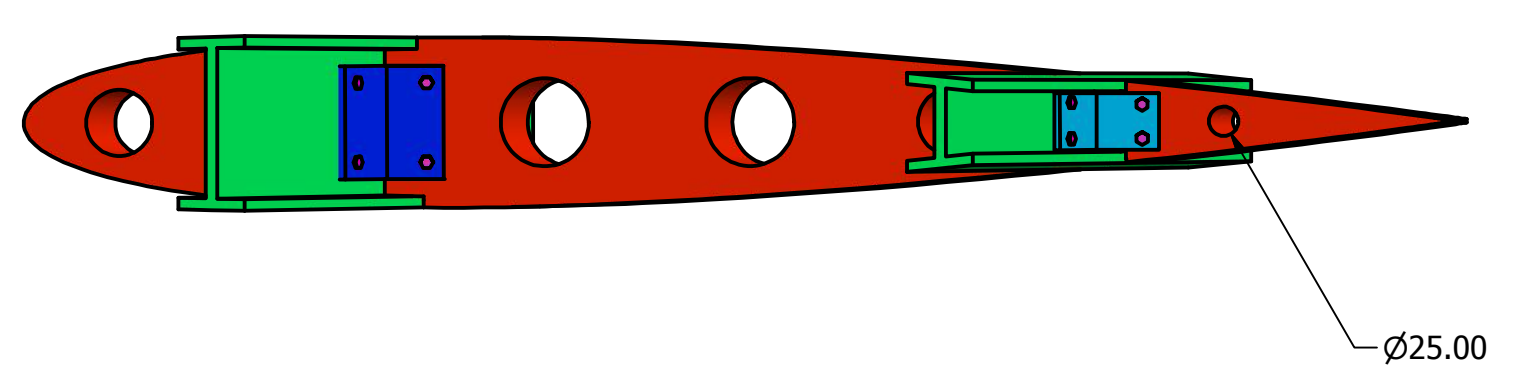
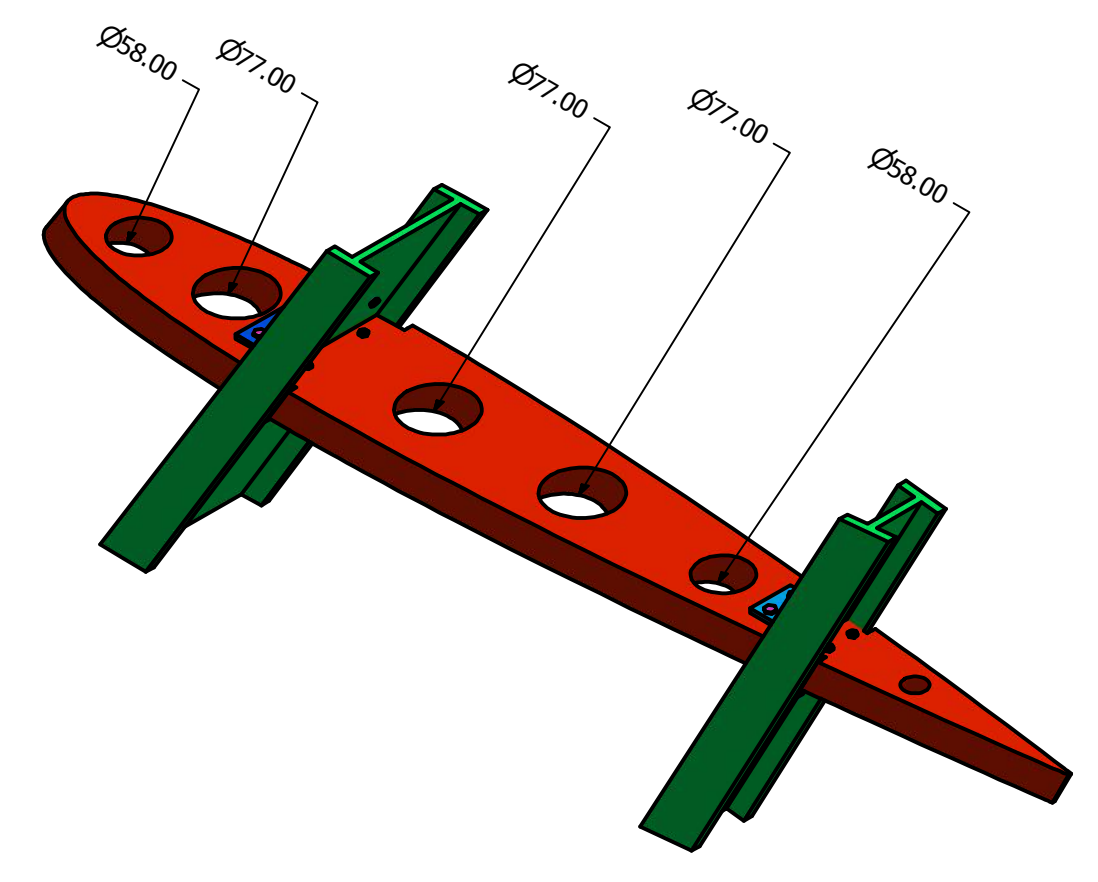
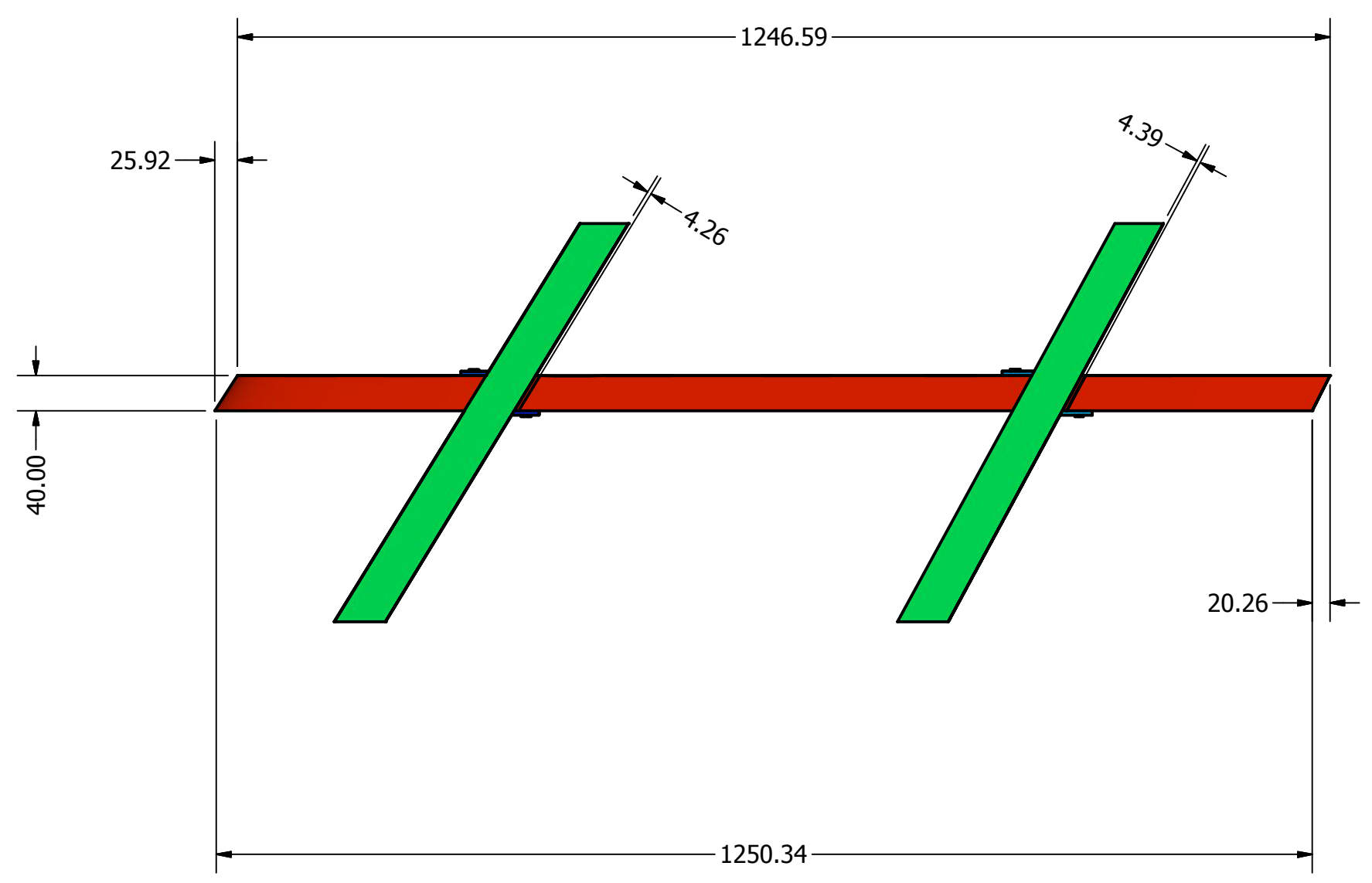
DRAWN		TITLE		
CHECKED		Assembly_naca0012		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



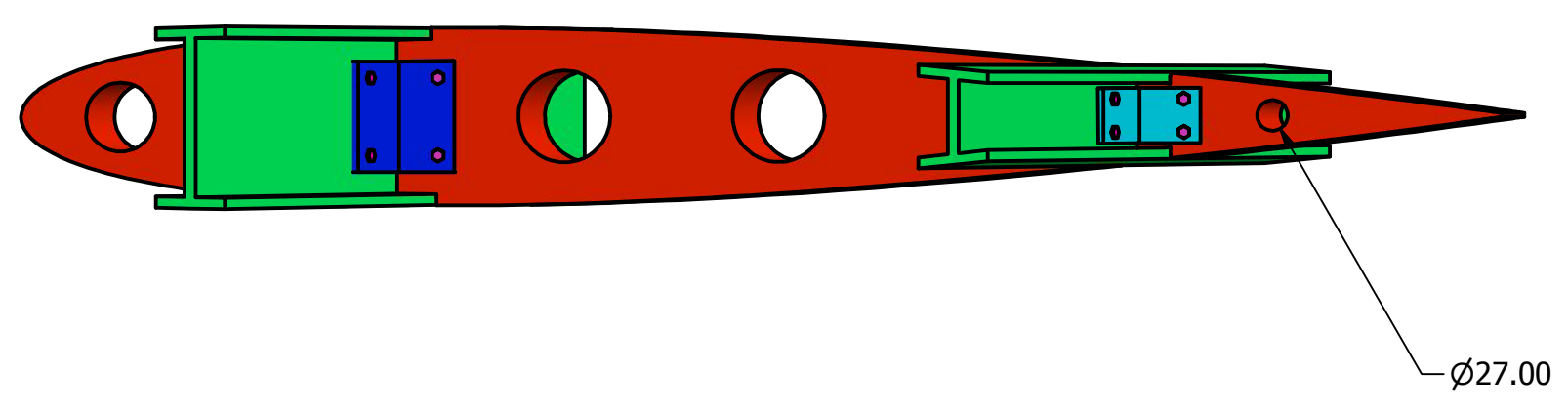
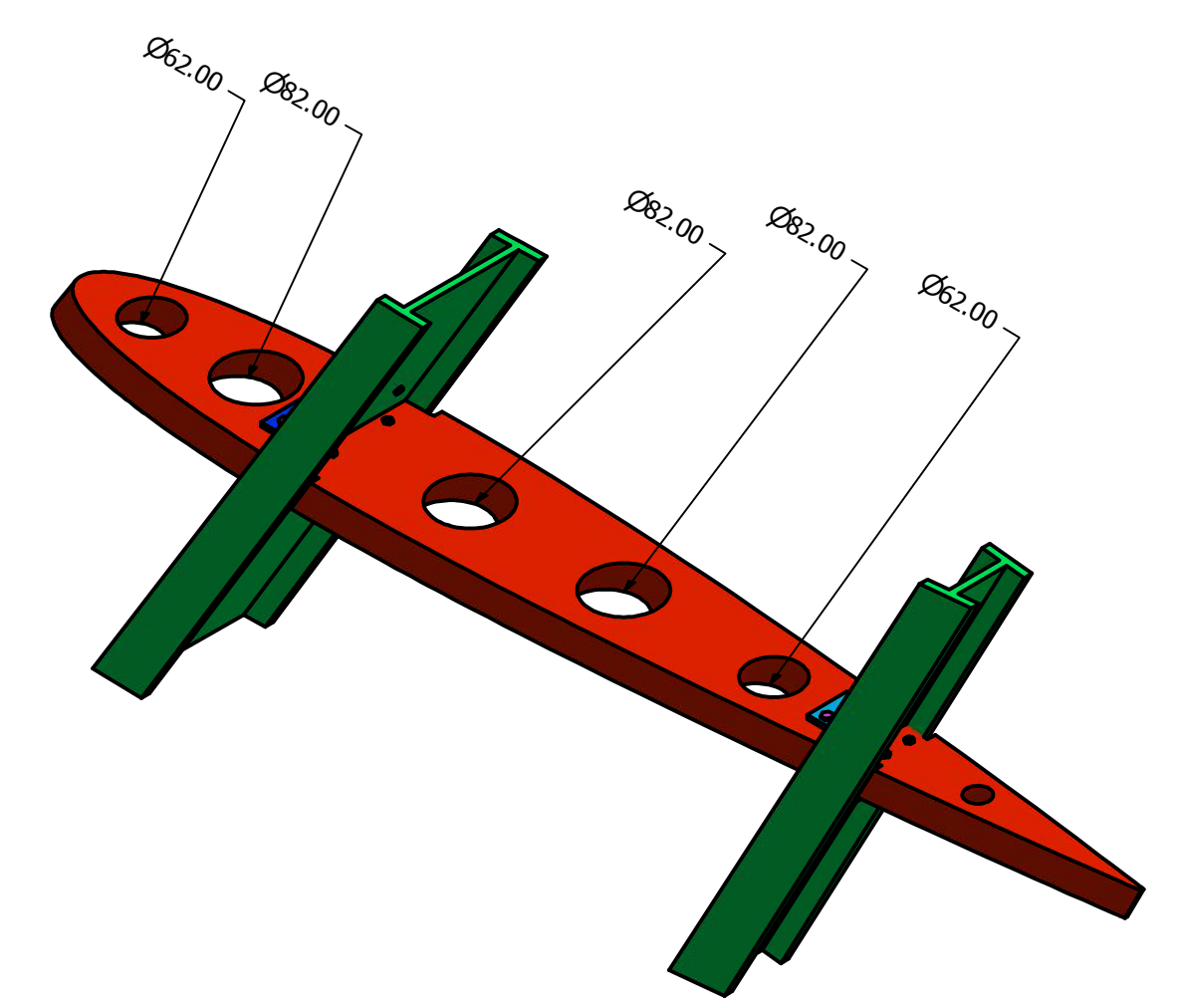
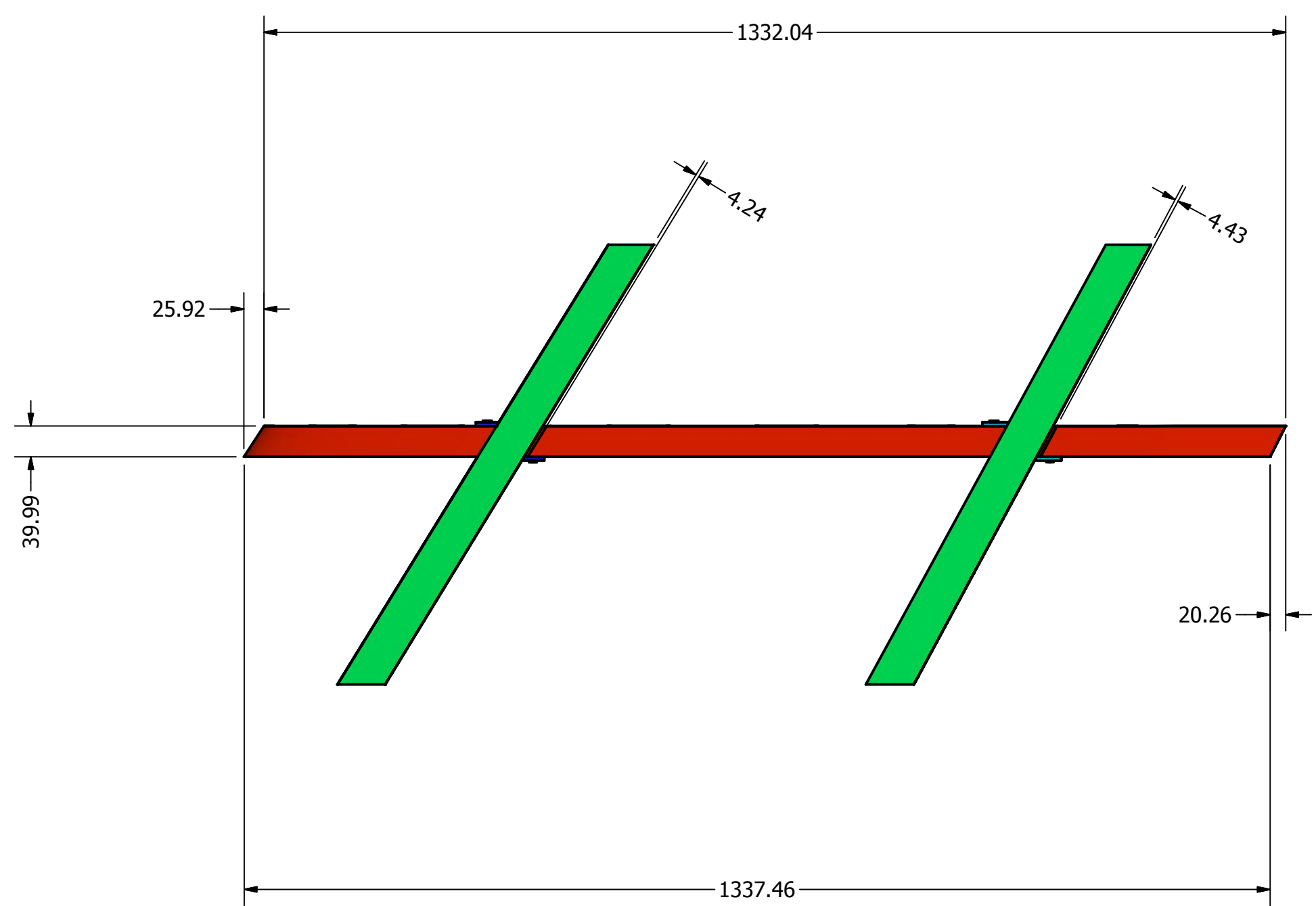
DRAWN		TITLE		
CHECKED		Assembly_naca0012		
QA		SIZE	DWG NO	REV
MFG		C	Assembly_naca0012all-1	
APPROVED		SCALE	SHEET 1 OF 1	



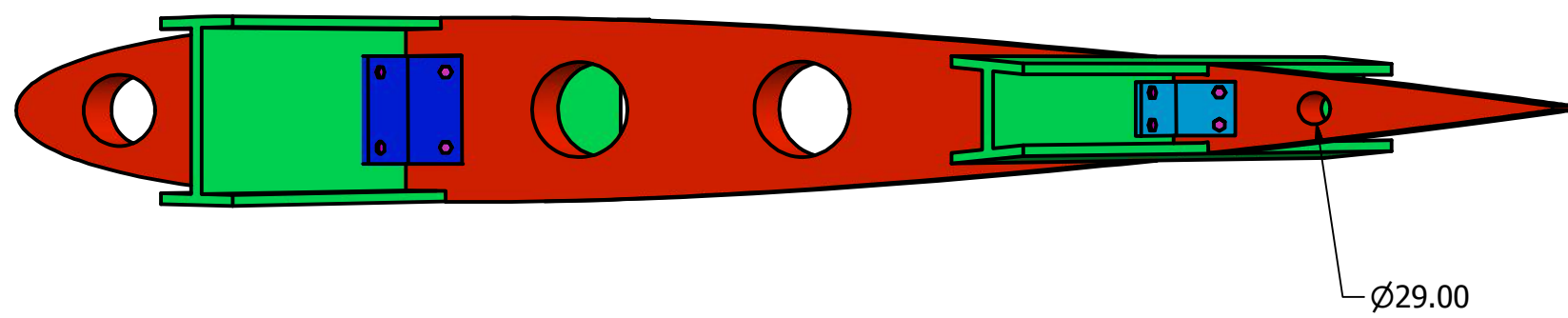
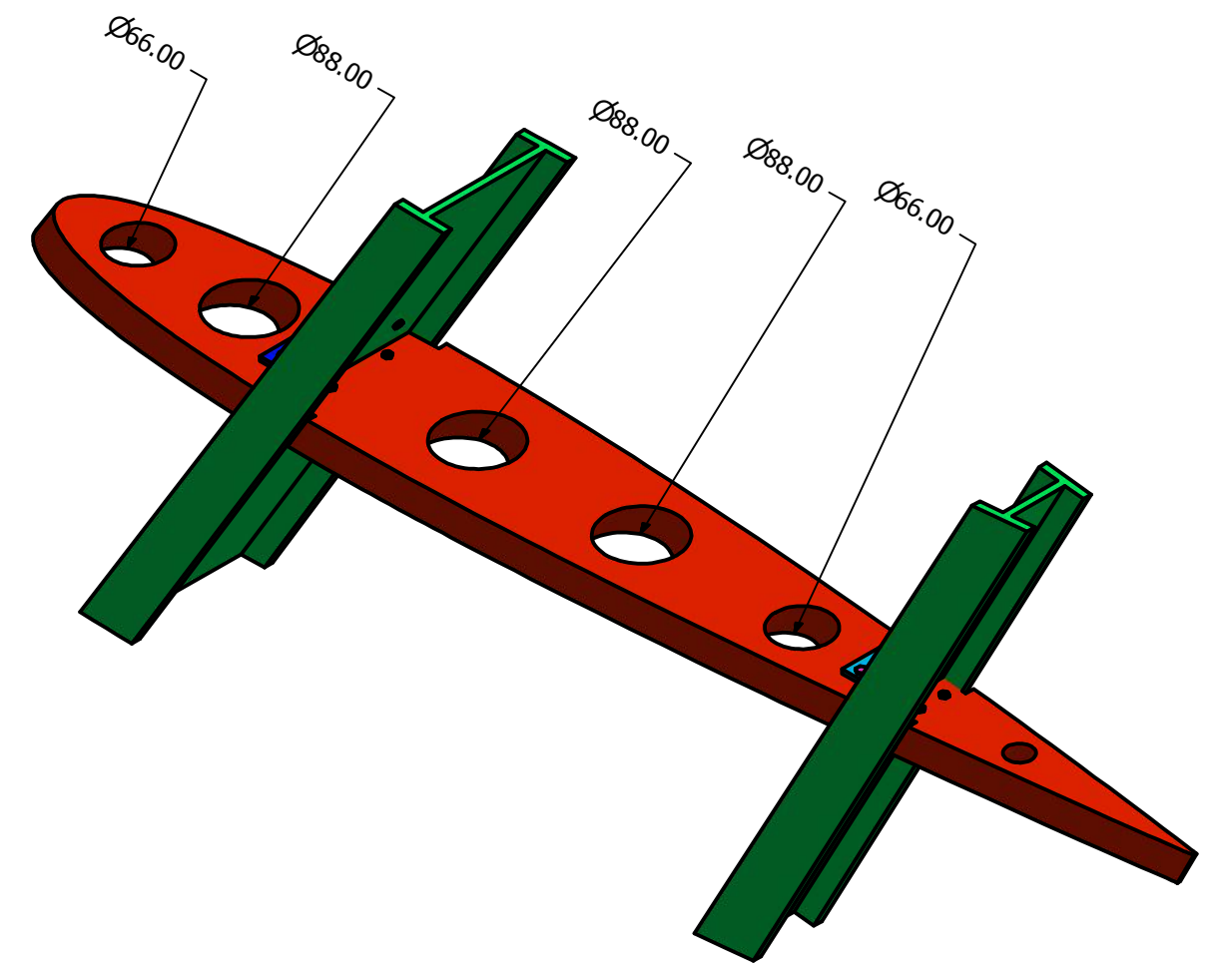
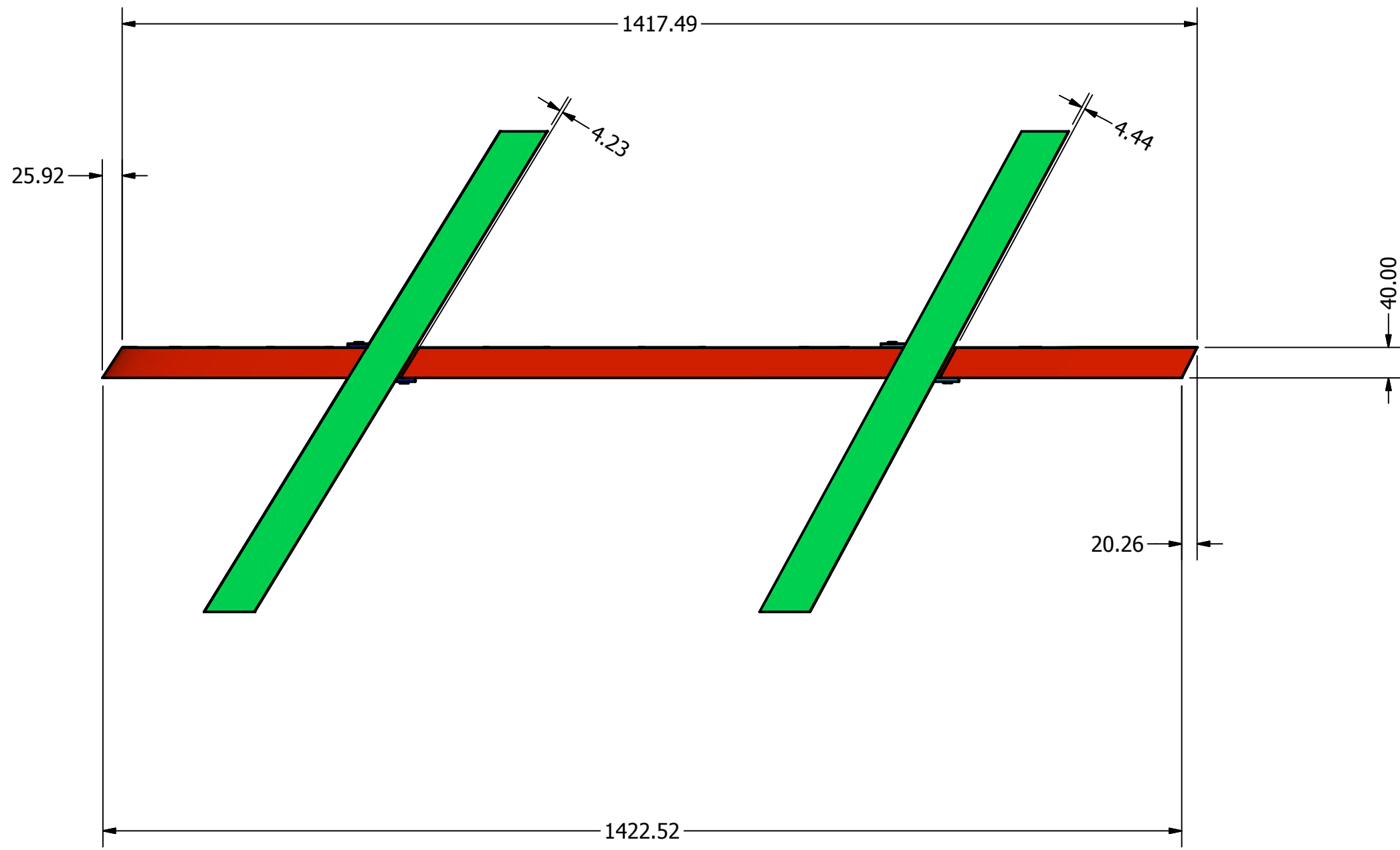
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part1)	
		SCALE	SHEET 1 OF 1	



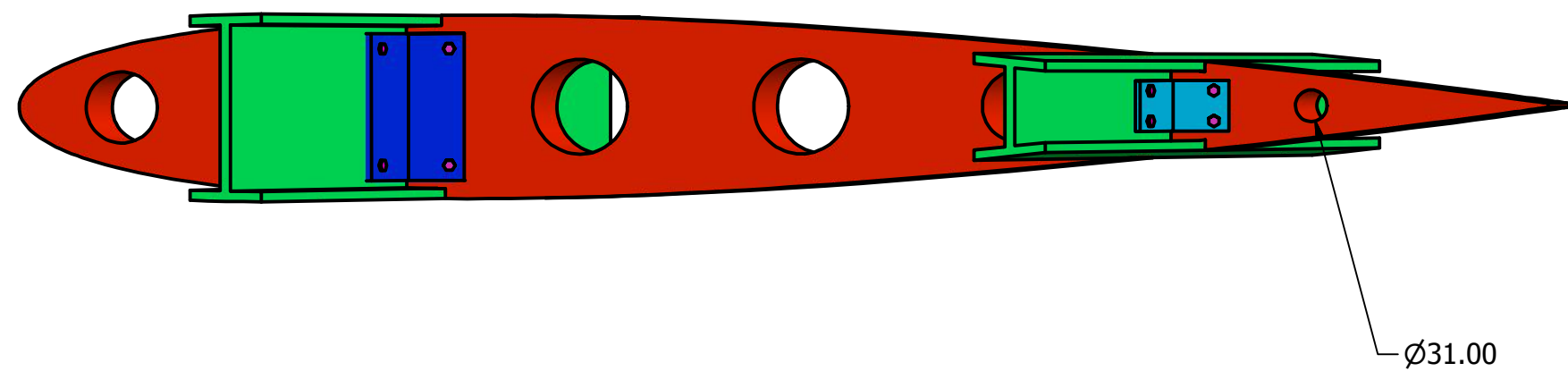
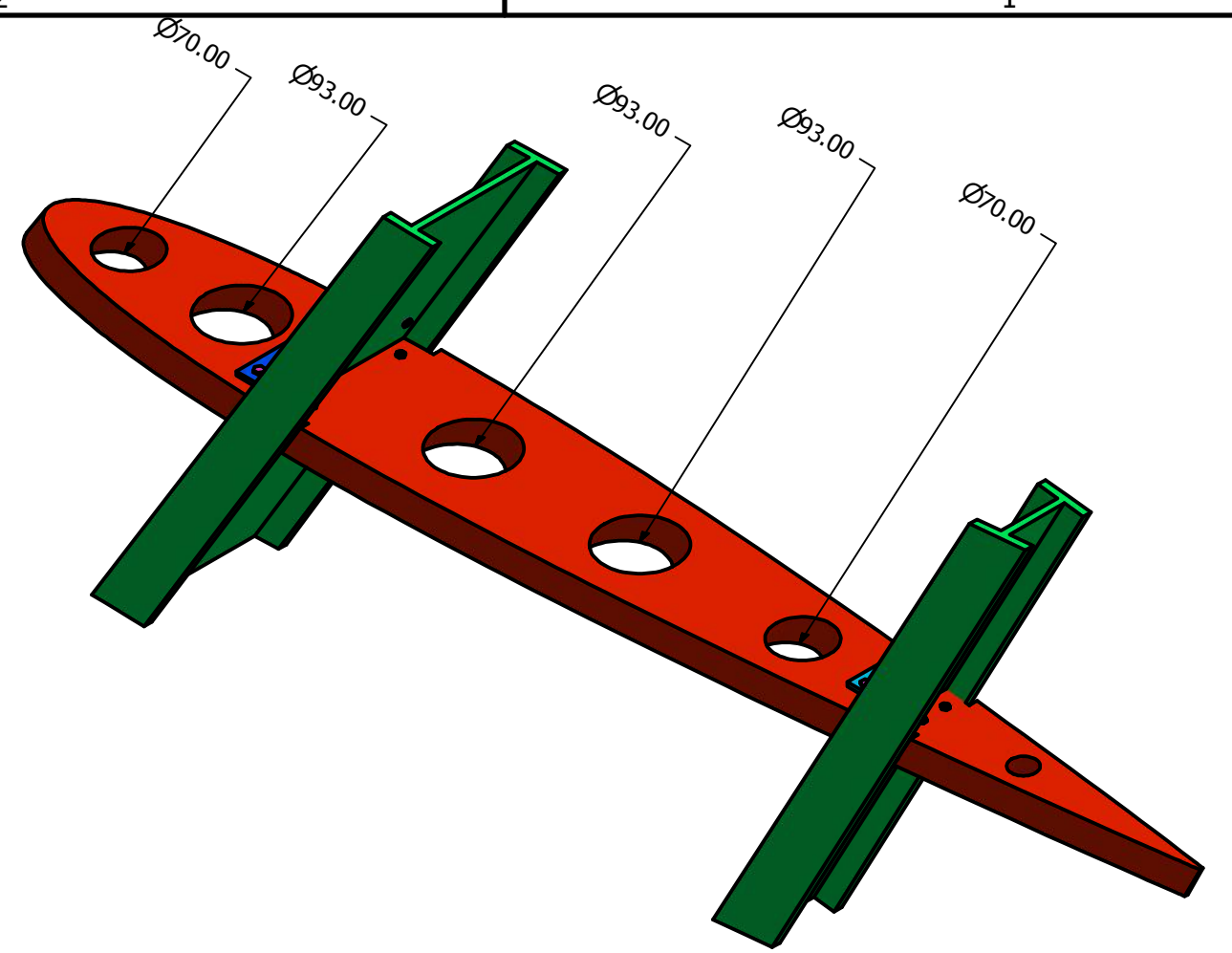
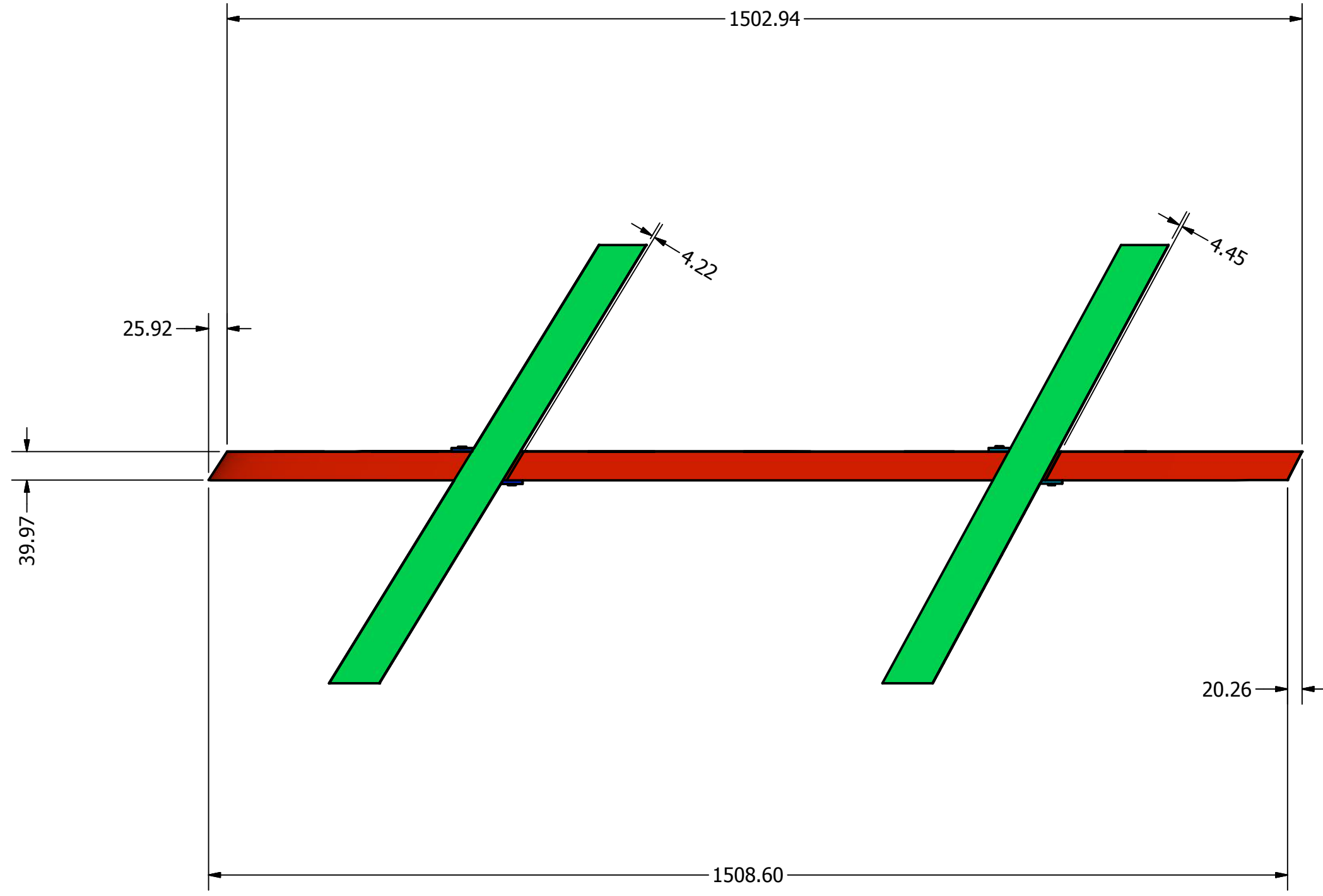
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part2)	
		SCALE	SHEET 1 OF 1	



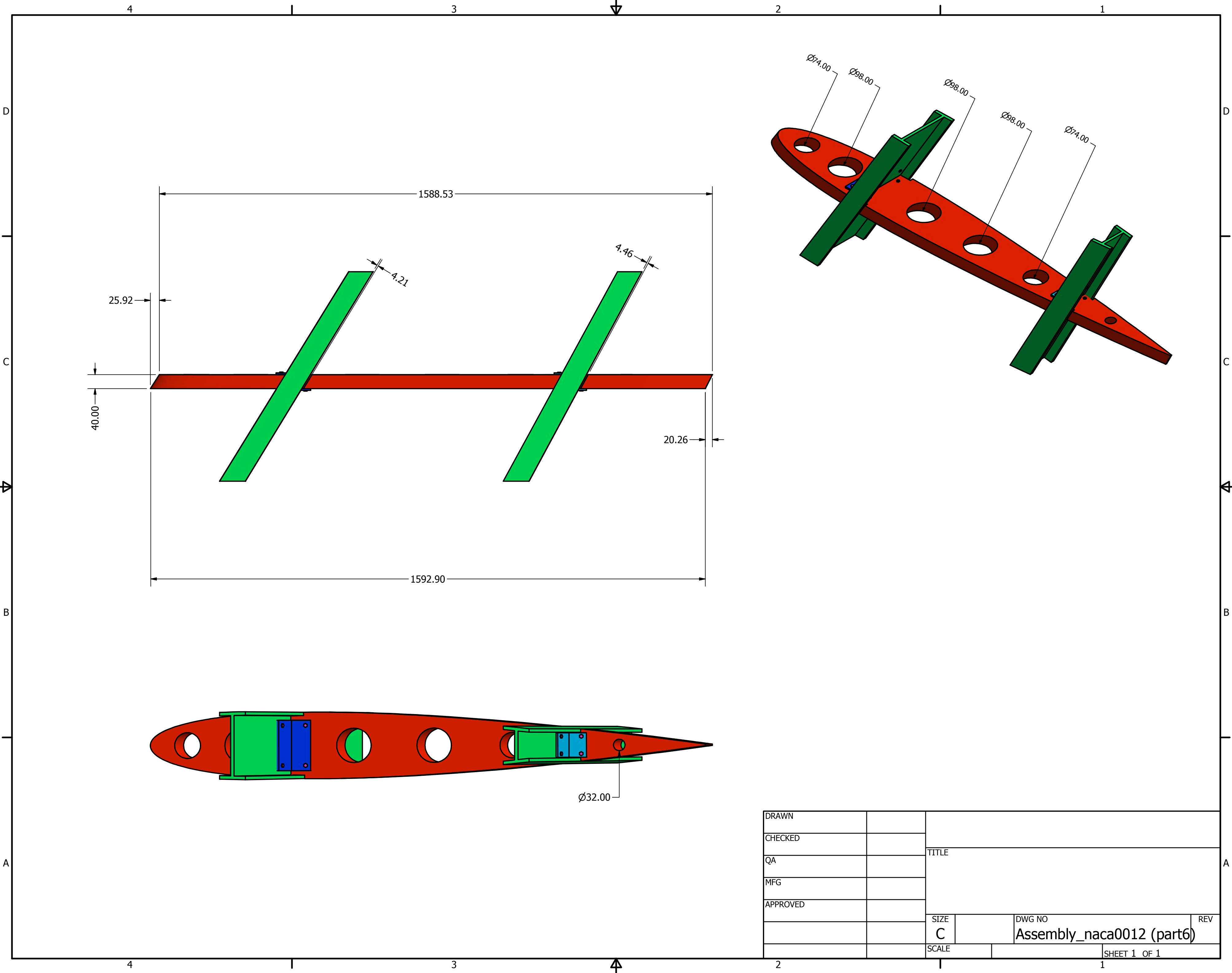
DRAWN		TITLE		
CHECKED		TITLE		
QA		TITLE		
MFG		TITLE		
APPROVED		TITLE		
		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part3)	
		SCALE	SHEET 1 OF 1	



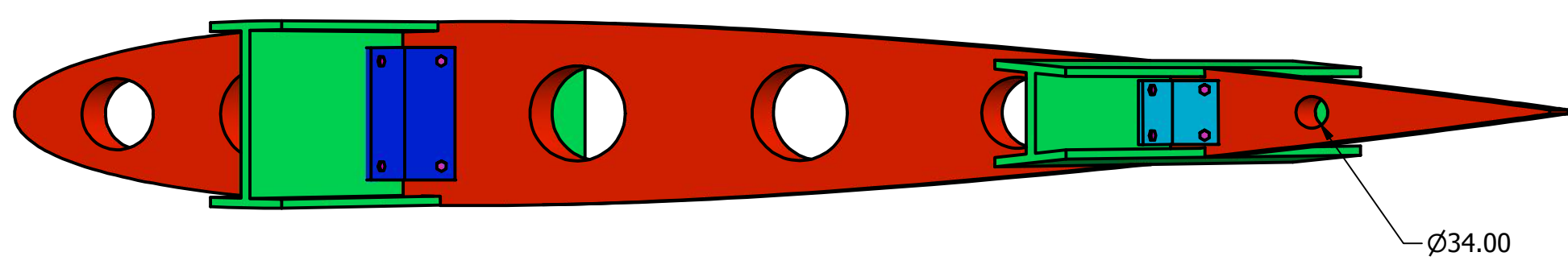
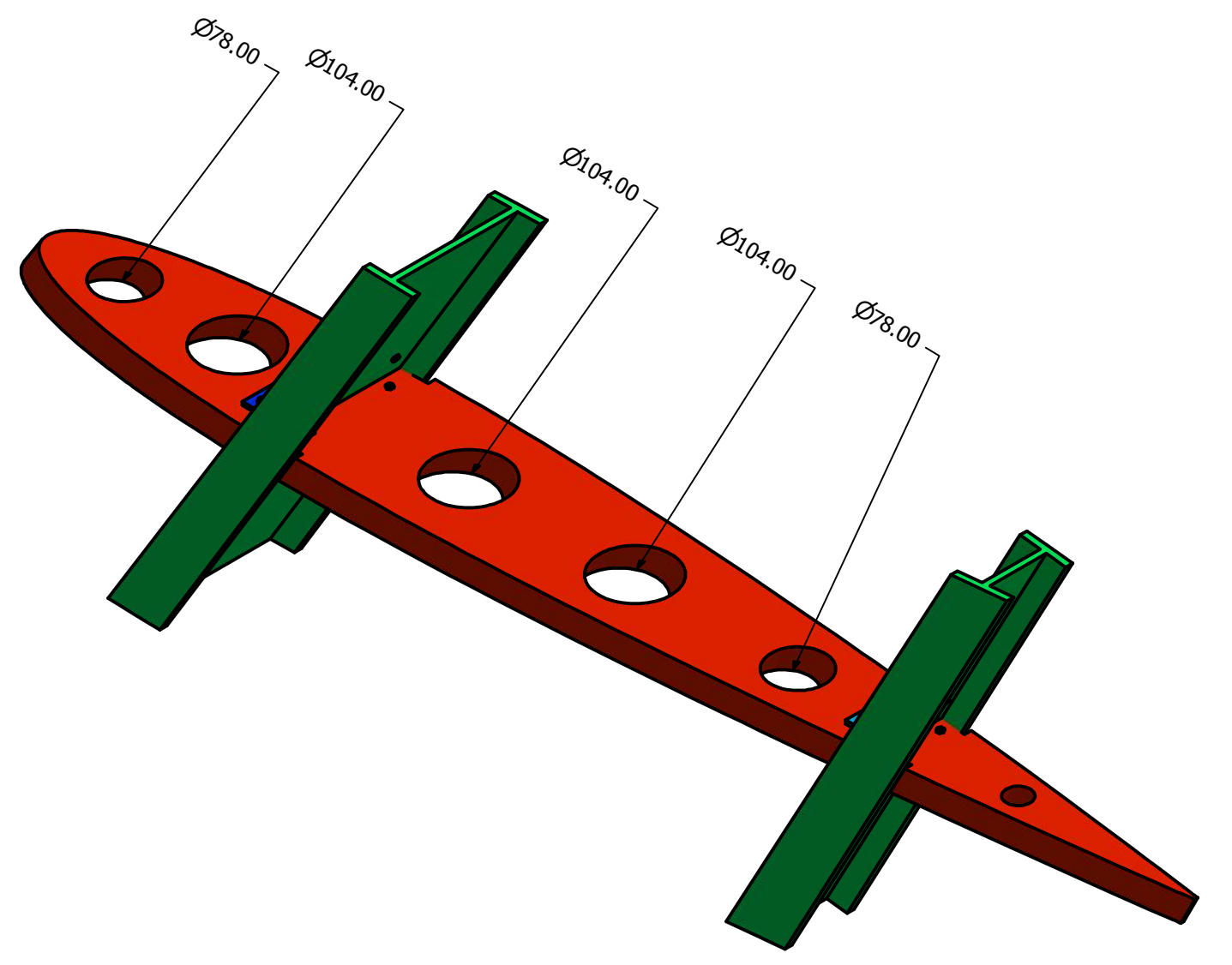
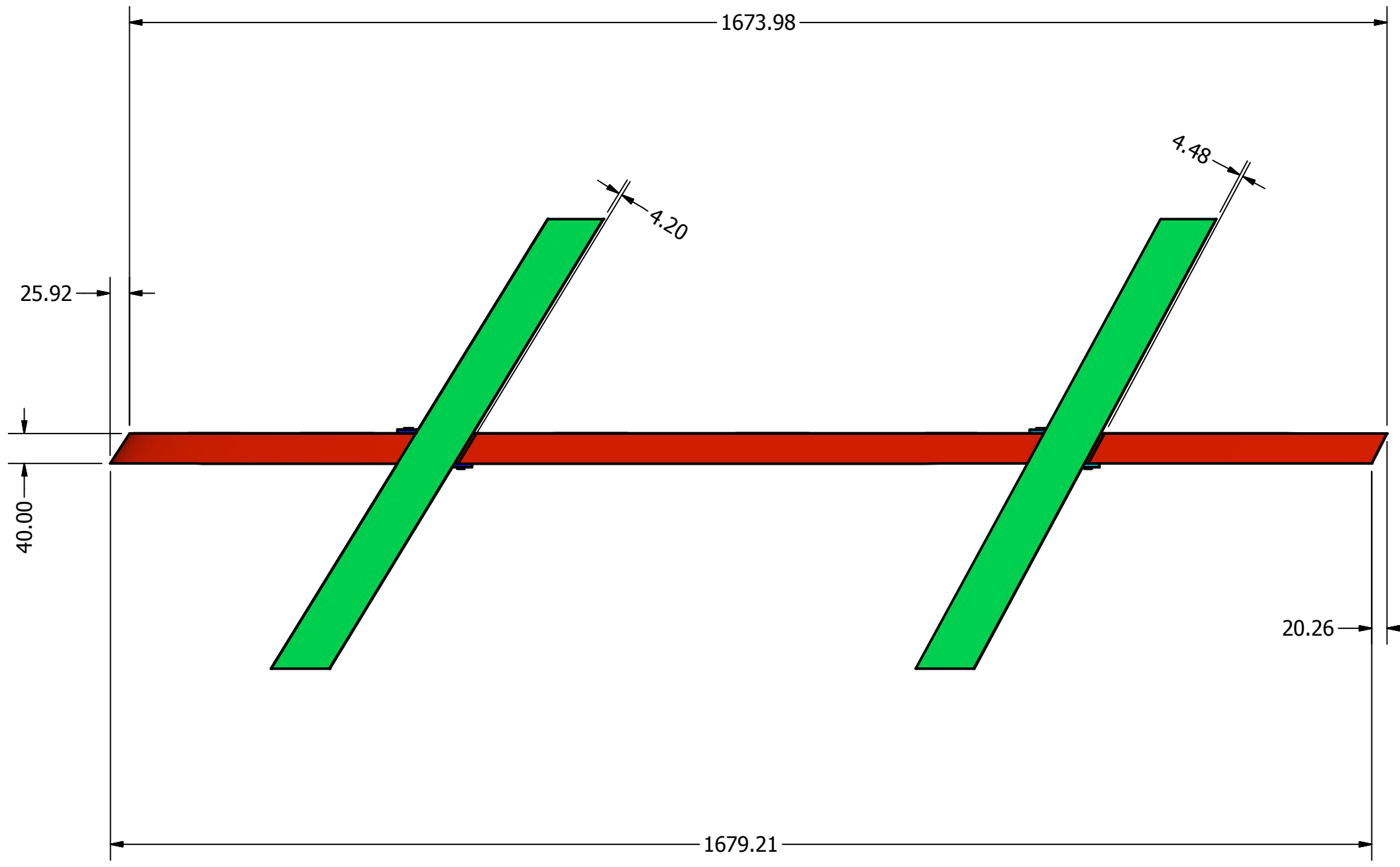
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part4)	
		SCALE	SHEET 1 OF 1	



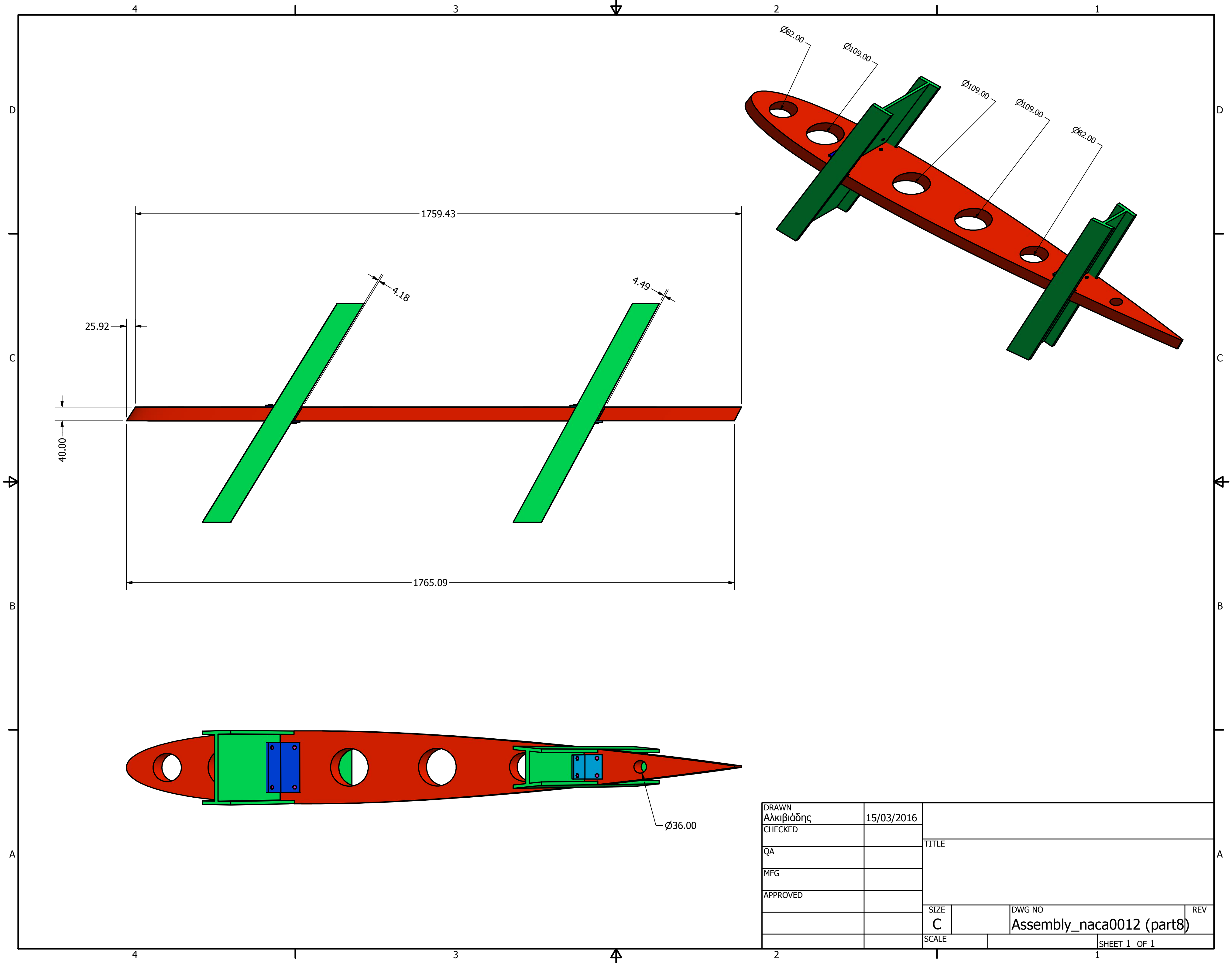
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part5)	
		SCALE	SHEET 1 OF 1	



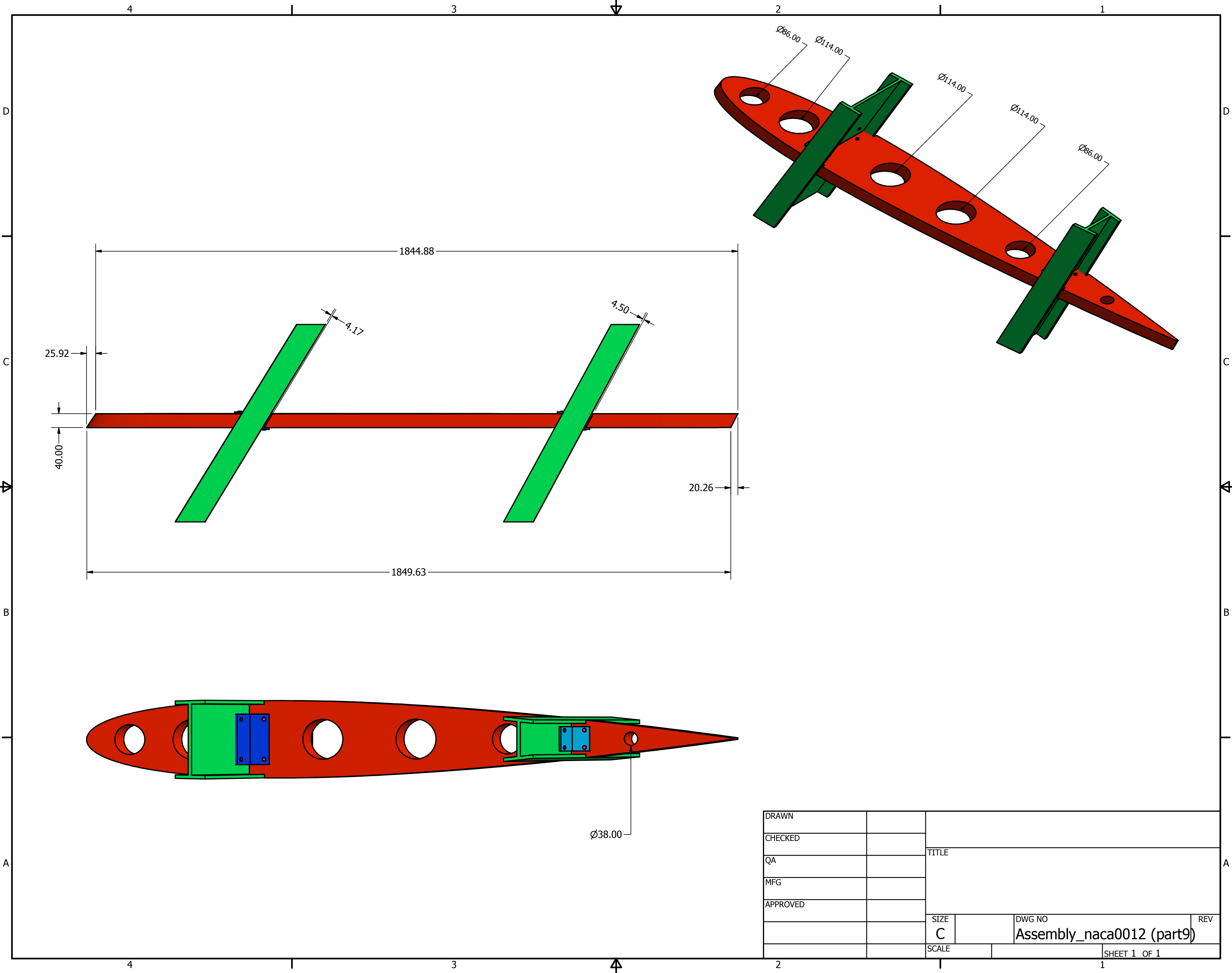
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part6)	
		SCALE	SHEET 1 OF 1	



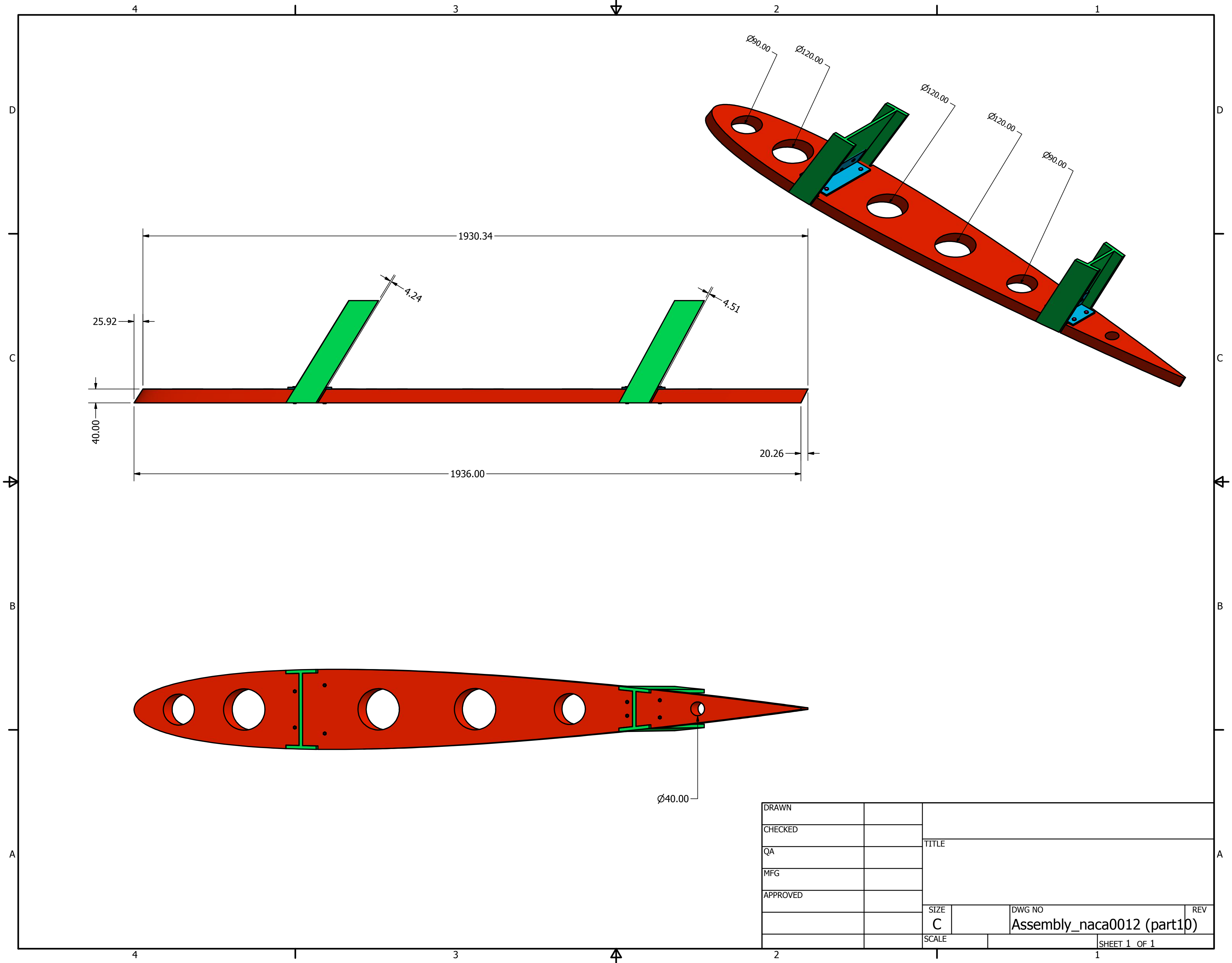
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part7)	
		SCALE	SHEET 1 OF 1	



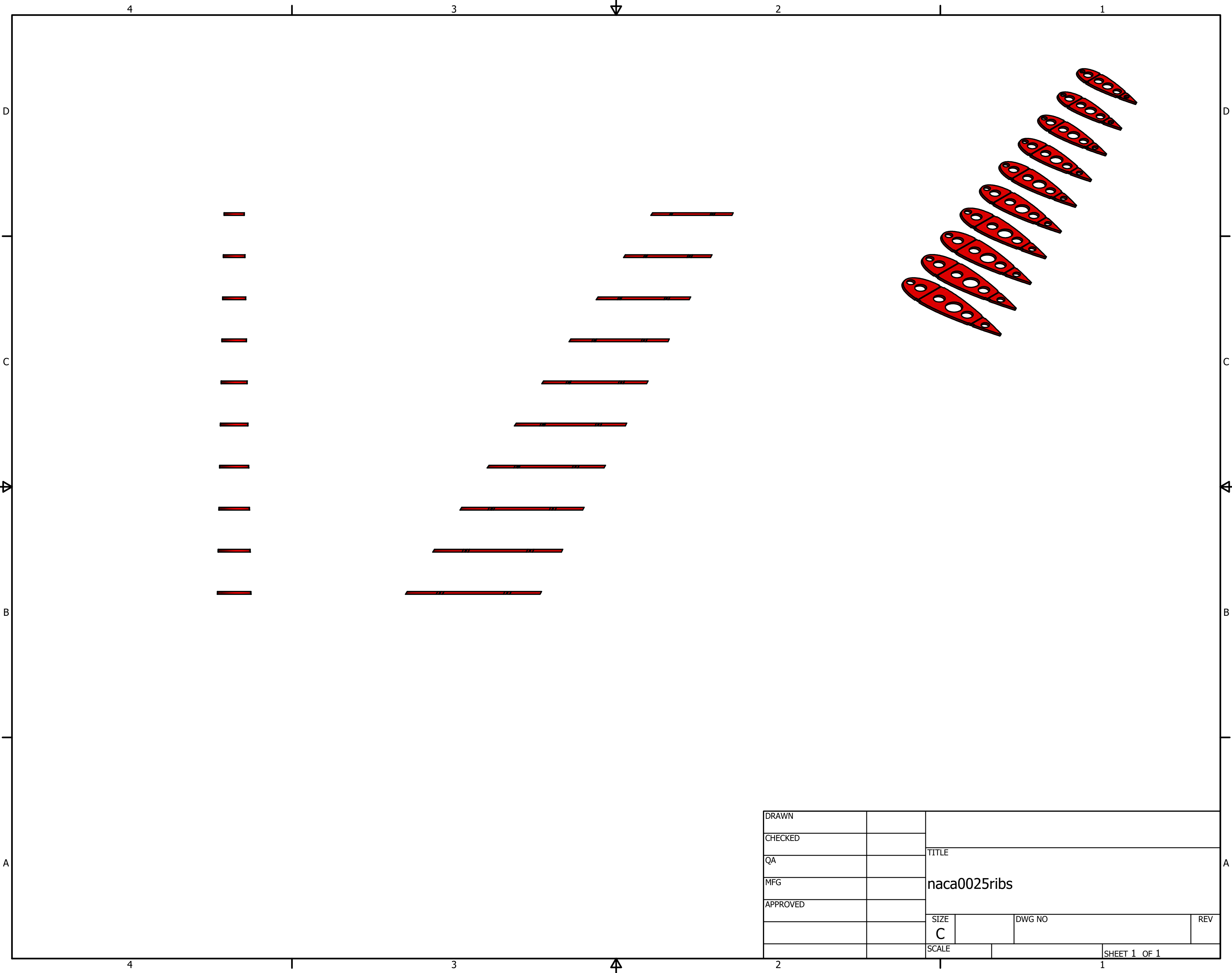
DRAWN Αλκιβιάδης	15/03/2016	TITLE		
CHECKED				
QA				
MFG				
APPROVED		SIZE C	DWG NO Assembly_naca0012 (part8)	REV
		SCALE	SHEET 1 OF 1	



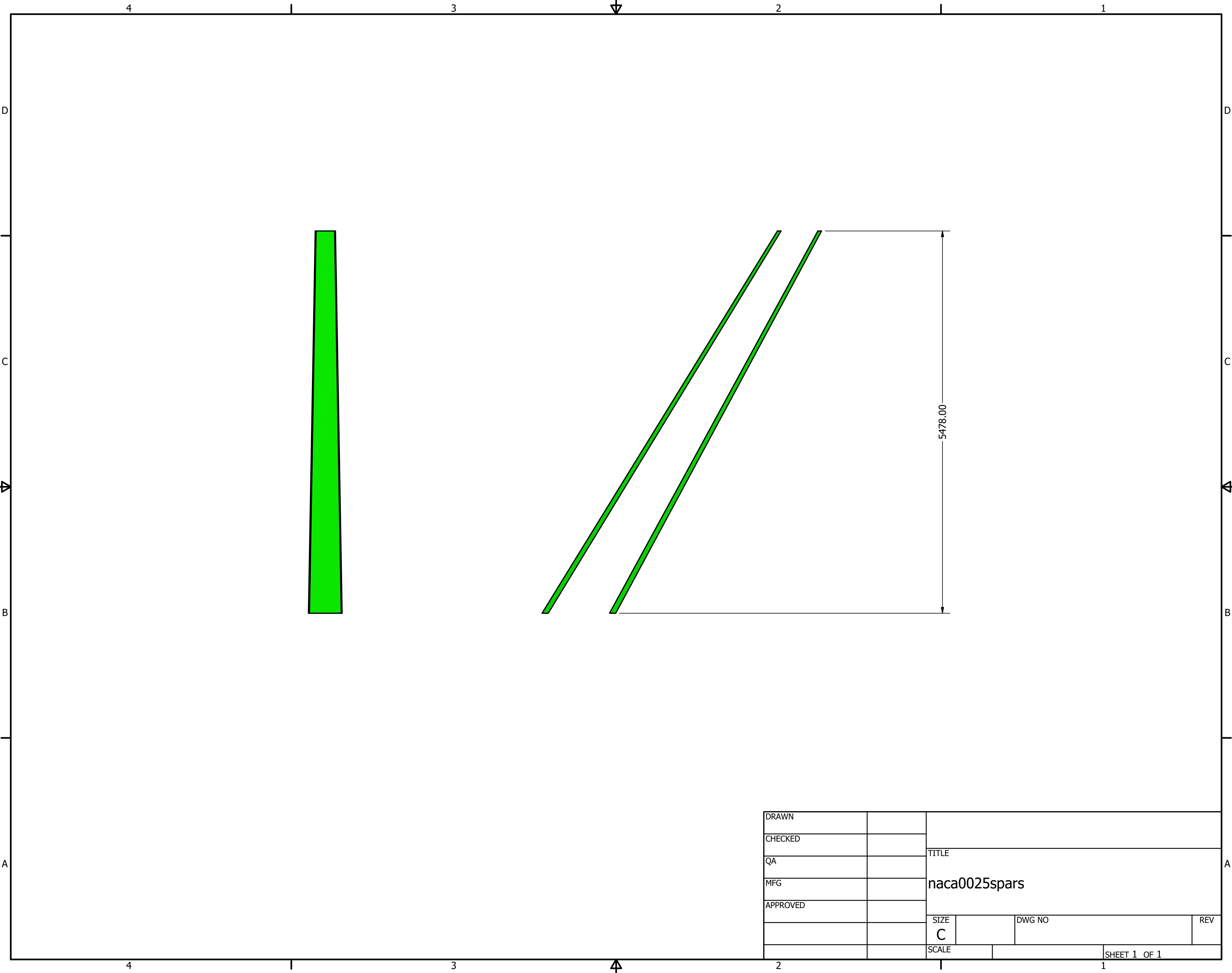
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part9)	
		SCALE	SHEET 1 OF 1	



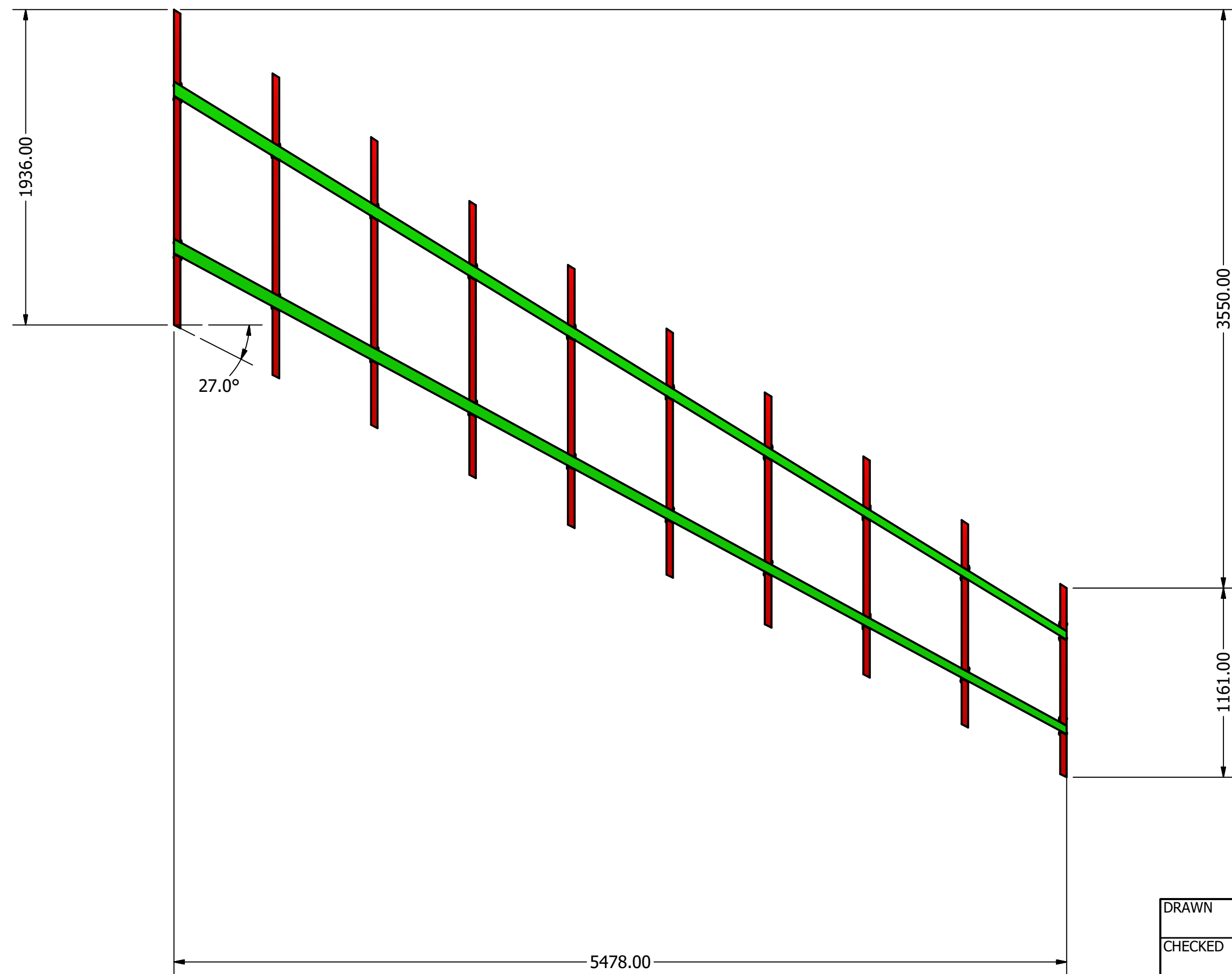
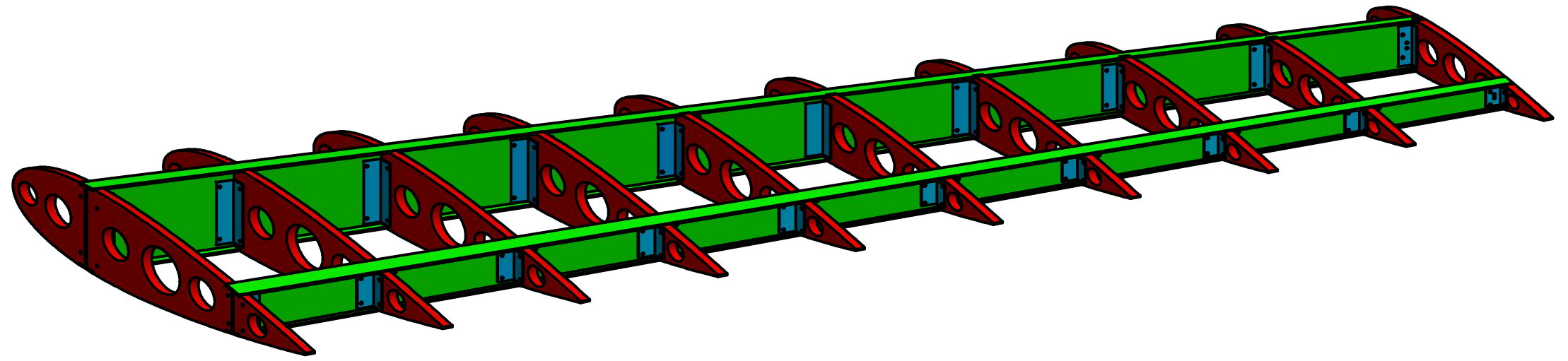
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0012 (part10)	
		SCALE	SHEET 1 OF 1	



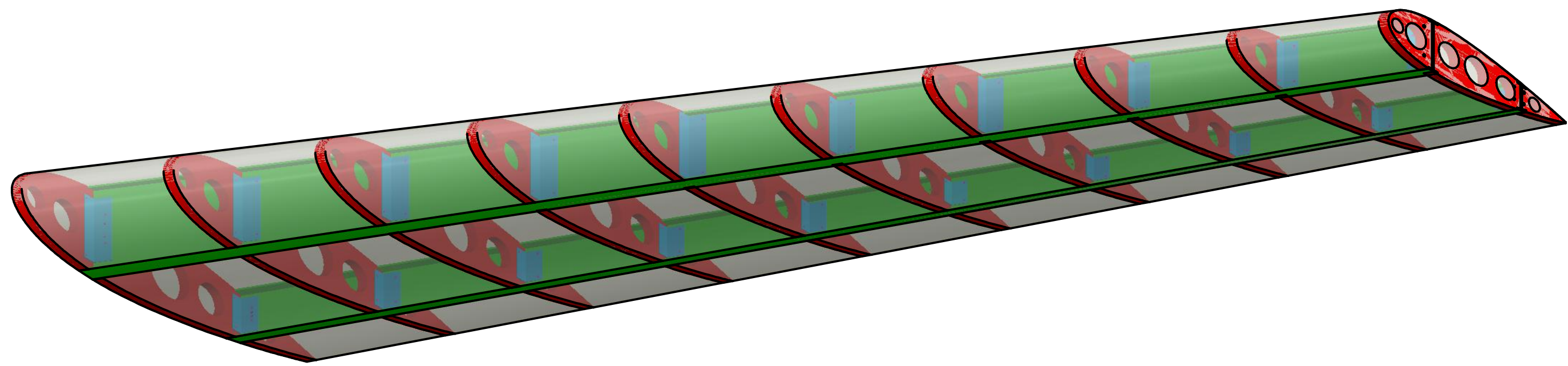
DRAWN		TITLE		
CHECKED		naca0025ribs		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



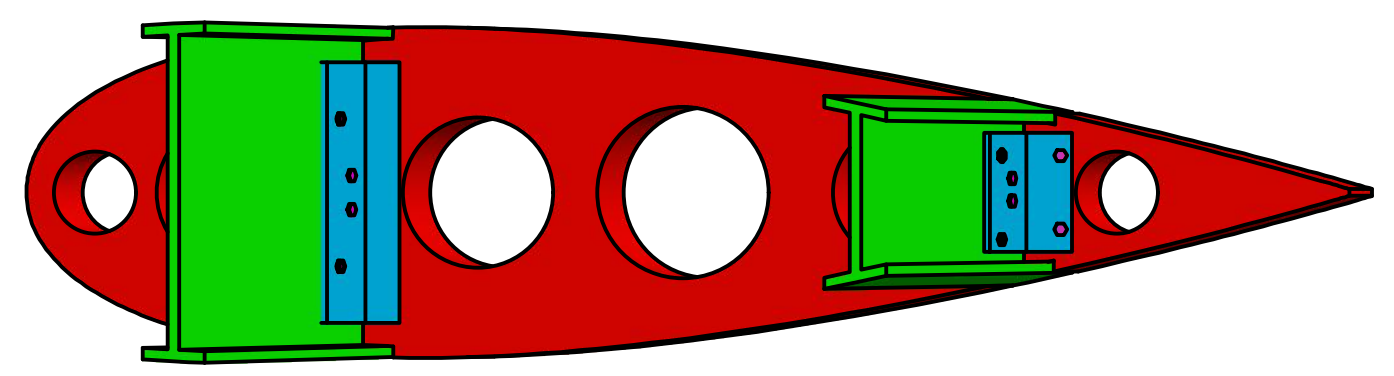
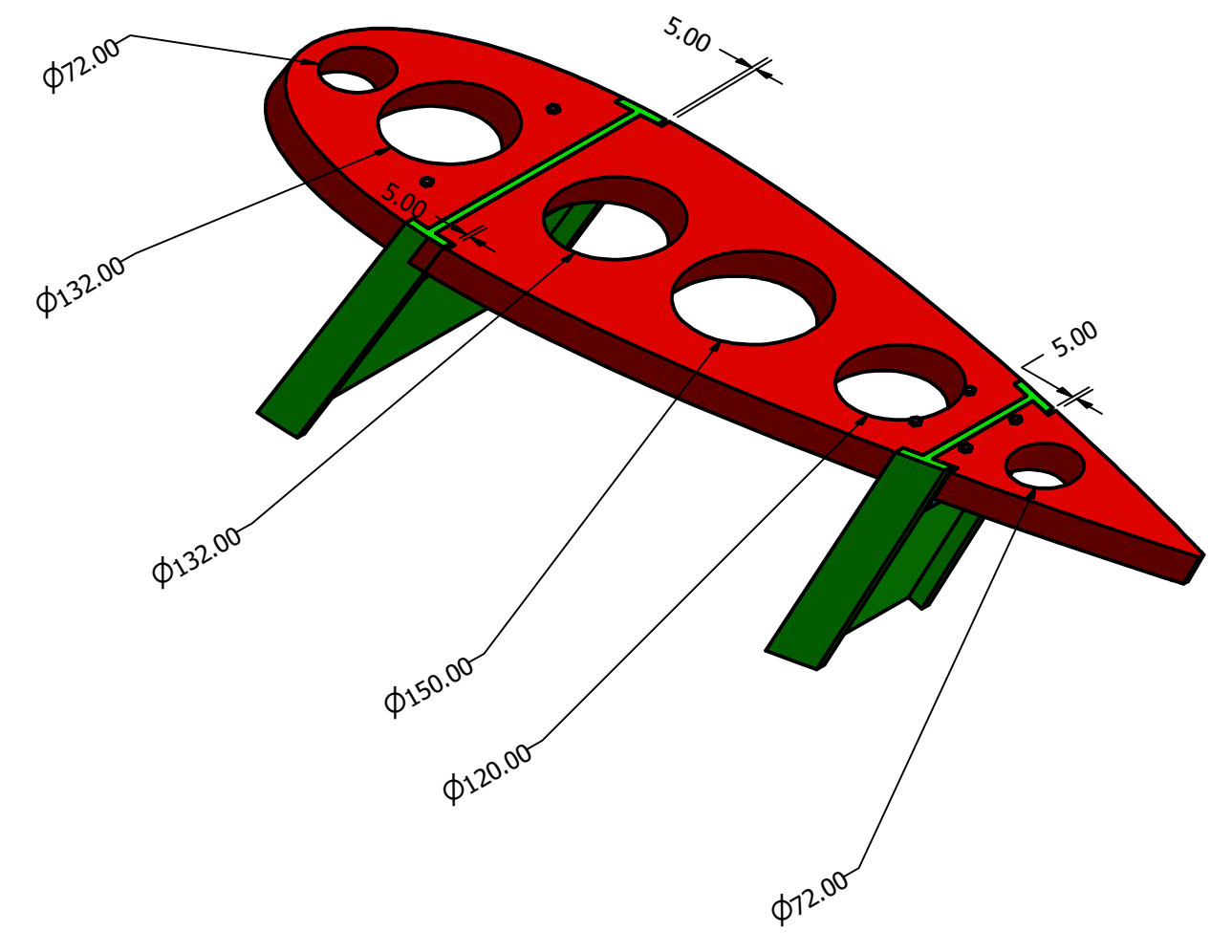
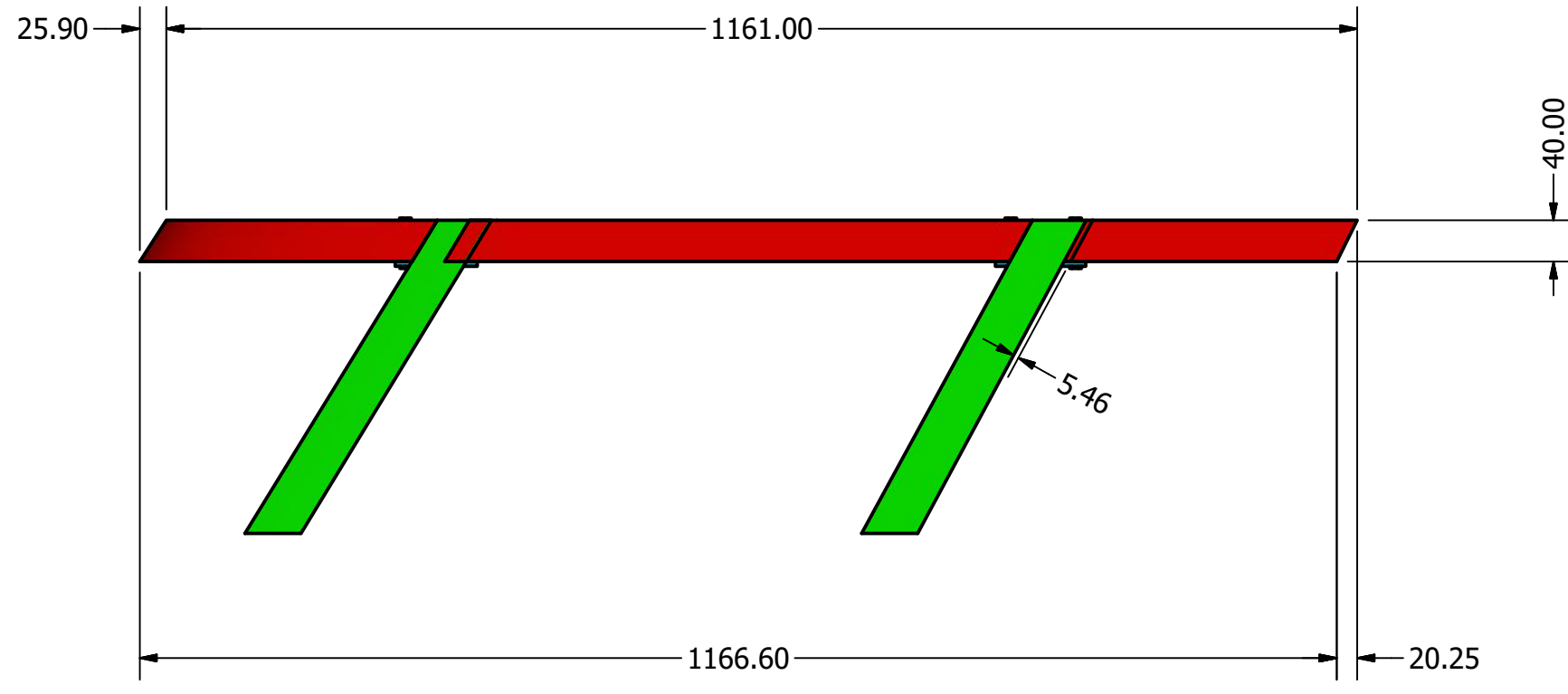
DRAWN		TITLE		
CHECKED		naca0025spars		
QA		SIZE	DWG NO	REV
MFG		C		
APPROVED		SCALE	SHEET 1 OF 1	



DRAWN		TITLE		
CHECKED		Assembly_naca0025.idw		
QA		SIZE	DWG NO	REV
MFG		C	Assembly_naca0025	
APPROVED		SCALE	SHEET 1 OF 1	



DRAWN		TITLE Assembly_naca0025		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE C	DWG NO Assembly_naca0025all	REV
		SCALE	SHEET 1 OF 1	



DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part1)	
		SCALE	SHEET 1 OF 1	

4

3

2

1

D

D

C

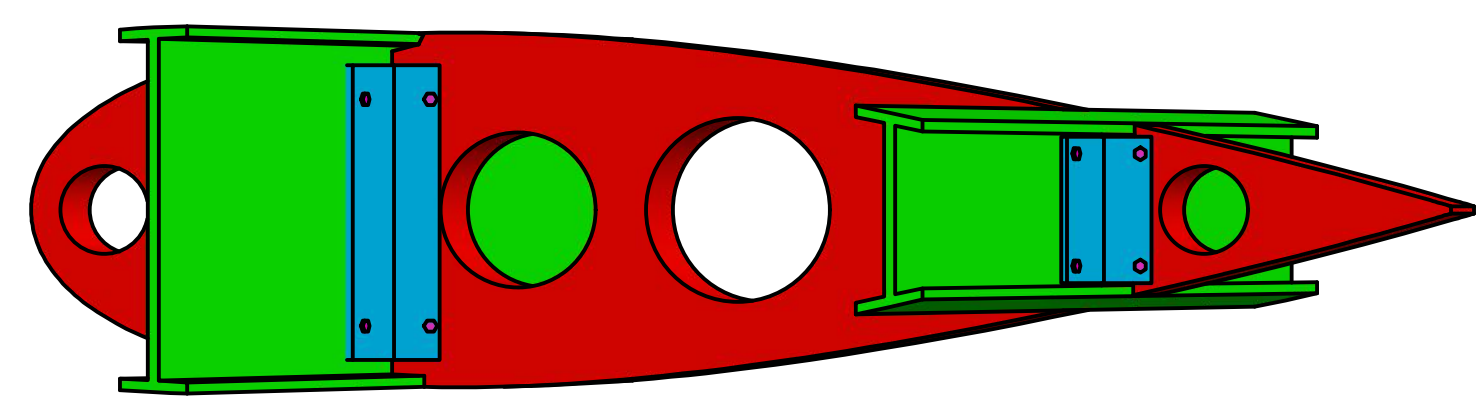
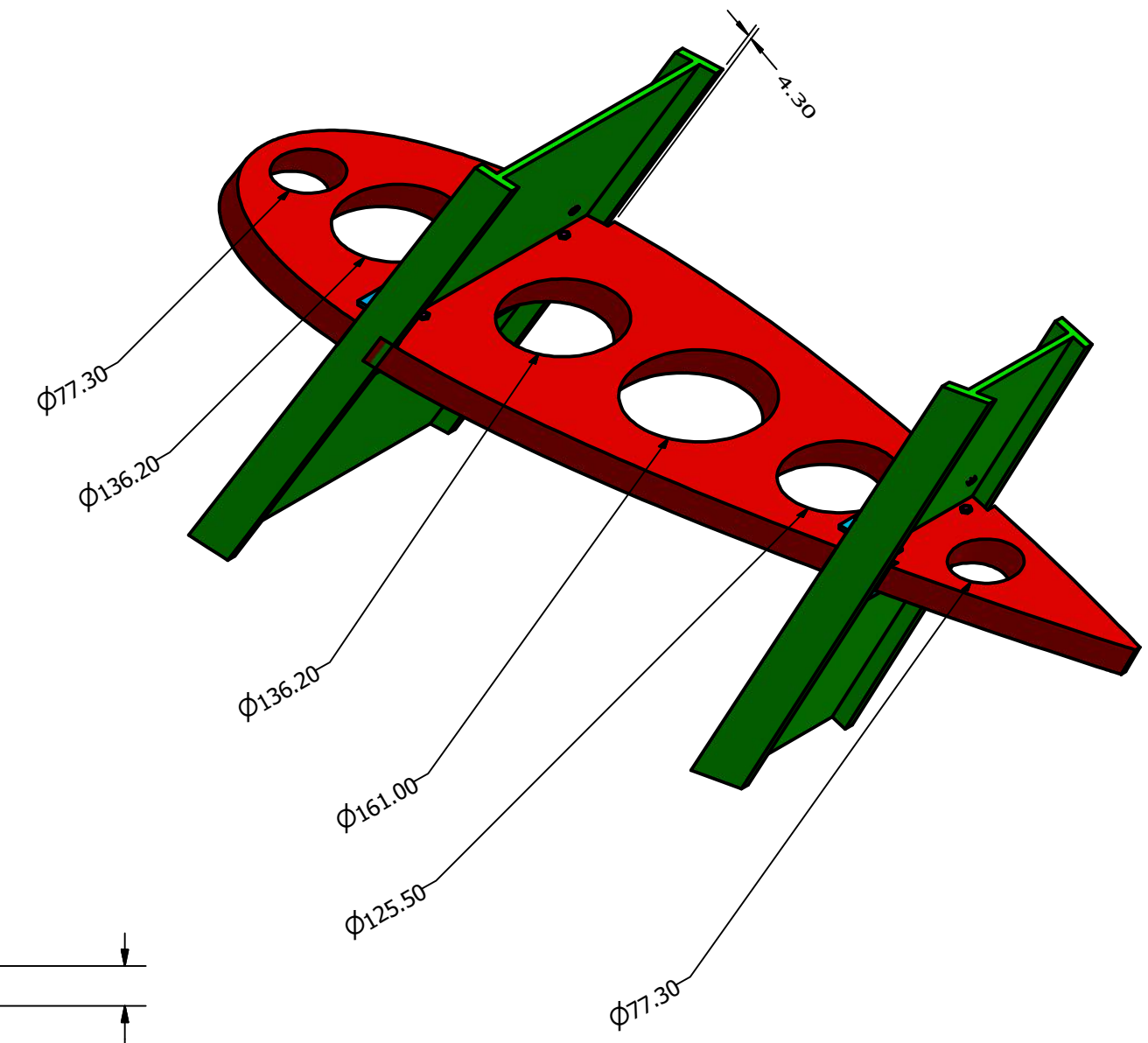
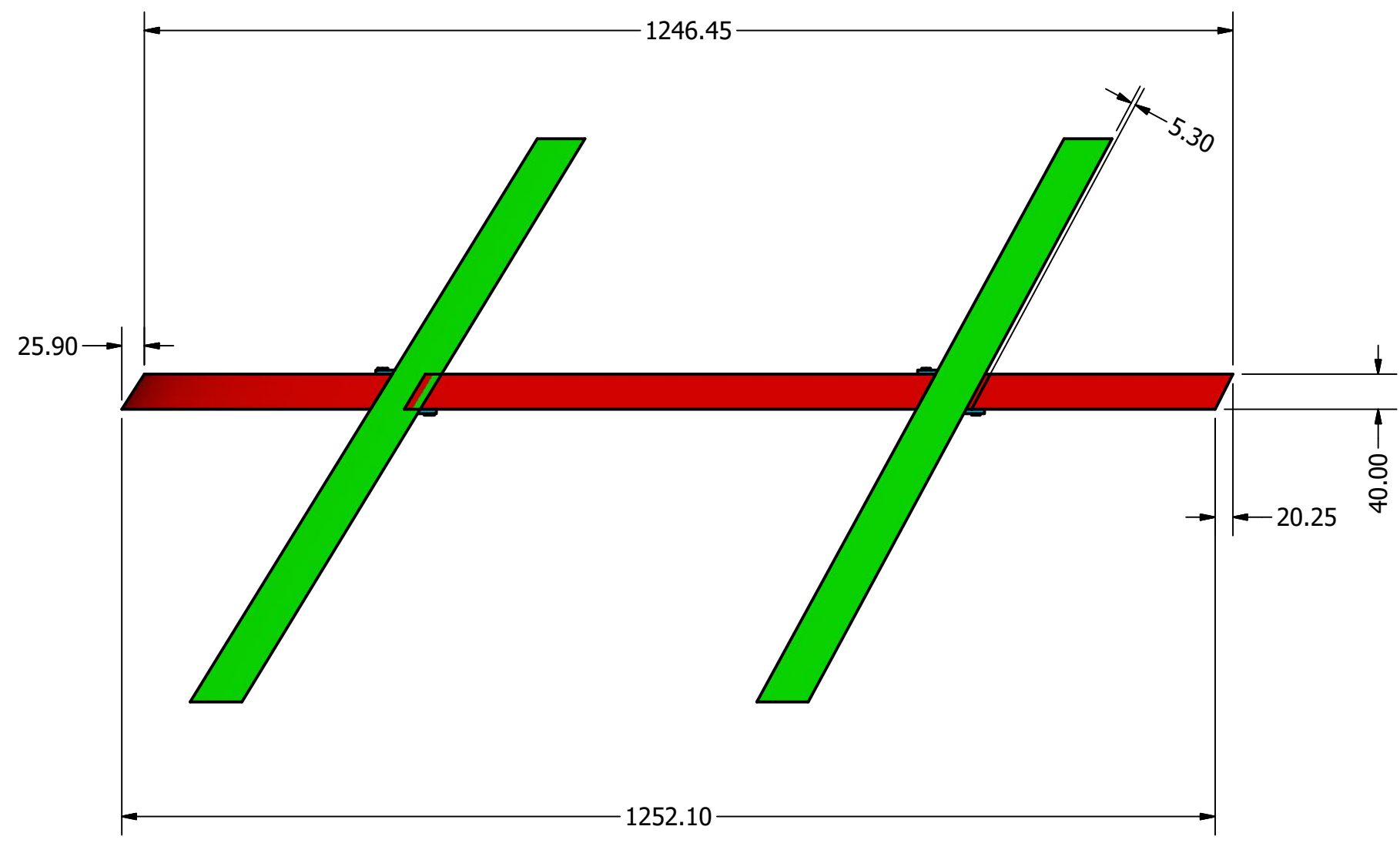
C

B

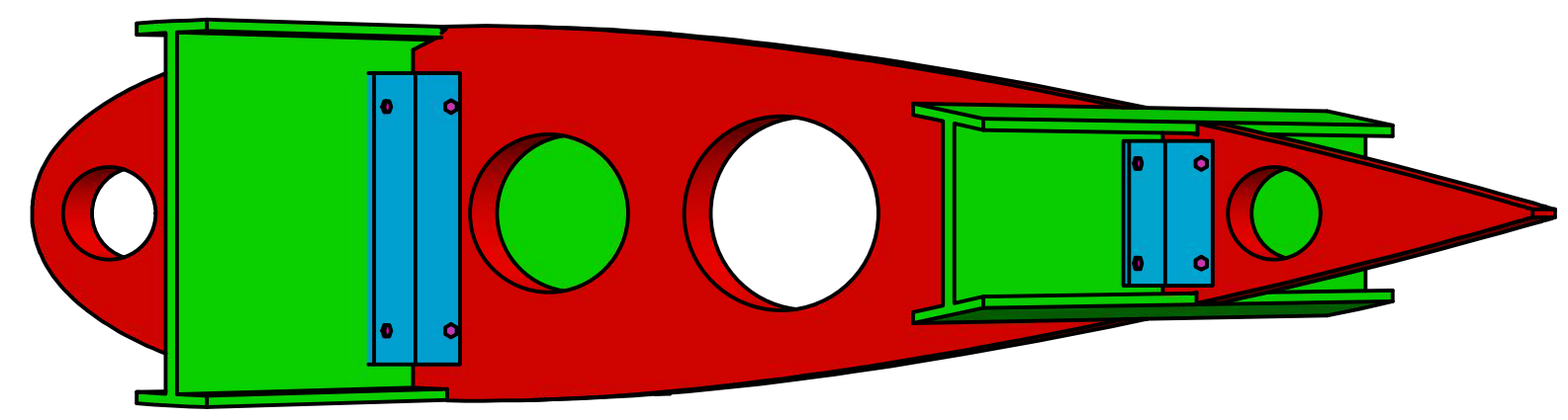
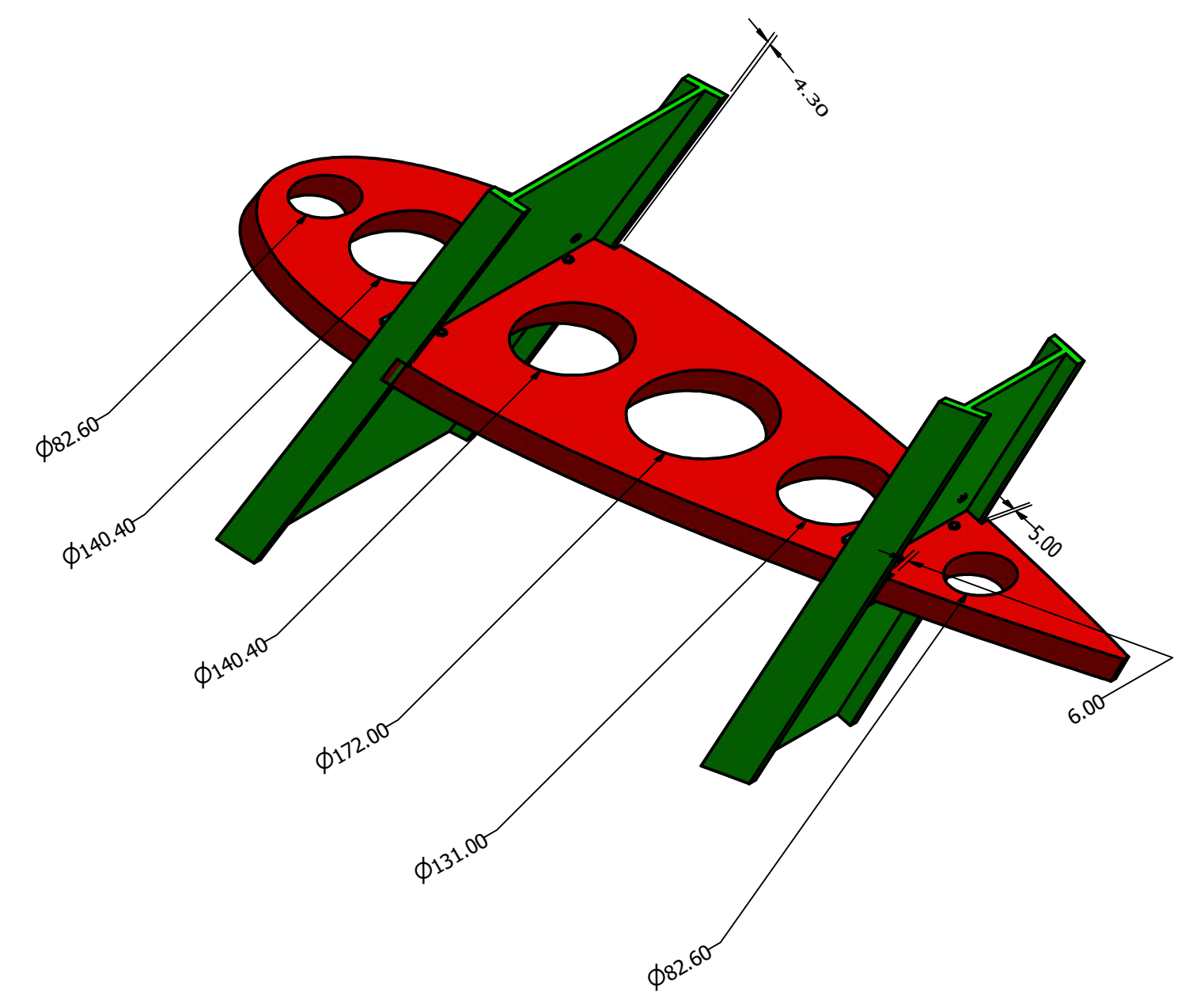
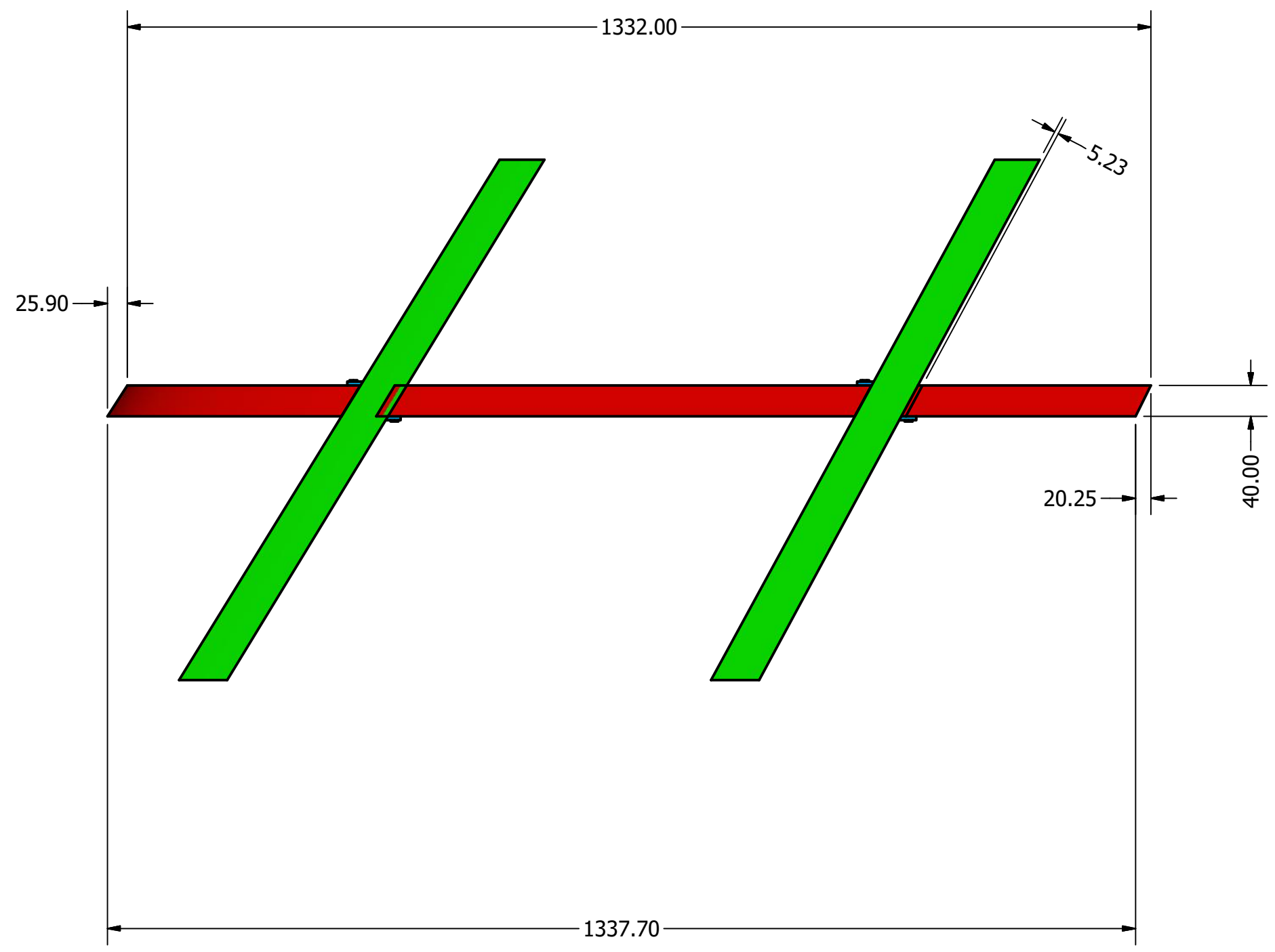
B

A

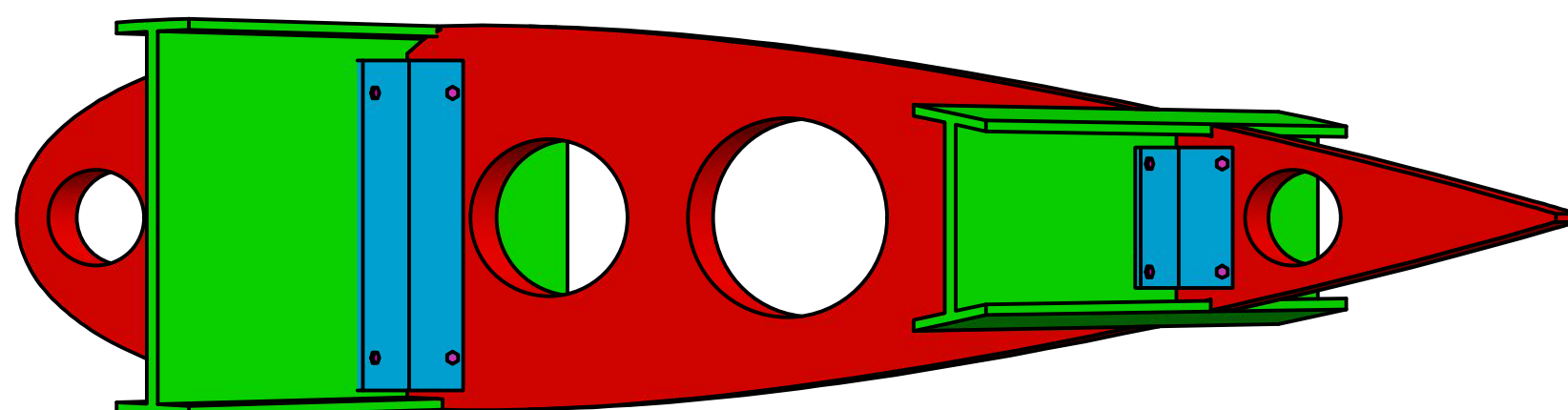
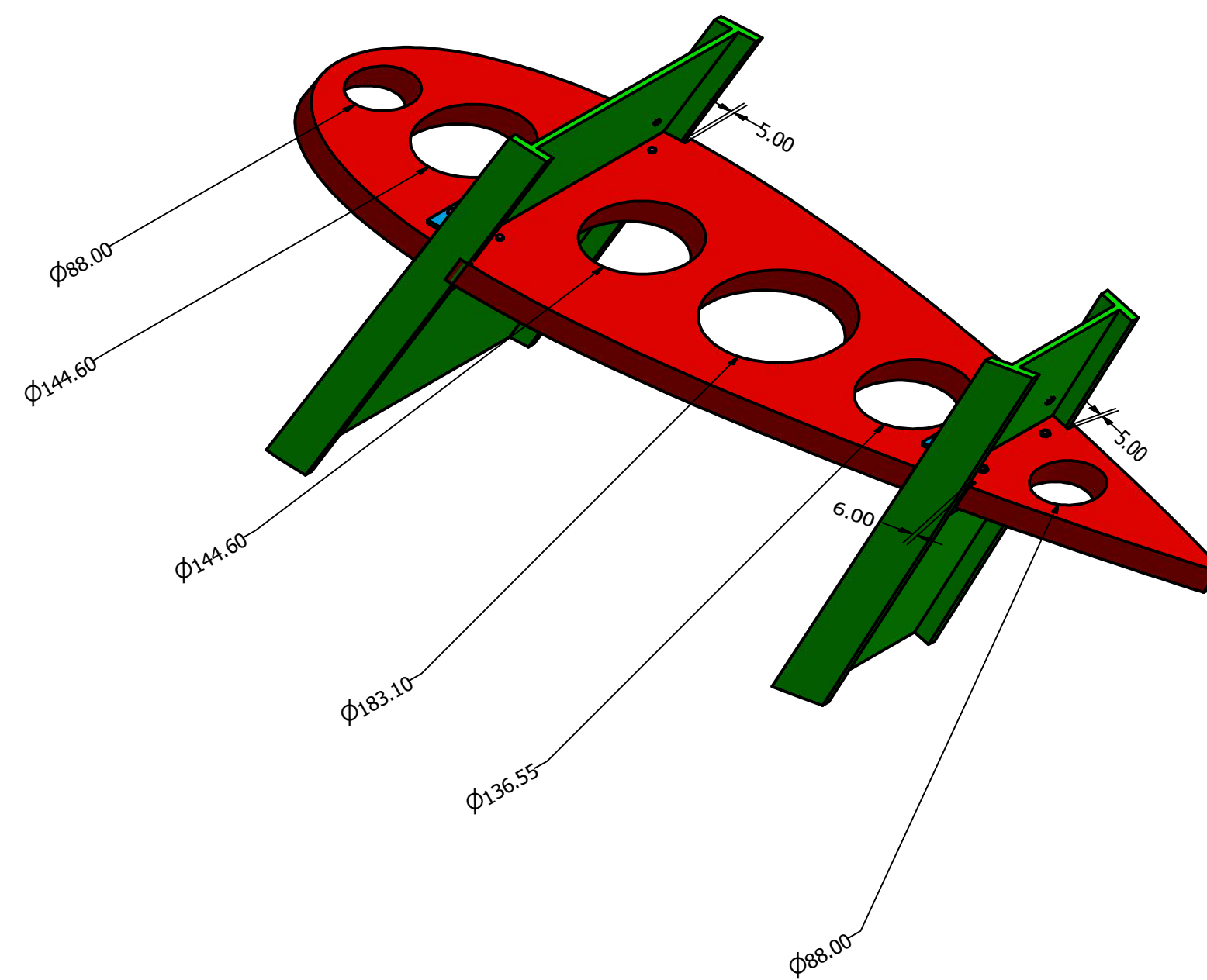
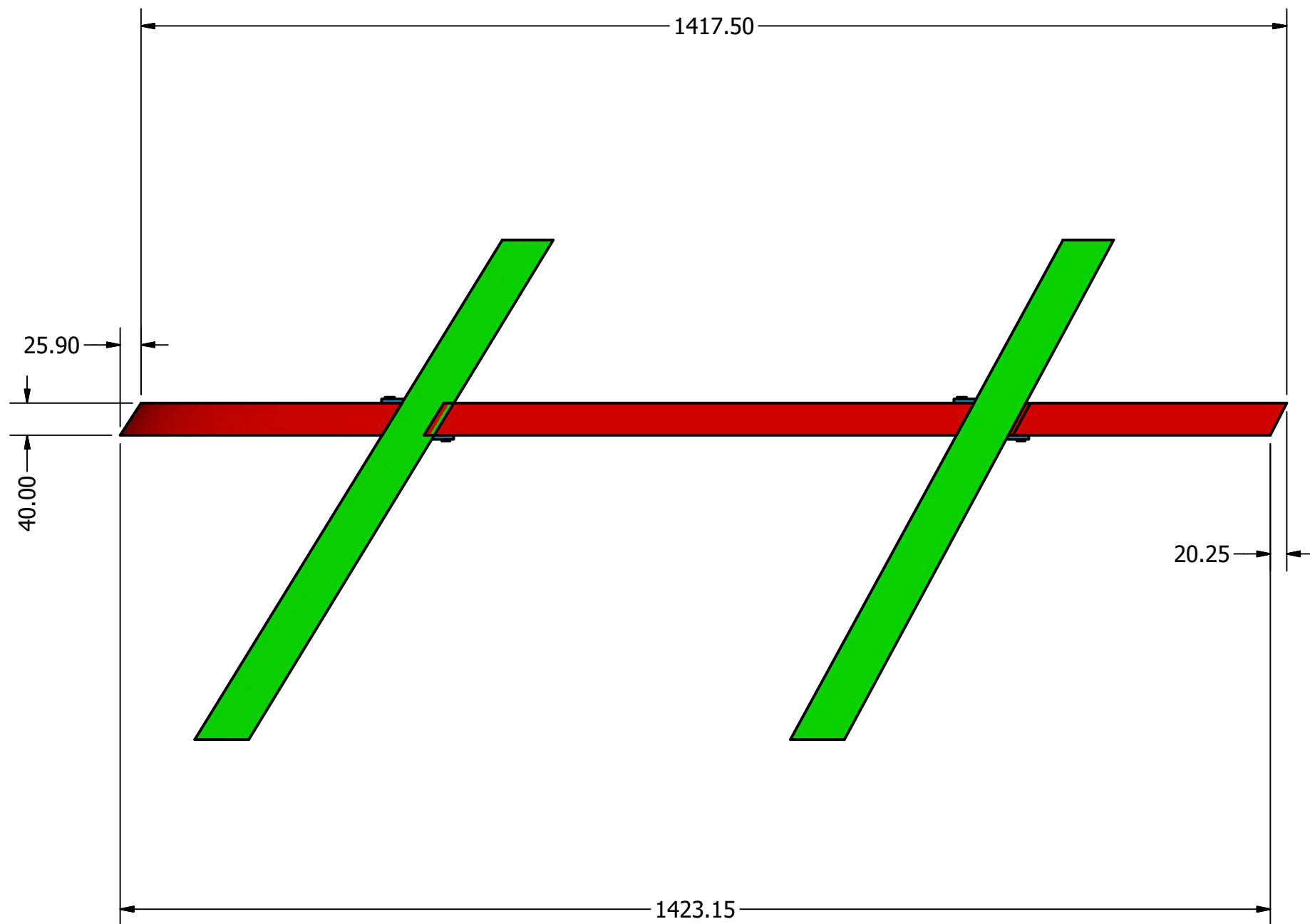
A



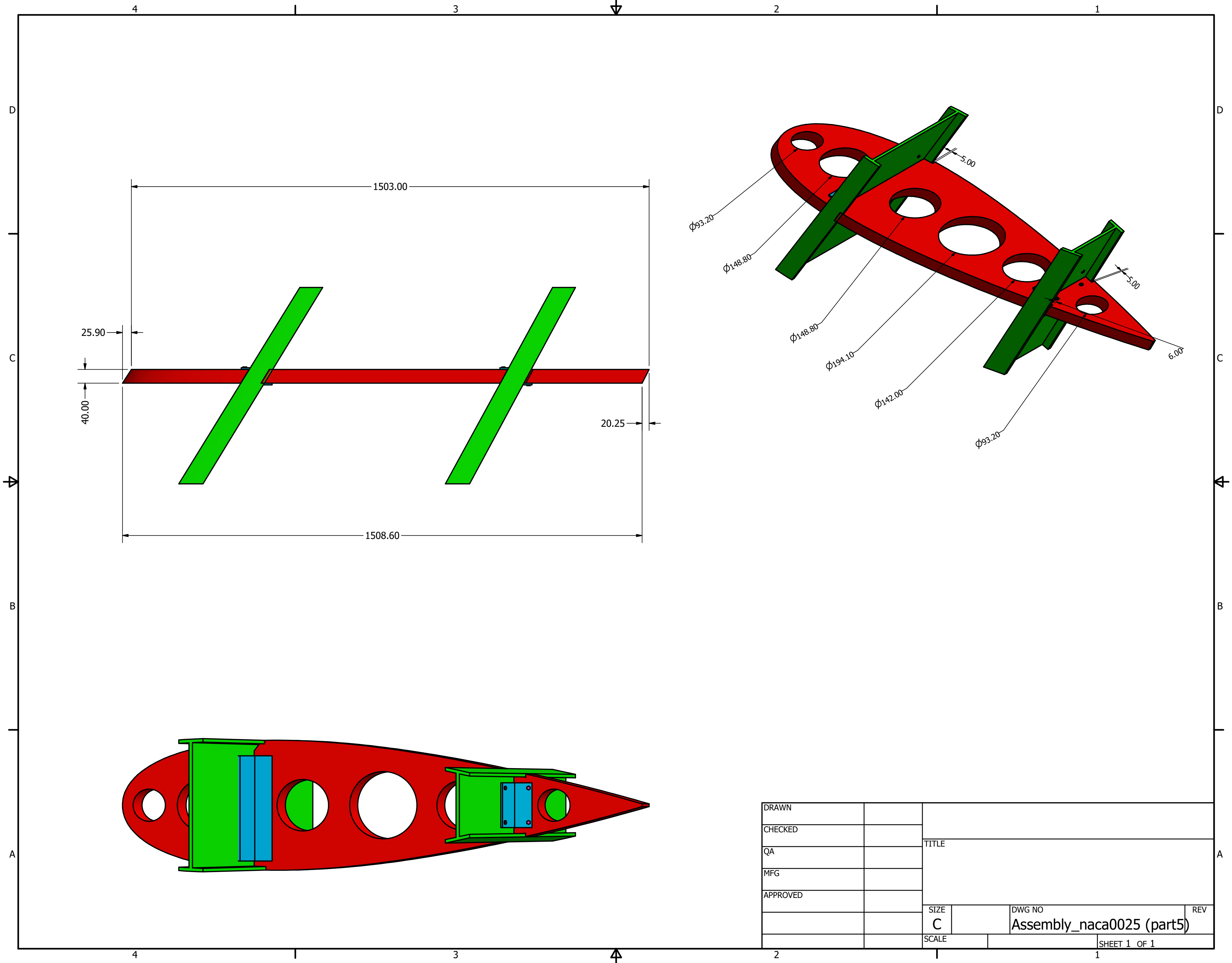
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part2)	
		SCALE	SHEET 1 OF 1	



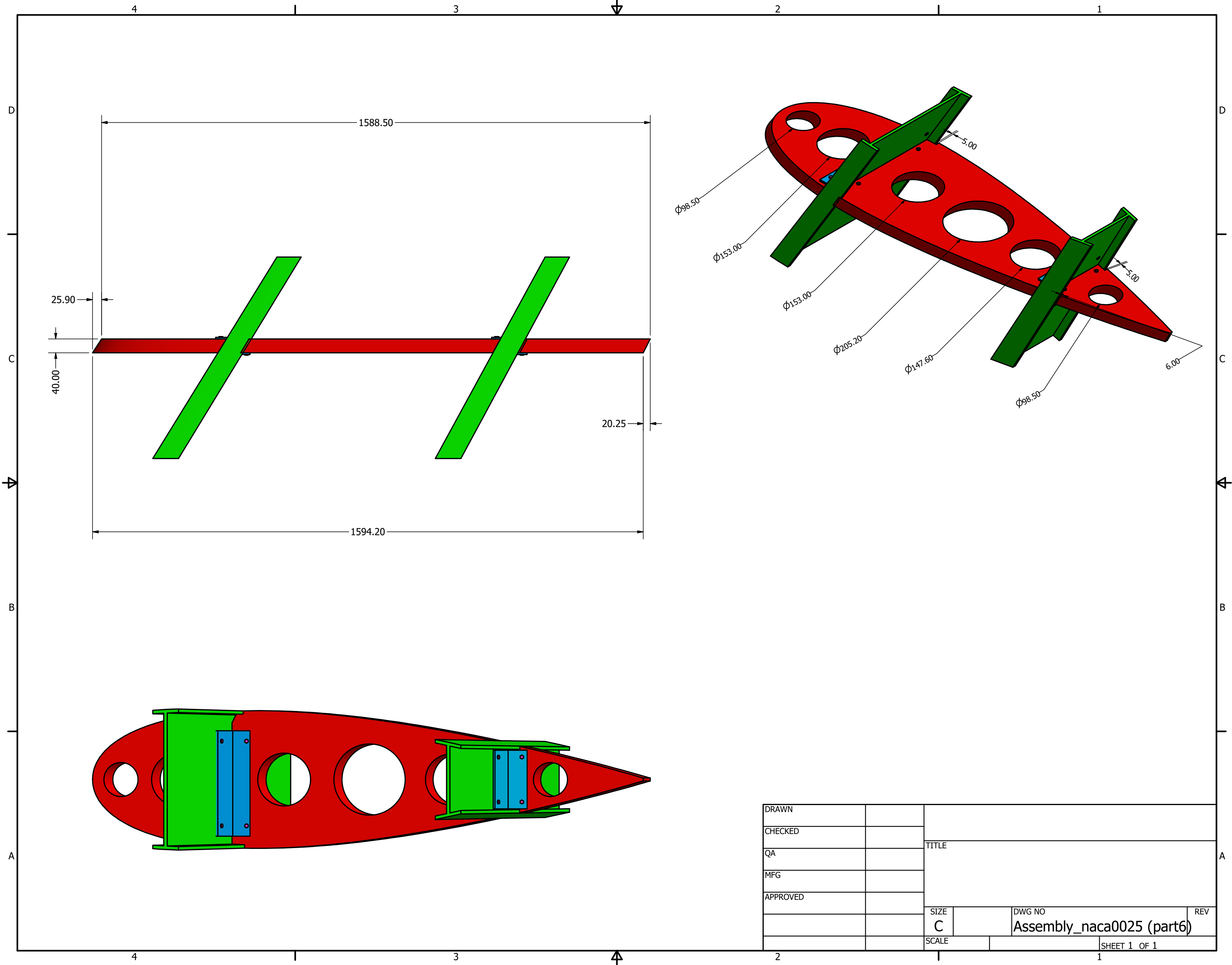
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part3)	
		SCALE	SHEET 1 OF 1	



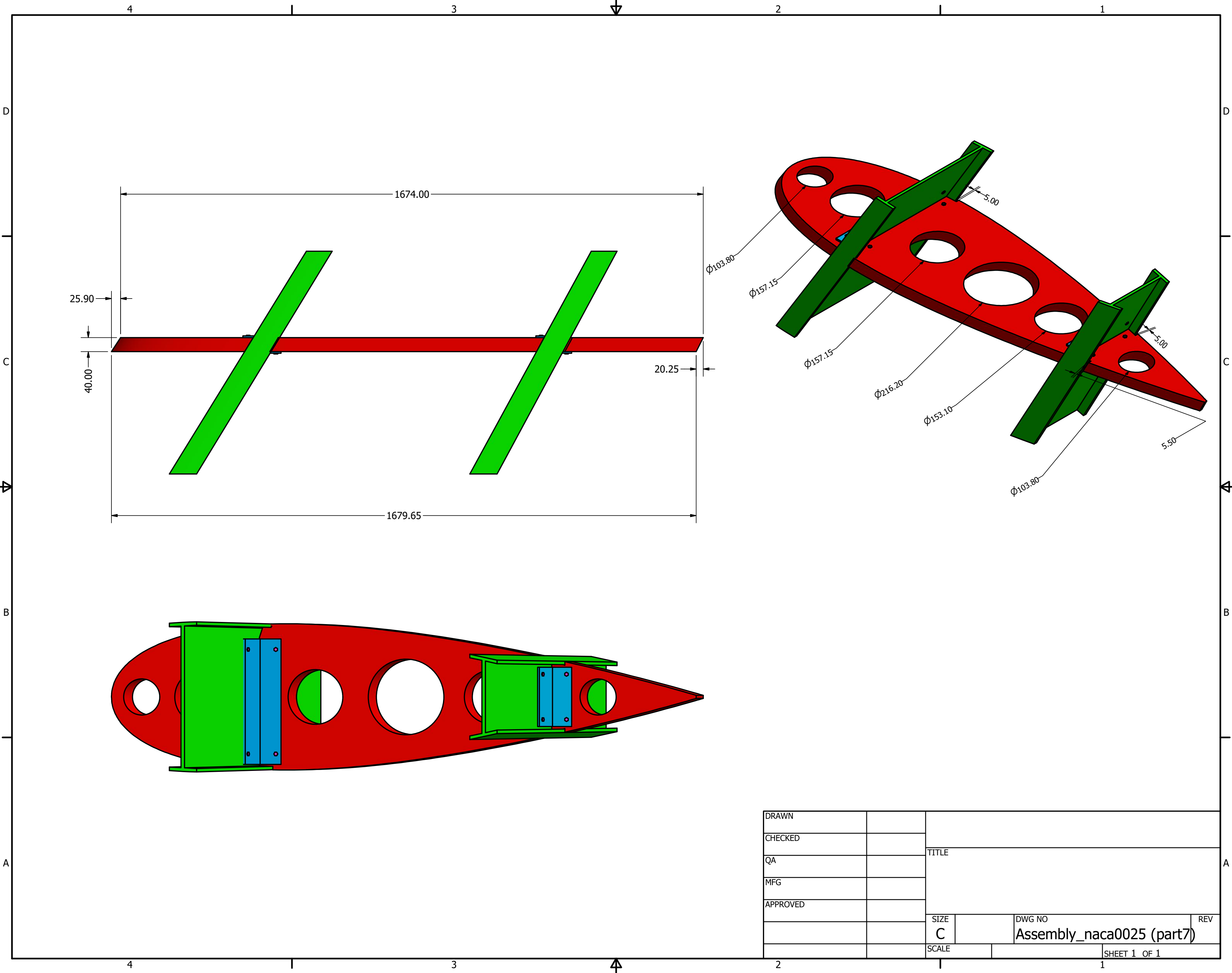
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part4)	
		SCALE	SHEET 1 OF 1	



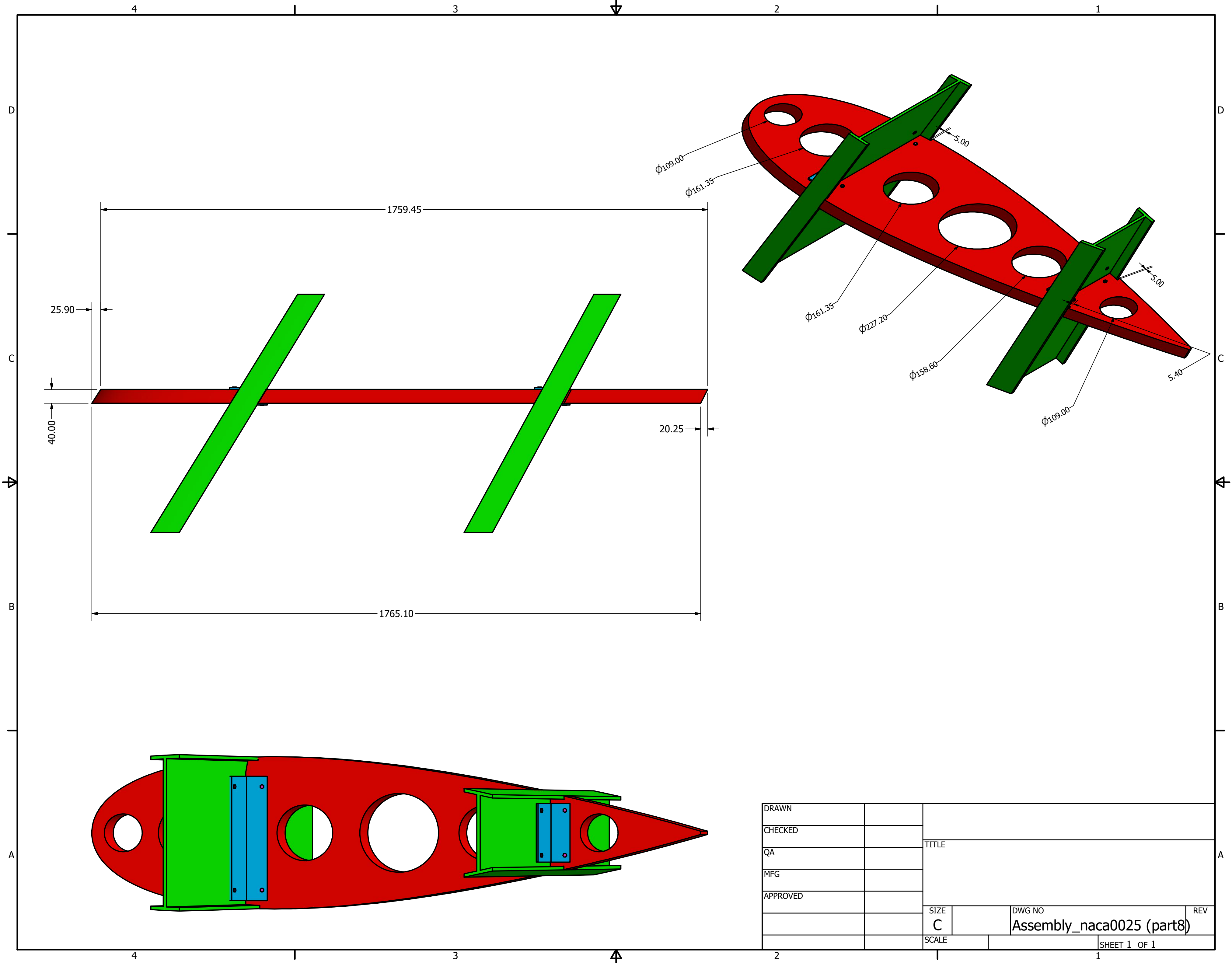
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part5)	
		SCALE	SHEET 1 OF 1	



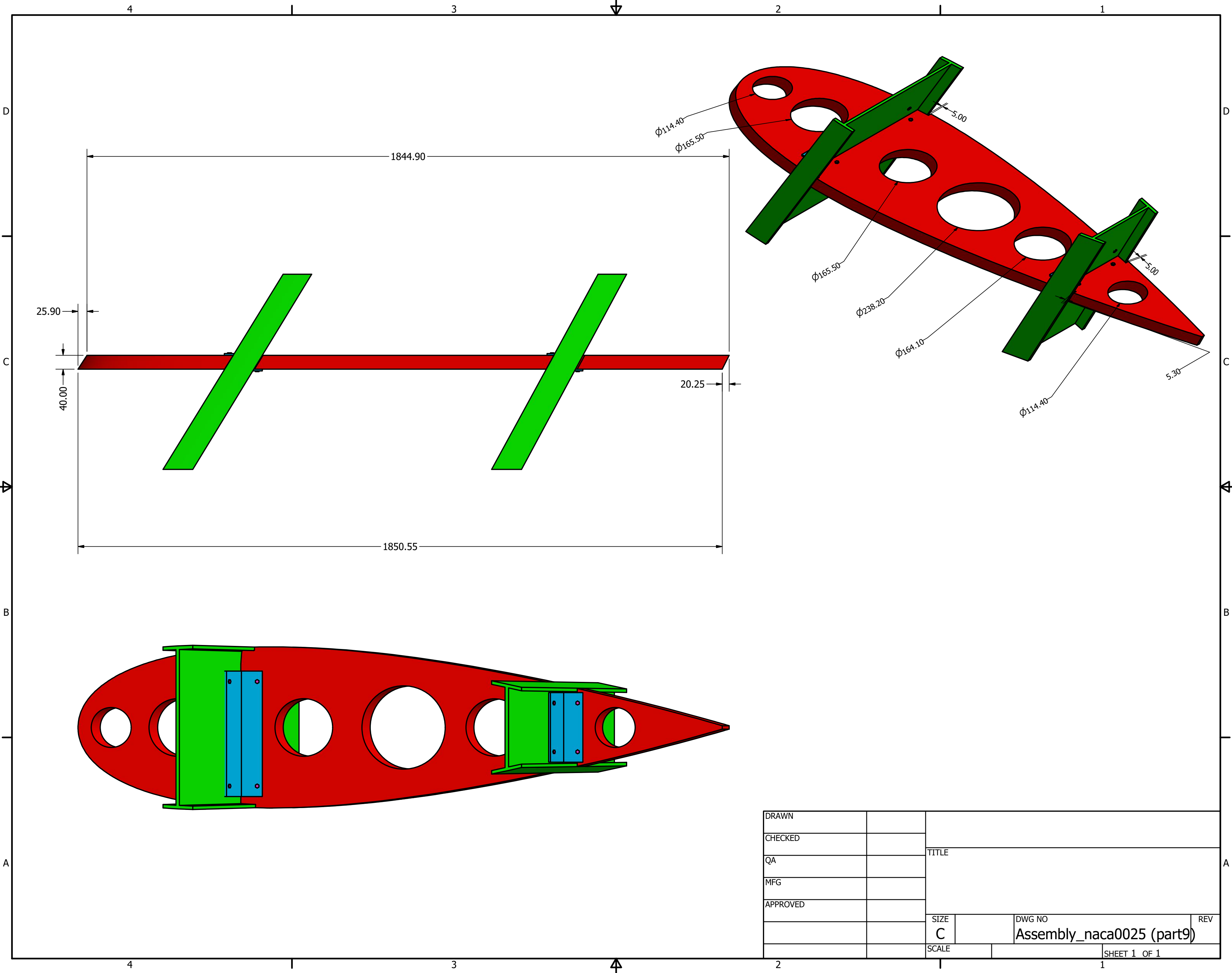
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part6)	
		SCALE	SHEET 1 OF 1	



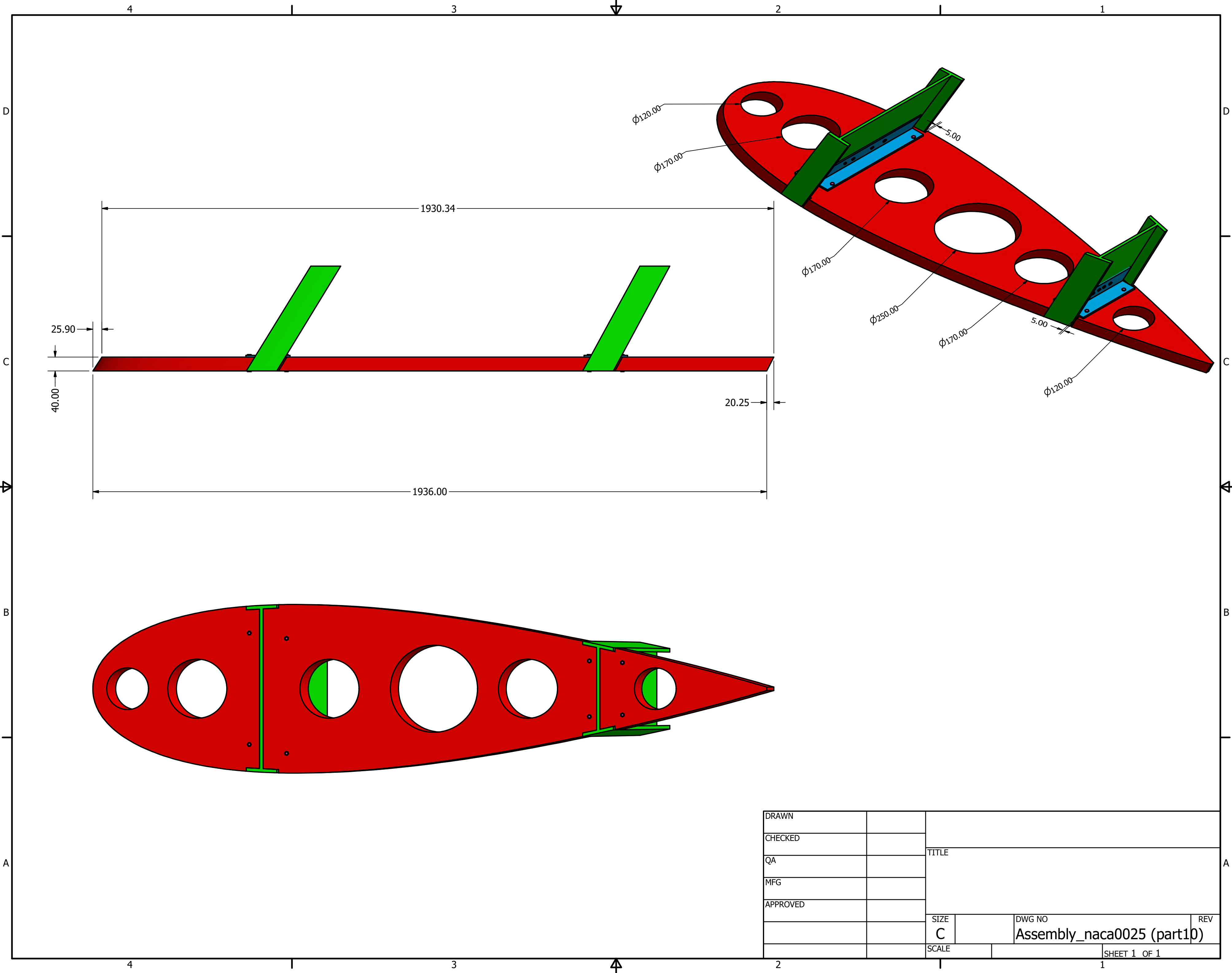
DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part7)	
		SCALE	SHEET 1 OF 1	



DRAWN		TITLE		
CHECKED		TITLE		
QA		TITLE		
MFG		TITLE		
APPROVED		TITLE		
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part8)	
		SCALE	SHEET 1 OF 1	



DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part9)	
		SCALE	SHEET 1 OF 1	



DRAWN		TITLE		
CHECKED				
QA				
MFG				
APPROVED				
		SIZE	DWG NO	REV
		C	Assembly_naca0025 (part10)	
		SCALE	SHEET 1 OF 1	