

Kontes Robot ABU Indonesia 2018 KRAI - 2018

**Menuju
ABU ROBOCON 2018
Ninh Binh - Vietnam**

**Direktorat Kemahasiswaan
Direktorat Jenderal Pembelajaran dan Kemahasiswaan
Kementerian Riset, Teknologi dan Pendidikan Tinggi
Jakarta**

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Latar Belakang

Kontes Robot Indonesia (KRI) telah mulai dilaksanakan sejak tahun 1993, oleh Politeknik Elektronika Negeri Surabaya (PENS) secara lokal dengan mengundang sejumlah peserta dari Perguruan tinggi Negeri maupun Swasta di Indonesia, dengan mengadopsi aturan pertandingan saat itu dari NHK ROBOCON di Jepang. Pemenang kontes robot ini dikirim untuk bertanding di NHK-Robocon –Jepang dibantu dengan dana kerjasama Indonesia-Jepang, (Jaica), Tim Robot dari Indonesia waktu itu, yang diwakilkan oleh tim robot dari PENS, menjadi satu-satunya tim robot dari luar Jepang yang mengikuti kontes NHK_Robocon ini.

Pada tahun 2001, Direktorat jenderal pendidikan tinggi mengambil inisiatif untuk mendanai kontes robot ini sebagai salah satu ajang kompetisi kreativitas mahasiswa perguruan tinggi di Indonesia, dan dimulailah Kontes Robot Indonesia yang pertama (KRI 1) secara resmi didanai DitJenDIKTI (saat itu) melalui program Penelitian dan Pengabdian kepada masyarakat (P2M-DIKTI). Kontes ini dilaksanakan di PENS Surabaya, diikuti sekitar 23 tim dari berbagai perguruan tinggi di Indonesia. Tim Robot *Becak* dari PENS sebagai pemenang KRI 1 dikirim untuk mewakili negara Indonesia ke Jepang, dan berhasil mendapatkan Juara Pertama dalam kontes robot NHK-Robocon di FUKUSIMA – Jepang. Dan sejak tahun 2002, NHK Robocon diubah menjadi ABU Robocon yang disponsori oleh Asian Broadcasting Union (ABU) sebagai organisasi penyiaran program Televisi yang memiliki lebih dari seratus anggota stasiun televisi dari berbagai negara di dunia. Dalam hal ini Indonesia diwakili oleh Televisi Republik Indonesia (TVRI) sebagai anggota. Pertandingan ABU Robocon yang pertama dilaksanakan pada tahun 2002 di Tokyo-Jepang.

Sejak Tahun 2001 dan seterusnya, Kontes Robot Indonesia (KRI) diadakan setiap tahun sekali, dengan mengambil Tema yang sesuai dengan Tema yang digunakan dalam ABU Robocon agar Tim dari Indonesia dapat menjadi salah satu peserta yang mewakili negara Indonesia. Sehubungan dengan ABU sebagai sponsor utama acara ABU Robocon, maka di Indonesia harus diwakili oleh TVRI sebagai Televisi anggota ABU yang mewakili negara Indonesia ini. Sehingga dalam hal ini TVRI bekerjasama dengan Dikti untuk memfasilitasi keikutsertaan Tim Robot dari Indonesia agar dapat bertanding dalam kontes internasional ABU Robocon ini.

Tahun 2018 ini, Indonesia kembali akan mengikuti kontes robot tingkat Internasional ABU Robocon 2018 yang akan berlangsung di Ninh-Binh, Vietnam, pada tanggal 26 Agustus 2018, yang merupakan lomba yang ketujuhbelas, dimana Tim Robot yang mewakili Indonesia akan berkompetisi dengan 20 tim Robot peserta dari negara-negara anggota Asia-Pacific Broadcasting Union (ABU) di seluruh dunia. Seleksi dan evaluasi tim robot yang akan mewakili Indonesia, dilakukan melalui kontes Robot ABU Indonesia (KRAI) yang dilaksanakan secara bertahap dalam bentuk kontes tingkat Regional dan tingkat Nasional.

KRAI dilaksanakan bekerjasama dengan Perguruan Tinggi yang ditunjuk untuk pelaksanaan Kontes tingkat regional dan Kontes tingkat Nasional. Tim yang mewakili Indonesia akan dipilih melalui seleksi dalam Kontes Robot ABU Indonesia 2018 (KRAI- 2018) yang akan diselenggarakan secara bertahap dimulai dengan Kontes Regional pada 4(empat) wilayah yaitu Bandar Lampung, **Bandung**, Semarang, dan Surabaya sesuai dengan jadwal yang telah ditentukan. Pemenang dari ke-empat Kontes Regional akan diundang untuk ikutserta dalam Kontes Nasional KRAI-2018 yang akan berlangsung pada **tanggal 28 Juni - 01 Juli 2018 di ITS Surabaya**.

Sebanyak dua puluh empat tim terbaik dari kontes regional, yang memenuhi persyaratan dan lolos seleksi, dapat berpartisipasi dalam kegiatan kontes Nasional KRAI-2018. Ketentuan pertandingan KRAI-2018 mengacu kepada aturan baku dari ABU Robocon 2018, dimana setiap tim terdiri dari 3(tiga) orang mahasiswa dan 1(satu) orang dosen pembimbing, yang akan merancang, membuat, mengoperasikan dan mengatur strategi robot manual atau robot otomatis yang akan digunakan.

Pemenang Juara pertama kontes Nasional KRAI-2018 akan mewakili Indonesia dalam ABU Robocon 2018 yang dilaksanakan pada tanggal 26 Agustus 2018 di Ninh Binh, Vietnam.

Tema:

Tema untuk Kontes Robot ABU Indonesia (KRAI) 2018 adalah

“Lempar Bola Berkah”

Tema ini diselenggarakan dengan tema yang telah ditentukan oleh ABU Robocon 2018 yaitu

““NÉM CÒN” The Festival Wishing Happiness and Prosperity”

Sistim Pertandingan

- Setiap tim terdiri dari tiga mahasiswa dan satu pembimbing, dengan maksimum tiga orang mekanik yang bertugas membantu di pit-stop dan set-up saat persiapan 60 detik diawal sesi.
- Setiap tim hanya membuat dua buah robot, boleh terdiri dari satu robot manual dan satu robot otomatis, atau kedua-duanya robot otomatis. Tetapi hanya satu robot otomatis yang boleh digunakan untuk melempar bola.
- Robot berukuran maksimal 1000mm(L) x 1000mm(W) x 1000mm(H), dan setelah robot bergerak dalam sesi pertandingan, maka ukuran robot seluruh nya tidak boleh melebihi 1500mm(L) x 1500mm(W) x 1800mm(H). termasuk rak bola yang dibawa.
- Berat setiap robot beserta kelengkapan nya tidak boleh melebihi 25 kg.
- Batas tegangan catudaya tidak melebihi 24 V, pencatu tekanan pneumatik maksimal 600kPa.
- Lapangan berbentuk persegi empat dengan ukuran 14.000mm x 14.000mm, dikelilingi kayu setinggi 100mm dengan tebal 50mm, terbagi menjadi dua area untuk tim biru dan tim merah beserta area NC (No Contact Area) yang berwarna biru langit dibagian tengah.
- Area untuk masing-masing tim terdiri dari beberapa zona, yaitu “Start Zone”, “Loading Zone(LZ)”, “Throwing Zone(TZ)”, “Manual Robot Area” dan “Automatic Robot Area”.
- Dalam area NC, terdapat tiga buah “Ring Tree” (tiang), dua buah tiang dengan gelang “Normal Ring” dan satu buah tiang dengan gelang “Golden Ring” diujung nya, serta dua buah “GoldenCup (GC)”.
- Sebelum pertandingan dimulai, tim diberikan waktu persiapan 60 detik, dalam waktu tersebut 10(sepuluh) buah bola-normal(Normal-Shuttlecock) dan 5(lima) buah bola-emas(Golden Shuttle cock).yang telah dibuat oleh masing-masing Tim peserta, sudah harus ditempatkan didalam Loading Zone (LZ). Tim dapat menggunakan rak buatan tim nya sebagai tempat bola.
- Setelah pertandingan dimulai, robot manual harus mengambil bola-normal dan memberikan nya kepada robot otomatis, kemudian robot otomatis harus bergerak ke zona TZ1 atau TZ2 untuk melemparkan bola-normal sampai melewati “normal-ring” untuk mengumpulkan nilai.
- Robot manual baru boleh mengambil bola-emas, apabila tim telah berhasil sedikit-nya satu kali melempar bola-normal kedalam “Normal-Ring”, dan memberikan nya kepada robot otomatis.
- Setelah robot otomatis berhasil menerima bola-emas dari robot manual, maka robot otomatis harus bergerak ke zona TZ3 untuk melemparkan bola-emas tersebut ke arah “Golden Ring”, dan apabila bola berhasil melalui “golden-ring”, maka tim akan mendapatkan nilai.
- Apabila setelah bola-emas berhasil melalui golden-ring, dan kemudian jatuh tepat kedalam “Golden-Cup”, maka tim berhasil mencapai “**Rong Bay**” dan tim tersebut dinyatakan sebagai pemenang, dan pertandingan dihentikan.
- Pertandingan hanya berlangsung 3(tiga) Menit.
- Apabila tidak ada tim yang mencapai “Rong Bay”, dan waktu pertandingan 3(tiga) menit sudah habis, maka pertandingan dihentikan dan tim yang berhasil mengumpulkan Nilai tertinggi dinyatakan sebagai pemenang.
- Peraturan selengkapnya dapat dibaca pada lampiran B dari buku panduan ini.

Peserta

KRAI 2018 dapat diikuti tim mahasiswa dari institusi atau perguruan tinggi Negeri dan perguruan tinggi Swasta yang **terdaftar di Kemenristekdikti**. Setiap Tim calon peserta harus mengajukan proposal kepada panitia pusat KRI2018 dengan persetujuan Wakil Rektor/Ketua/Direktur Bidang Kemahasiswaan masing-masing Perguruan Tinggi. Borang Pendaftaran/proposal (*Application Form*) dapat dilihat pada lampiran A. Proposal merupakan Registrasi awal yang harus diajukan kepada Panitia KRI-2018.

Setiap tim calon peserta harus mendaftar dengan mengunggah softcopy proposal dalam format pdf secara on-line melalui alamat Website : <https://kontesrobotindonesia.id> dan juga wajib mengirimkan ke alamat email : harunnasrullah@gmail.com. Ukuran file softcopy maksimal 2(dua) Mbyte termasuk scan copy surat pengantar resmi dari pimpinan perguruan tinggi, dengan nama file/folder "**KRAI_NamaPT_NamaTim**". Calon peserta juga HARUS mengirimkan hardcopy 1(satu) set proposal ke alamat Dirmawa.

Pengiriman proposal softcopy dan hardcopy selambat-lambatnya sudah diterima di panitia **tanggal 08 Januari 2018**. Setiap Perguruan Tinggi **hanya diperkenankan untuk mengirim satu Tim peserta KRAI**. Semua proposal yang masuk ke sekretariat panitia akan dievaluasi oleh panitia.

Tahapan Evaluasi

Evaluasi dilakukan dalam beberapa tahap yaitu:

Evaluasi tahap pertama merupakan evaluasi administratif. Proposal yang diterima dan disetujui oleh panitia pusat akan diberitahukan kepada calon peserta melalui surat pemberitahuan ke alamat masing-masing dan melalui website Panitia pusat sesuai dengan jadwal yang sudah ditentukan.

Evaluasi tahap kedua dilakukan melalui laporan kemajuan dalam rekaman Video yang dibuat oleh peserta.

Kriteria evaluasi yang digunakan adalah :

- Kemajuan rancang bangun Mekanik Robot
- Sistem Kontrol Robot, Sensor dan Rangkaian Interface
- Strategi melakukan pelemparan bola-normal dan bola-emas
- Kemampuan Maksimal Robot sampai pada saat tahapan evaluasi ini.

Evalusi tahap ketiga dilakukan melalui pertandingan KRAI tingkat regional yang akan dilaksanakan di empat tempat. Regional I bertempat di Bandar Lampung, Regional II bertempat di **Bandung**, Regional III bertempat di Semarang, Regional IV bertempat di Surabaya.

Peserta yang lolos evaluasi tingkat regional dan mengikuti KRAI–2018 tingkat Nasional di ITS- Surabaya, akan mendapatkan bantuan dana pembinaan pembuatan robot yang nilainya akan ditentukan kemudian, bantuan biaya transportasi kelas ekonomi dari perguruan tinggi ke tempat pelaksanaan KRAI Nasional serta akomodasi Tim, terdiri dari 3(tiga) mahasiswa dan 1(satu) dosen pembimbing, pembiayaan anggota mekanik tidak ditanggung. Khusus untuk tim peserta dari pulau Jawa, hanya diperkenankan menggunakan transportasi darat kelas ekonomi.

Penghargaan

Panitia menyediakan penghargaan bagi Tim Robot Juara Pertama, Juara Kedua, Juara Ketiga, Juara Harapan, Desain terbaik, Strategi terbaik dan penghargaan lain yang akan ditentukan oleh panitia kemudian.

Juara pertama kontes Nasional KRAI-2018 akan menerima piala bergilir Kontes Robot ABU Indonesia yang bernama **Sambhawana Pratimacala**. dan akan ditunjuk untuk mewakili Indonesia, dalam ABU Robocon 2018 yang akan dilaksanakan pada tanggal 26 Agustus 2018 di Ninh Binh - Vietnam.

Alamat Penyelenggara

Panitia Pusat Kontes Robot Indonesia 2018
Direktorat Kemahasiswaan
Direktorat Pembelajaran dan Kemahasiswaan
Kementerian Riset, Teknologi dan Pendidikan Tinggi.
Gedung D, lantai 4.
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Jakarta Pusat 10270
Telp. 021 57946100 ext.0433,
Fax. 021-5731846, 57946085
Website : <https://kontesrobotindonesia.id>
E-mail : harunnasrullah@gmail.com;
wahidin.wahab@kontesrobotindonesia.id
Mailing list: kri@groups.eepis-its.edu dan krci@groups.eepis-its.edu

Informasi Lanjut

Panitia akan memberikan arahan dan informasi lanjut dalam milis:

kri@groups.eepis-its.edu,

Tim Peserta dapat membaca FAQ dengan langsung membuka situs resmi ABU Robocon 2018 di alamat :

<http://www.aburobocon2018.vtv.vn>

Borang Pendaftaran Peserta

KRAI - 2018

KONTES ROBOT ABU INDONESIA 2018

“Lempar Bola Berkah”

(“NÉM CÒN” The Festival Wishing Happiness and Prosperity)

Borang Pendaftaran/Proposal

1. Setiap Perguruan Tinggi hanya diperkenankan mengirim **satu** proposal KRAI kepada panitia pusat pelaksana KRI.
2. Borang pendaftaran harus disetujui oleh Pembantu/Wakil Direktur/Ketua/Rektor bidang Kemahasiswaan Perguruan Tinggi calon peserta.
3. Borang pendaftaran/proposal harus sudah diterima panitia Kontes Robot Indonesia 2018 paling lambat tanggal 08 Januari 2018, dengan alamat:

SoftCopy di Unggah Kealamat : <https://kontesrobotindonesia.id>

Dan dikirim ke email : harunnasrullah@gmail.com;

HardCopy dikirim ke-alamat:

Panitia Pusat Kontes Robot Indonesia 2018
Direktorat Kemahasiswaan
Direktorat Pembelajaran dan Kemahasiswaan
Kementerian Riset, Teknologi dan Pendidikan Tinggi.
Gedung D, lantai 4.
Jln Jenderal Sudirman, Pintu 1 Senayan
Jakarta Pusat 10270
Telp. 021 57946100 ext.0433,
Fax. 021-5731846, 57946085

4. Hardcopy Proposal dijilid dengan kulit **warna merah muda** jadi satu bendel (jilid), berisi informasi lengkap tentang nama anggota tim, nama pembimbing, institusi, alamat lengkap, nomor telepon, e-mail, dan nomor hp, yang mudah dihubungi, serta informasi lengkap tentang robot yang akan dibuat meliputi desain, gambar konstruksi, strategi, dan algoritma pengendalian robot dan lainnya.
5. Proposal tidak boleh melebihi maksimal 25(duapuluh lima) halaman termasuk semua gambar, daftar isi dan lampiran.
6. Masing-masing tim mengirimkan hanya satu set proposal ke-panitia KRI 2018.
7. Softcopy Proposal dikirim ke alamat website KRI, <https://kontesrobotindonesia.id> sesuai dgn informasi dalam panduan.
8. Proposal akan diseleksi Panitia KRI sesuai dengan kriteria seperti telah disebutkan dalam buku panduan KRAI. Tim yang lolos seleksi administrasi akan diumumkan pada tanggal 12 Januari 2018.

INFORMASI RINCI DARI TIM

1. TIM PESERTA

Nama Tim (Maksimum 15 huruf, gunakan nama yang mudah dibaca.) :	
Nama Ketua Tim (mahasiswa) :	Nama Pembimbing (Contact Person)
Nama Anggota Tim (mahasiswa):	
1. _____	
2. _____	

2. INSTITUSI

Nama Politeknik/Institut/Universitas lengkap	
Alamat Lengkap dan Jelas, dengan nama Kota:	
Nomor Telepon:	Nomor Fax. :
Alamat e-mail :	

3. Alamat lengkap yang mudah dihubungi, hp, telepon, fax, e-mail.

(contact person address)

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INFORMASI LENGKAP MENGENAI ROBOT

1. Nama Tim : _____

(gunakan nama tim yang mudah dibaca, maks. 15 karakter)

2. Robot :

Jenis Robot yang dibuat, Robot Manual dan/atau Robot Otomatis

Jelaskan mengenai Robot yang akan dibuat, Robot Manual dan Robot Otomatis, ukuran dimensi saat start dan saat beroperasi, Cara mengambil bola, penggunaan sensor, dan cara lempar yang akan digunakan, sistem kendali robot, dilengkapi dengan sketsa gambar bagian-bagian robot serta strateginya. Gunakan halaman tambahan bila dirasa kurang untuk menggambarkan masing-masing unit.

Tambahkan keterangan lain yang perlu untuk robot anda.

Gunakan halaman tambahan bila dibutuhkan.

3. STRATEGI

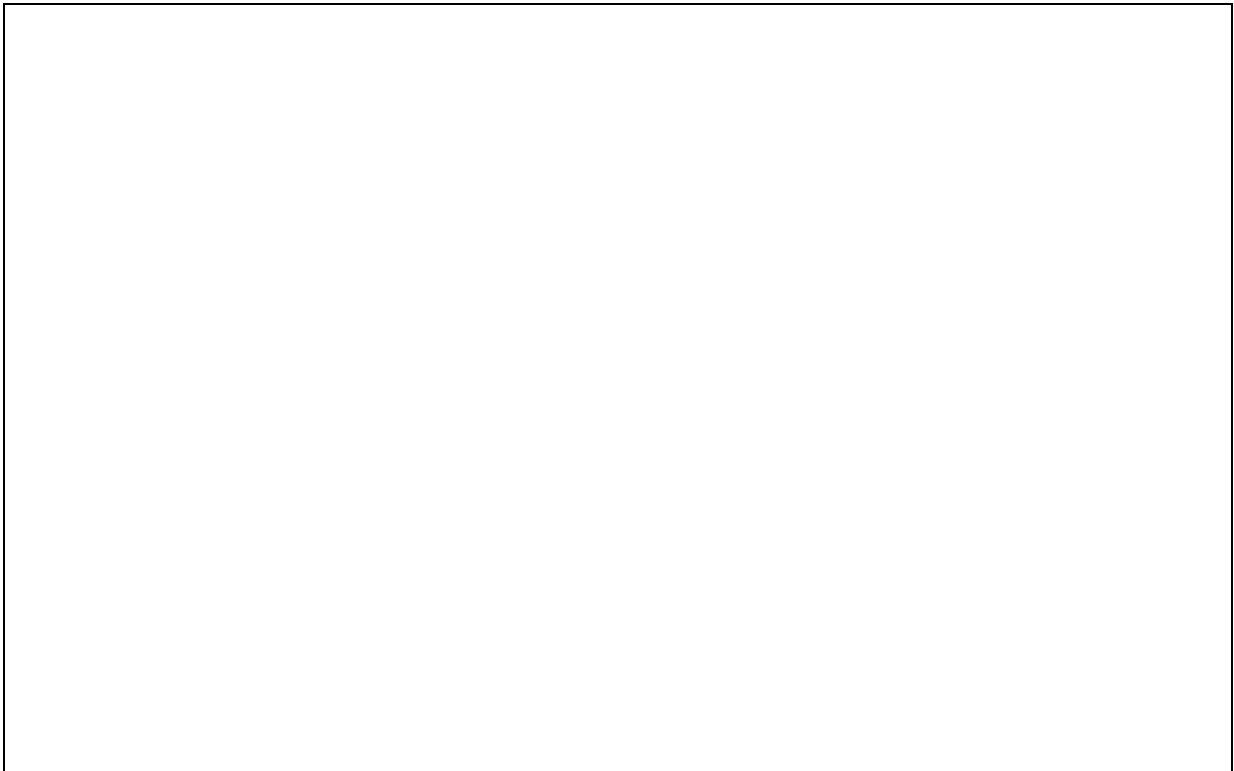
Jelaskan bagaimana strategi yang digunakan untuk mendapatkan nilai selama pertandingan. (cara gerakan robot untuk mencapai zona, cara mengambil dan melempar bola kedalam gelang dengan tepat, cara membidik lemparan bola, serta hal-hal yang lain nya yang dirasakan perlu.)



Gunakan halaman tambahan bila dibutuhkan..

4. SKETSA GAMBAR

Sketsa gambar desain lengkap dengan ukuran untuk konstruksi robot. Tambahkan gambar lengkap jika diperlukan. Gambar/skema robot hanya mencantumkan nama tim.



Gunakan halaman tambahan bila dibutuhkan.

Tema dan Peraturan
ABU ROBOCON - 2018

ABU
ASIA - PACIFIC ROBOT CONTEST 2018
NINH BINH - VIET NAM



THEME & RULES

“NÉM CÒN”

The Festival Wishing Happiness and Prosperity

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Figures and information on contest-related articles (Appendix) will be a separate file.

I. THEME

“NÉM CÒN”

The Festival Wishing Happiness and Prosperity

Vietnam is on the fast development track. However, the traditional culture is always treasured.

The concept of the ABU Robocon 2018's Theme & Rules is based on an interesting folk game called “Shuttlecock Throwing”.

So what is required for Shuttlecock Throwing?



The game consists of an open field with a 15m bamboo trunk planted in the middle.

A bamboo ring is hung on top of the bamboo stick. The ring is covered in yellow and pink papers. Yellow color represents the moon, while pink represents the sun.

The heart and soul of this game is the Shuttlecock. The shuttlecock is an object made of cotton balls or filled with rice husks, symbolizing prosperity and happiness.



The shuttlecock is hung by a string sewn to the center of the Shuttlecock. It is decorated with colorful cotton representing the colors of the rainbow.

When playing, the player holds the end of the string to swing it clockwise various times before throwing and aims for the center of the ring.

If the shuttlecock makes it through the ring, the player wins. The flying shuttlecock depicts a flying dragon, iconic of human power and the universe.



That's why the Shuttlecock Throwing Festival opening is commenced with a ceremony to pray for deities of the Land and Sky. After the first shuttlecock hits the target, it will be opened. The husks inside it are shared among the people as a wish for a prosperous year.



Nobody knows when the game started. Today, it is not only a folk game for both men and women, where they can meet and find their other halves but also a sport for players to show their skills.



In this spirit, teams of ABU Robocon 2018 are expected to design formidable robots and charismatic shuttlecocks showing their colors.

Now, let's celebrate the spirit of Shuttlecock Throwing in the ABU Robocon 2018!

II. THE IMPORTANCE OF SAFETY

In ABU Robocon, safety is a top priority. Participants shall give safety precedence over everything at all times, from the robot designing and building stages to taking part in the actual contest. They are also asked to cooperate fully with the organizer in order to ensure a safe running of the contest for everyone involved, including team members, spectators, officials and staff, as well as for the surrounding environment.

Members of all teams are required to wear sneakers, helmets and goggles when participating the game.

III. DOMESTIC CONTESTS AND CONTEST DATES

1. Domestic Contests

All domestic contests held in order to select the representing teams that will participate in ABU Robocon 2018 Ninh Binh – Vietnam should adhere to the rules laid out in this Rule Book. However, it is understood that if (a) material(s) is/are not available, organisers are to employ the best possible replacement(s) available in their country/region.

2. Contest Dates

24/8/2018 (Fri.): Arrival

25/8/2018 (Sat.): Test- run, Rehearsal

26/8/2018 (Sun.): Contest Day

27/8/2018 (Mon.): ABU General Meeting, Producers Workshop, Friendship Exchange Programme.

28/8/2018 (Tue.): Departure.

3. Contest Venue: Ninh Binh Sport Center (Ninh Binh city, Ninh Binh province)

IV. CONTEST RULES

1. Terms and Definitions

Terms	Definitions	Remark
Manual Robot	The robot which is operated by operator via wireless or cable connection. Abbreviation: MR.	
Automatic Robot	The robot which is able to work independently without any help from an operator. Abbreviation: AR.	
Manual Robot Start Zone	An area, from where the manual robot starts the game. Abbreviation: MRSZ.	See Figure 1.1
Manual Robot Area	An area which manual robot and operator are allowed to operate. Abbreviation: MRA.	
Automatic Robot Start Zone	An area, from where the Automatic Robot starts the game. Abbreviation: ARSZ.	
No Contact Area	An area which robots cannot come in contact with. Robots are able to enter the space above. Abbreviation: NC.	
Throwing Zone	An area from which Automatic Robot throws Shuttlecock. Throwing Zone consists of three zones: - The first throwing zone: Abbreviation: TZ1. - The second throwing zone: Abbreviation: TZ2. - The third throwing zone: Abbreviation: TZ3.	
Loading Zone	Areas where teams allocate Shuttlecock or Shuttlecock Rack before the game begins. Abbreviation: LZ.	
Ring	The circle attached vertically on top of Ring Tree. The Automatic Robot will throw the Shuttlecock through the Ring. Ring includes 2 types: Normal Ring and Golden Ring.	See Figure 1.4
Ring Tree	The pole attached vertically against the game field, with the Ring on top.	See Figure 1.4

Golden Cup	The Cup that receives the Golden Shuttlecock threw by Automatic Robot. Abbreviation: GC.	See Figure 1.5
Shuttlecock	The object is used during the game, with a sphere shape or other shapes. Shuttlecock is designed and made by teams with a team name or symbol or logo so that which shuttlecock belongs to which team. Shuttlecock is made of soft material (natural fiber or synthetic fiber) and is attached by Tail and Fringe. Shuttlecock has 2 types: - Normal Shuttlecock: ten (10) in whatever colors, can be single color (except for gold), or multi colors. - Golden Shuttlecock: five (5) in gold color.	See Figure 3.1
Tail	The component attached to the Shuttlecock which is used to keep and throw the Shuttlecock . Tail is made of soft material (natural fiber or synthetic fiber), not elastic and have different colors.	
Fringe	The decoration component, freely attached to different po Shuttlecock. Fringe is made of soft material (natural fiber or synthetic fiber) in different colours with minimum 3 colors.	
Keeping point	The point on the Tail, created from one or more kinks or tie the tail forming circle (without additional materials).	
Rack	Rack is used to place or hang the Shuttlecock, designed and made by teams. Team can make as many racks as they wish and there is no regulation in dimension. All the Shuttlecock Racks have to be fit inside the Loading Zone. Rack can be used or not used by teams.	See Figure 3.3

2. Contest Outlines

2.1 A game between two teams takes place within 3 minutes. Each team has two robot of:

- + One (1) manual robot and one (1) automatic robot or
- + Two (2) automatic robots.

Only one (1) automatic robot is allowed to throw Shuttlecock.

2.2 Game field is divided into 3 areas, including fields for the 2 teams and NC area (See figure 1.1).

2.3 A team field consists of: Start Zone, Loading Zone, Throwing Zone, Manual Robot Area, and Automatic Robot Area.

2.4 NC Area is placed with Ring Trees, Normal Rings, Golden Ring and Golden Cup.

2.5 Before a game starts, ten (10) Normal Shuttlecocks and five (5) Golden Shuttlecocks are placed inside Loading Zone.

2.6 When a game starts, Manual Robot will pick Normal Shuttlecocks and handle it to Automatic Robot.

2.7 After receiving the Normal Shuttlecock, Automatic Robot will move into TZ1, TZ2 and throw the shuttlecock at the Normal Ring. If the shuttlecock goes through the ring successfully, points will be given.

2.8 Manual Robot can go and pick up the Golden Shuttlecock only after at least one Normal Shuttlecock thrown from each TZ1 and TZ2 went through the Normal Ring successfully.

2.9 After receiving Golden Shuttlecock from Manual Robot, Automatic Robot can move to TZ3 and throw the Golden Shuttlecock at the Golden Ring. If the Golden Shuttlecock goes through the Golden Ring successfully, points will be given.

2.10 When Golden Shuttlecock is thrown through the Golden Ring and then is landed on the Golden Cup, that team will gain the victory and the match will be finished. This victory is called **“Rongbay”** (“Flying Dragon”).

2.11 If neither team reaches **“Rong bay”**, and the game time of three (3) minutes passes, the game shall end. The winner will be decided by who has the higher score at the said end of the game. In case two (2) teams get the same scores, the winner will be determined under Article 3.7.

3. Game Procedure

3.1. Set up

3.1.1 Before a game, there is one (1) minute for each team to set up, moving the robot and shuttlecocks or the rack (if any) to the regulated position.

3.1.2 Three (3) team members and up to three (3) pit crew members shall be allowed to participate in the set-up.

3.1.3 The set-up time will start right after the signal from referees and will end right after one (1) minute.

- 3.1.4 If a team fails to complete its set-up within the given one (1) minute, it may resume set-up after the start of the game by obtaining permission from the referee.

3.2 Start of the Game

- 3.2.1 When the set-up time is over, referees will signal to start the game.
- 3.2.2 Teams that complete their set-up after the start of the game shall obtain permission from the referee at that moment to commence moving their robots.
- 3.2.3 When the game starts, robots have to be abided by the Article 7.5.

3.3 Team members during the game

- 3.3.1 Team members including an operator are prohibited from entering the contest field without permission from the referee.
- 3.3.2 Other members have to stand inside the pre-assigned area out of the game field.
- 3.3.3 Team members are not allowed to touch robots without referees' permission.

3.4 Shuttlecock Loading, Handling/ Receiving and Throwing

3.4.1 Loading the Shuttlecock

Manual Robot picks the Shuttlecock in the LZ area.

In each time, Manual Robot is allowed to load one (1) or more shuttlecocks or the racks (if any).

Manual Robot can go and pick up the Golden Shuttlecock only after at least one shuttlecock thrown from each TZ1 and TZ2 went through the Normal Ring successfully.

3.4.2 Handling/Receiving the Shuttlecock

The Manual Robot must pass Automatic Robot one Normal Shuttlecock at a time. Only after the Automatic Robot has finished throwing the Normal Shuttlecock, Manual Robot can pass on the next Normal Shuttlecock.

Robots are allowed to handle and receive one (1) or more Golden Shuttlecock or the rack (if any) each time.

Handling and Receiving the Shuttlecock is considered successful only when having enough 4 factors as follows:

- + Automatic Robot successfully keeps or hold Shuttlecock or Tail or Fringe.
- + Shuttlecock is not allowed to touch the game field.
- + None of the Manual Robot part makes any contact with shuttlecock.
- + None of the Manual Robot part makes any contact with Automatic Robot.

During the process of handling and receiving shuttlecock, the Manual Robot is allowed to make contact with Automatic Robot. But, the Manual Robot is not allowed to send any signal to or control the Automatic Robot.

However, the Automatic Robot is allowed to control itself using sensors and so on.

3.4.3. Throwing the Shuttlecock

Automatic Robot is allowed to choose the order of throwing Normal Shuttlecock in TZ1, TZ2.

Only when throwing successfully at least one (1) Normal Shuttlecock in TZ1 and one (1) Normal Shuttlecock in TZ2, the Automatic Robot is allowed to take the Golden Shuttlecock.

The Automatic Robot is allowed to carry multiple shuttlecocks if they are Golden Shuttlecocks. The Automatic Robot can throw the maximum of five (5) Golden Shuttlecocks in TZ3.

When the Automatic Robot fails to throw the Golden Shuttlecock, it is allowed to come back and throw Normal Shuttlecock in TZ1 and TZ2 for scoring.

For each throwing:

- + The Automatic Robot is allowed to throw one (1) Normal Shuttlecock at a time.
- + The Automatic Robot is allowed to throw one (1) or more Golden Shuttlecocks at a time.
- + The Automatic Robot has to hold the Tail to throw from the Keeping point or a further position from the shuttlecock. The Automatic Robot is not allowed to hold the Shuttlecock. Distance between the Keeping point and Shuttlecock is 250 millimeters, at minimum (See Figure 3.1a).

When throwing Normal Shuttlecock, the Automatic Robot has to entirely stay inside TZ1, TZ2. The vertical shape of robot is not allowed to fall on the border line between MRA and TZ1, TZ2.

When throwing Golden Shuttlecock, the Automatic Robot has to entirely stay inside TZ3. The vertical shape of robot is not allowed to fall on the border line between TZ2 and TZ3.

3.4.4 Picking up the Shuttlecock

The Manual Robot is allowed to pick falling Normal Shuttlecocks in the MRA and handle them to the Automatic Robot.

Falling Normal Shuttlecocks and Golden Shuttlecocks in the NC are not allowed to be picked.

The Normal Shuttlecocks fell outside of the game field can be picked up and placed in the LZ by the team members without asking for a retry. In case of Golden Shuttlecock, team members could pick it up without re-using.

When team members ask for retry and agreed by the referee:

- + The team members can pick up Normal Shuttlecocks that fell in MRA, TZ1, TZ2 and TZ3 and place them in LZ.
- + Team members can pick up Golden Shuttlecocks that fell in TZ1, TZ2 and TZ3. However, they will not be re-used.
- + The two robots must restart from Start Zone.

3.5 Score

Score is calculated as follows:

- + A success of one (1) shuttlecock from the Handle and Receive between Manual Robot and Automatic Robot: **One point**
- + A success of throwing one (1) Normal Shuttlecock by the Automatic Robot through the Normal Ring in TZ1: **10 points**
- + A success of throwing one (1) Normal Shuttlecock by the Automatic Robot through the Normal Ring in TZ2: **15 points**
- + A success of throwing one (1) Golden Shuttlecock by the Automatic Robot through the Golden Ring in TZ3 and not landing on the Golden Cup: **30 points**
- + A success of throwing one (1) Golden Shuttlecock by the Automatic Robot through the Golden Ring and landing on the Golden Cup: Winning the **“Rong bay”**.

3.6 End of the Game

The game ends when:

- + A team wins the **“Rong Bay”**, or
- + The game time of three (3) minutes is over.

3.7 Deciding the Winner

A Winning Team is determined as follows::

- 1) The **“Rong Bay”** Winner.
- 2) A team whose best score.
- 3) In case 2 teams have the same points:
 - a. Team of higher scores in TZ3.
 - b. Team of higher scores in TZ2.
 - c. Team of higher scores in TZ1.
 - d. Team with less total weight of the robots.
 - e. Determination by Judge Committee.

3.8 Retries

- 3.8.1 There is no limitation for retry. A retry is considered by the rule with approval from referee.
- 3.8.2 Before a retry takes place, Teams have to bring their robots back to start zone.
- 3.8.3 The Shuttlecocks or Racks on Robot will stay in the same position even during the retry. If the team wishes to rearrange the shuttlecocks or racks (if any), they have to place them in LZ first and then pick them up again. Robots have to be abided by the Article 3.4.

4. Violations

The team who commits the following shall be deemed to be in violation of the rules and subject to a mandatory retry:

- 4.1 Manual Robot enters the opponent's game field (including space area);
- 4.2 A team member touches the robot without referee permission;
- 4.3 Manual Robot enters throwing zones or no contact area.
- 4.4 Any other acts deemed to be an infringement on the rules

5. Disqualifications

If a team is deemed to have committed the following intentionally, the team shall be disqualified for that game.

- 5.1 Any acts that pose danger to the game field, its surroundings, the robots, and/or people.
- 5.2 Any other act that goes against the spirit of fair play.
- 5.3 Any act of disobedience against a referee's warning.

6. Teams

- 6.1 One (1) representing team from each country or region shall participate in ABU Robocon 2018. As the host country, Vietnam shall be represented by two (2) teams.
- 6.2 A team consists of three (3) team members who are students and one instructor, who all belong to the same university/college/polytechnic.
- 6.3 Besides three (3) team members, three members are allowed to be registered as the pit crew. The members of the pit crew shall also be students from the same university/college/polytechnic as those in 6.2. The pit crew may assist in the work in the pit area, in carrying the robot from the pit area to the game field.
- 6.4 Graduate students cannot participate in ABU Robocon 2018.

7. Robot

7.1 Each team is allowed to bring one (01) Manual Robot and one (01) Automatic Robot to participate in the contest. In case of using two (02) Automatic Robot, the robot starting from MRSZ shall be considered as Manual Robot.

7.2 The robot must not split into parts during the game.

7.3 The robot must be hand-built by students from the same university/college/polytechnic.

7.4 Wireless/infrared/laser/super sonic communications between Manual Robot and Automatic Robot is not allowed.

7.5 Robot size

The robot (including the controller and cable) must fit into the Start Zone (1000mm x 1000mm x 1000mm). Throughout the game, the robot together with any rack that will be attached to the robot after shuttlecocks loading shall not exceed regulated 1500mm length x 1500mm width x 1800mm height.

7.6 Robot weight

7.6.1 The total weight of each robot, including Racks, battery, controller, cables and any other equipment that the team brings for use in the game must not exceed 25kg.

7.6.2 Back-up batteries (of the same type as that originally installed in the robot) are exempt.

7.7 Power source of the robot

7.7.1 Each team shall prepare its own power source.

7.7.2 All batteries used in the robot, controller, and any other device used during the game shall not exceed 24V.

7.7.3 The maximum voltage within the circuits shall not exceed 42V.

7.7.4 Teams using compressed air must use either a container made for the purpose, or a plastic soda bottle in pristine condition that is prepared appropriately. Air pressure must not exceed 600kPa.

7.7.5 Any power source deemed dangerous may be banned from use.

8. Safety

8.1 Emergency stop buttons must be built on all robots.

8.2 Robots must be designed and built so as to pose danger to no one, including the team, the opposing team, the people in the surroundings, and the venue.

8.3 The use of the following are prohibited:

8.3.1 Accumulator, lead-acid batteries (including colloidal), power sources that involve flames and/or high temperatures, anything that may contaminate the game field, as well as anything that may cause the robots to break down and/or create a situation that hinders the procession of the contest.

8.3.2 If laser is used, it shall be class 2 or less. Care must be taken not to damage the eyes of anyone in the venue.

9. Others

9.1 For anything not mentioned in this Rule Book, the teams are required to obey the decisions of the organisers and referees.

9.2 Dimensions, weights, etc. of the game field described in this Rule Book have a margin of error of plus or minus 5% unless otherwise stated.

9.3 Questions must be sent in through the contact page on the ABU Robocon 2018 Ninh Binh – Vietnam <http://www.aburobocon2018.vtv.vn>.

9.4 Any additions/changes to the rules will also be posted on the ABU Robocon 2018 official website <http://www.aburobocon2018.vtv.vn>. Rule changes will be updated on the official website <http://www.aburobocon2018.vtv.vn>

9.5 For anything that has to do with the safety of the robots and/or the people in the vicinity, the teams are to obey the directions from the organisers and referees.

9.6 Transporting of the robots

9.6.1 The organiser shall arrange for the transport of the robots participating in the ABU Asia-Pacific Robot Contest 2018 Ninh Binh - Vietnam. Details will be given separately to each representing team.

9.6.2 For ABU Robocon 2018 Ninh Binh - Vietnam, the robot must fit inside a single box of length 1000mm x width 1600mm x height 1400mm.

Note: Participants should take note in designing and building their robots to accommodate for this box size; its dimensions are smaller than that allowed for the robots during the contest.

10. Shuttlecock Award

ABU Robocon Contest 2018 Ninh Binh Vietnam shall award the prize of the best Shuttlecock to the team designing the most beautiful and impressive shuttlecock.

Update Detail

Date: October 04, 2017

- Page 05, Item II

“Members of all teams are required to wear sneakers, helmets and goggles when participating the game” has been updated.

- Page 06, Terms and Definitions

The definition of “Throwing Zone” has been updated

- Page 09, Rule 3.3.1

“Team members including an operator are prohibited from entering the contest field without permission from the referee” has been updated.

- Page 11, Rule 3.4.4

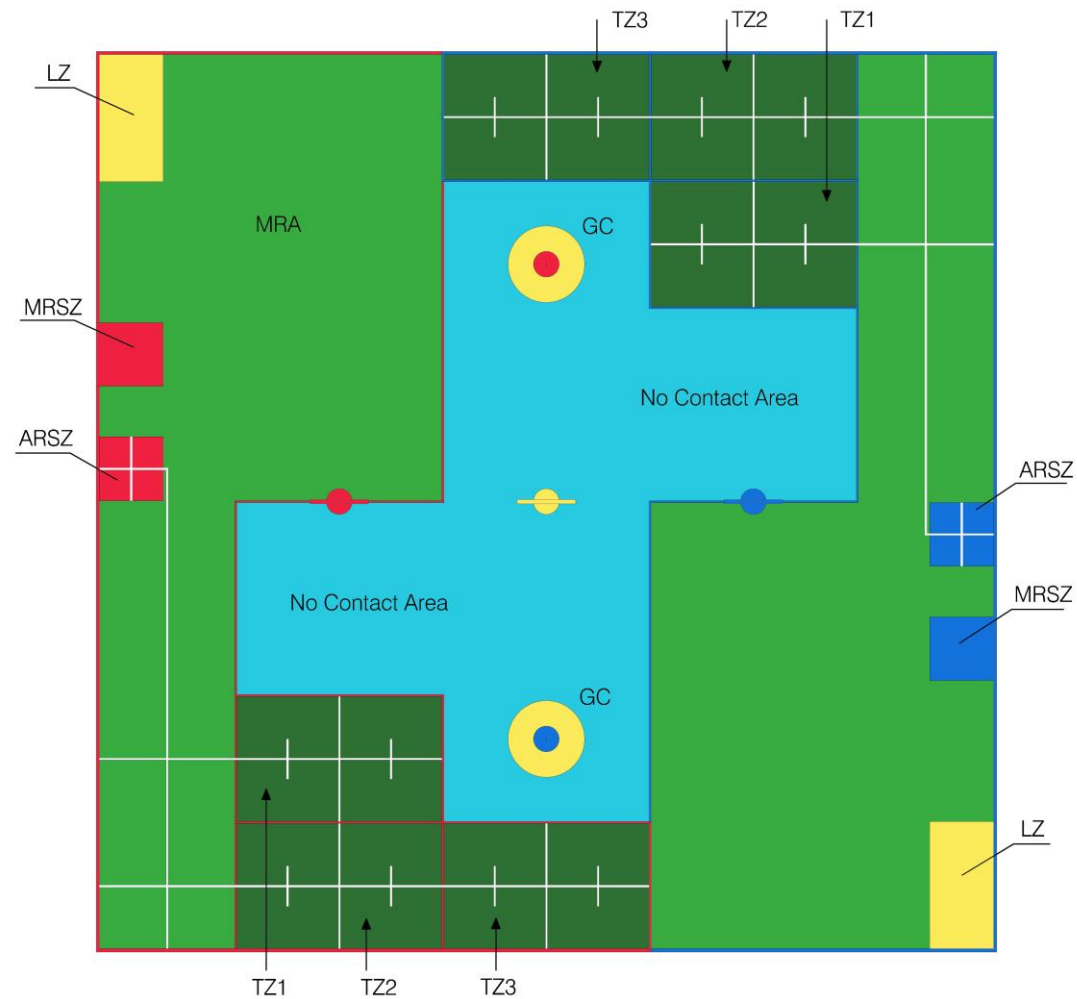
“When team members ask for retry and agreed by the referee:

+ The team members can pick up Normal Shuttlecocks that fell in MRA,... ”

+ The two robots must restart from Start Zone” has been updated.

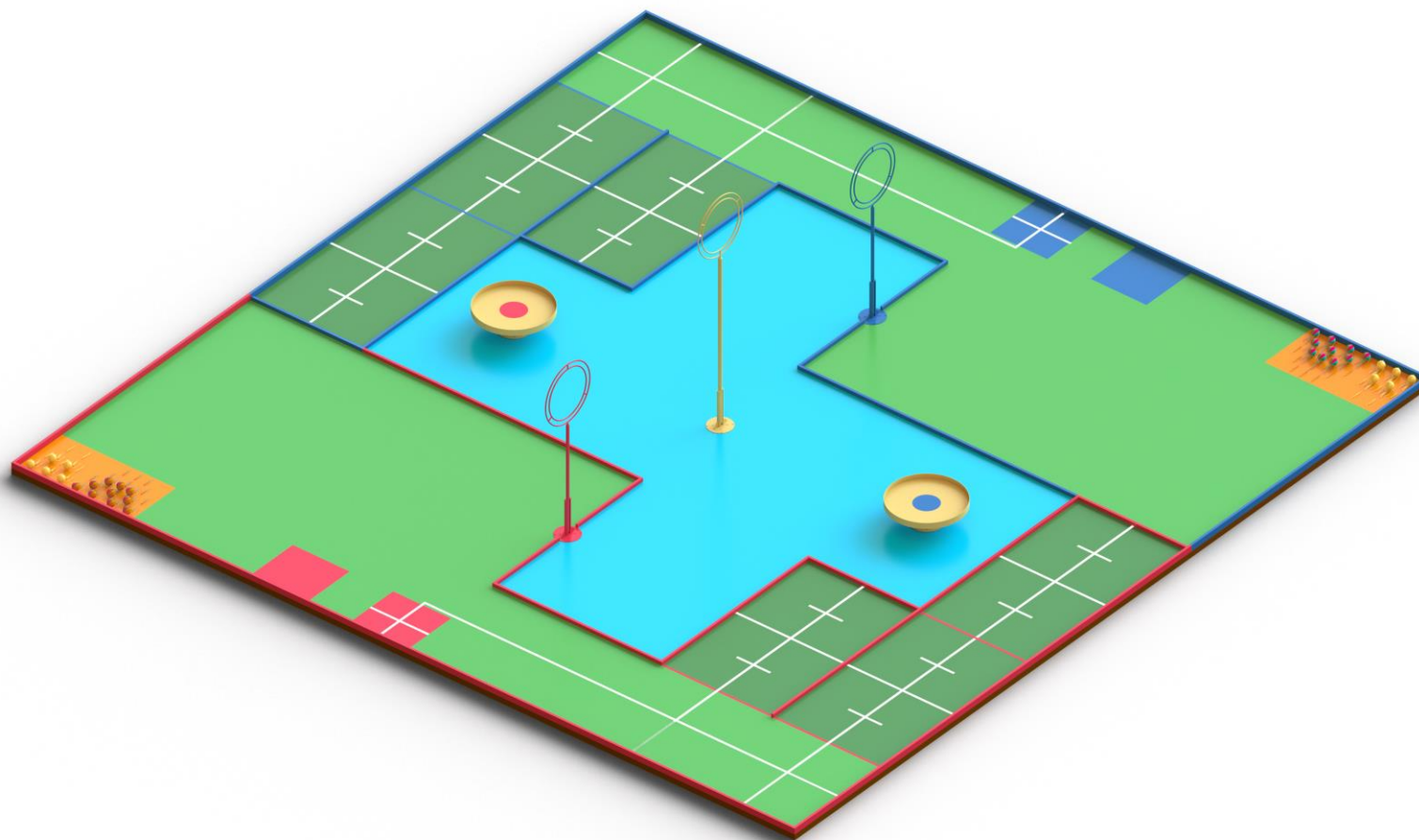
V. APPENDIX

1. Game field

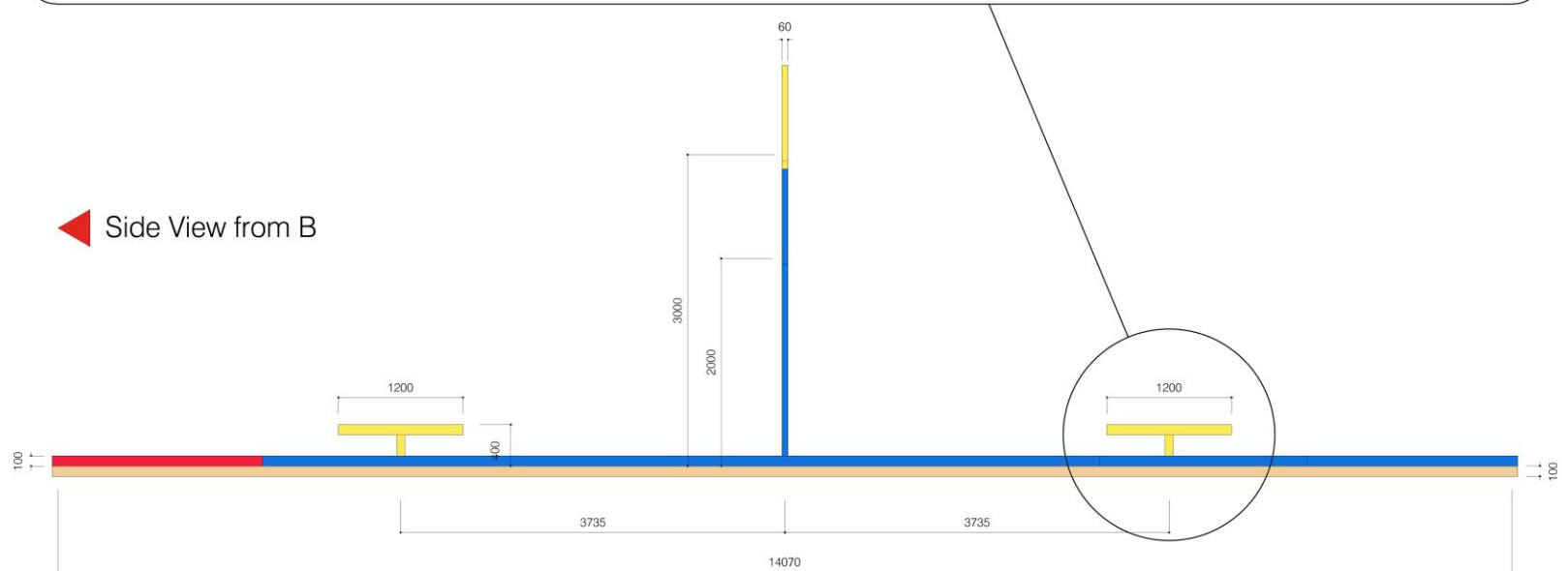
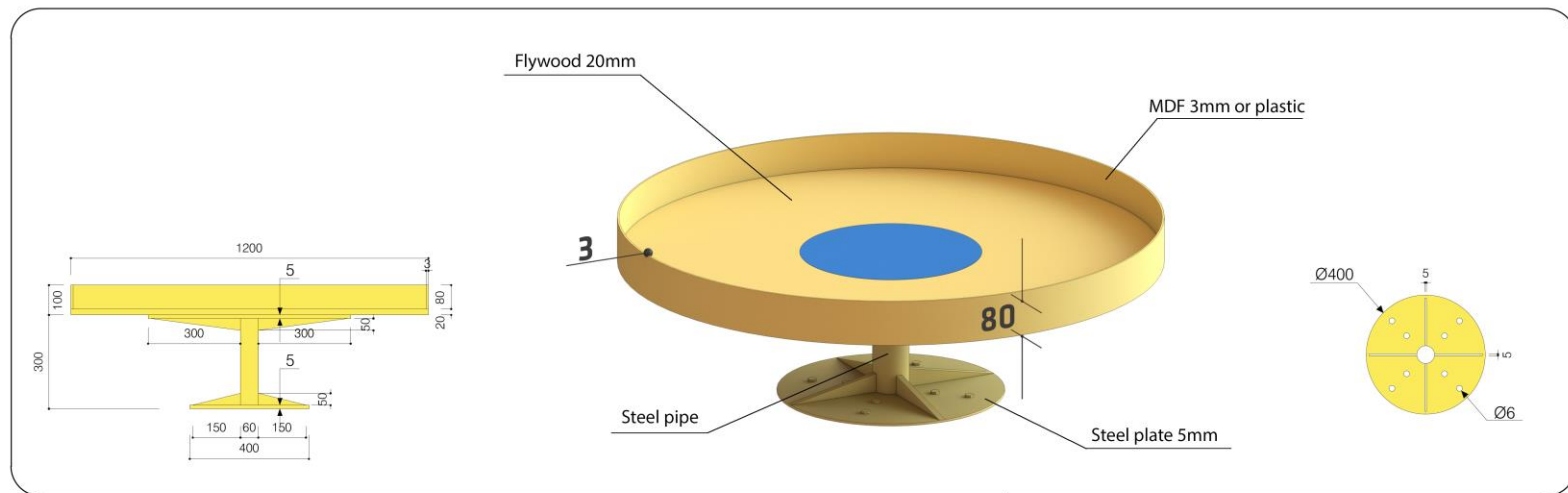


Note:	
	NC
	LZ
	MRSZ
	ARSZ
	MRA
	GC
	TZ

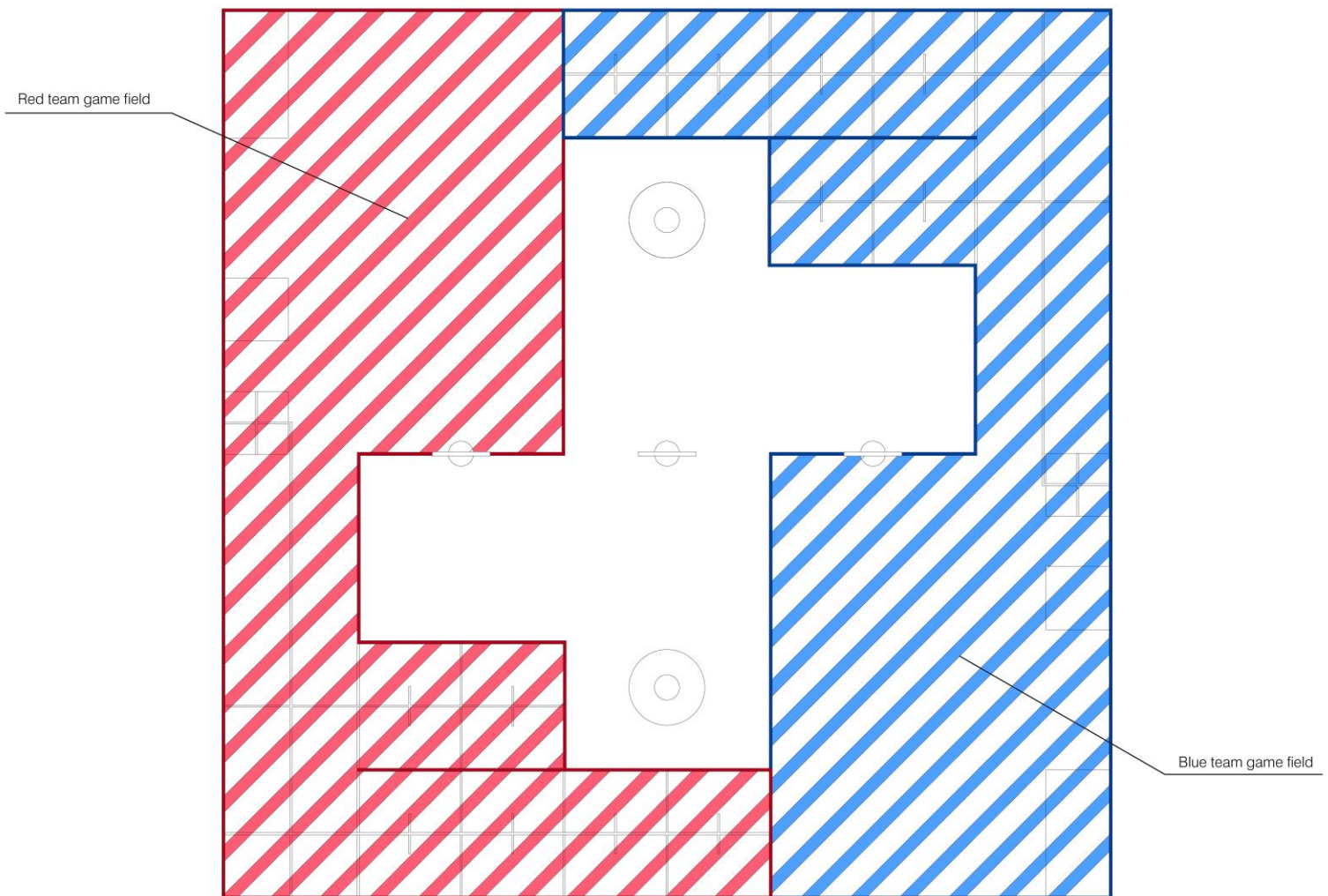
Project Title	Drawing Name	Date	Date	No.
ABU Asia-Pacific Robot Contest 2018 Ninh Binh - Vietnam	Figure 1.1 Zones and areas on the game field	1 / 60 (A3)	2017.07.23	ABU Robocon 2018 Contest Committee



Project Title	Drawing Name	Date	Date	No.
ABU Asia-Pacific Robot Contest 2018 Ninh Binh - Vietnam	Figure 1.3 Game field : Isometric View	1 / 60 (A3)	2017.07.23	ABU Robocon 2018 Contest Committee



Project Title	Drawing Name	Date	Date	No.
ABU Asia-Pacific Robot Contest 2018 Ninh Binh - Vietnam	Figure 1.5 : Golden Cup	1 / 60 (A3)	2018.07.23	ABU Robocon 2018 Contest Committee



Project Title	Drawing Name	Date	Date	No.
ABU Asia-Pacific Robot Contest 2018 Ninh Binh - Vietnam	Figure 1.6 Team Game Field	1 / 60 (A3)	2017.07.23	ABU Robocon 2018 Contest Committee

2. Material for game field

Table 1: Material and color standard

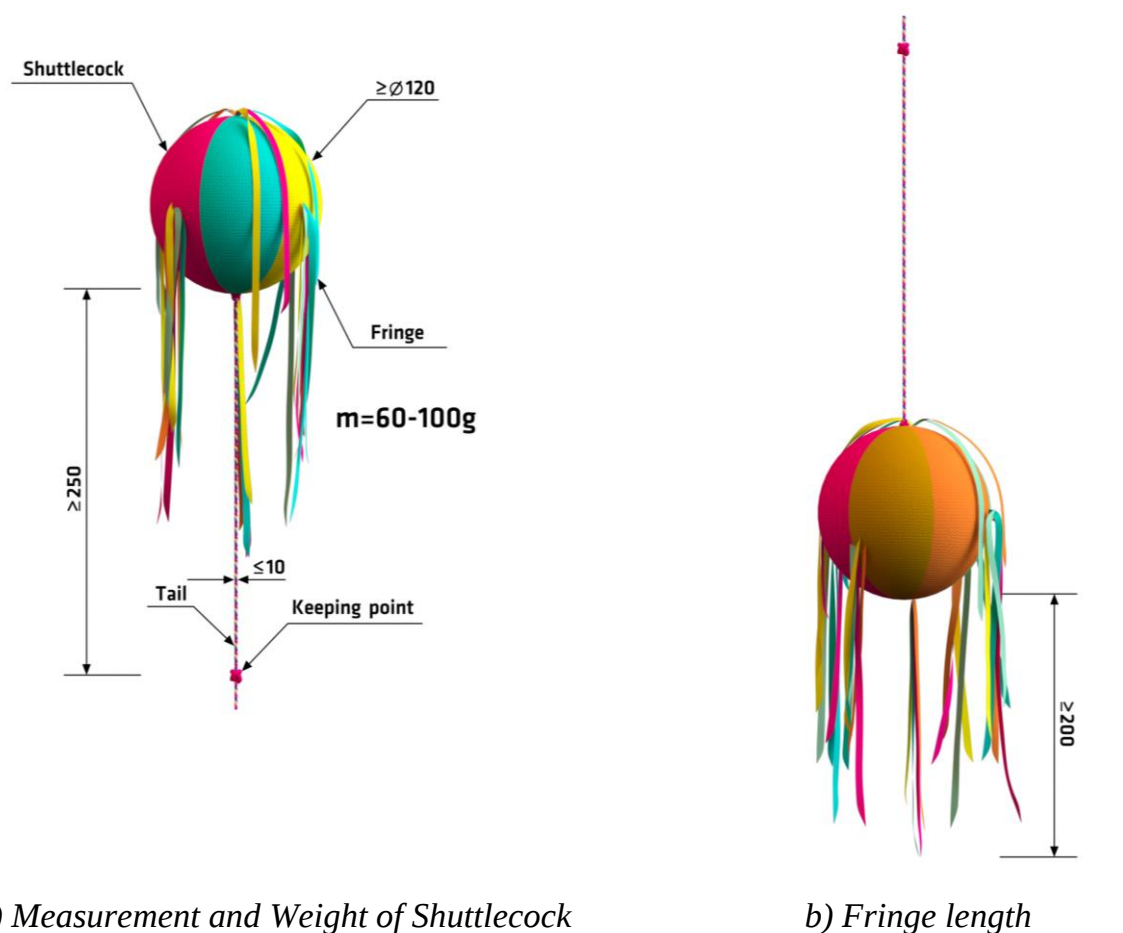
Description	Material	Color	Color Standard Pantone
Red Team game field			
Manual Robot Starting Zone (MRSZ)	Plywood; water paint	Dark Red	PANTONE 1787 C
Automatic Robot Starting Zone (ARSZ)	Plywood; water paint	Dark Red	PANTONE 1787 C
Loading Zone (LZ)	Plywood; water paint	Yellow	PANTONE 3935 C
Manual Robot Area (MRA)	Plywood; water paint	Green	PANTONE 7738 C
Throwing Zone 1 (TZ1)	Plywood; water paint	Dark Green	PANTONE 7742 C
Throwing Zone 2 (TZ2)	Plywood; water paint	Dark Green	PANTONE 7742 C
Throwing Zone 3 (TZ3)	Plywood; water paint	Dark Green	PANTONE 7742 C
Fence	Steel; oil paint	Light Red	PANTONE 1785 C
Border Line between MRA and TZ1	Water paint	Light Red	PANTONE 1785 C
Border Line between MRA and TZ2	Water paint	Light Red	PANTONE 1785 C
Border Line between MRA and TZ3	Water paint	Light Red	PANTONE 1785 C
Blue Team game field			
Manual Robot Starting Zone (MRSZ)	Plywood; water paint	Dark Blue	PANTONE 2727 C
Automatic Robot Starting Zone (ARSZ)	Plywood; water paint	Dark Blue	PANTONE 2727 C
Loading Zone (LZ)	Plywood; water paint	Yellow	PANTONE 3935 C
Manual Robot Area (MRA)	Plywood; water paint	Green	PANTONE 7738 C

Description	Material	Color	Color Standard Pantone
Throwing Zone 1 (TZ1)	Plywood; water paint	Dark Green	PANTONE 7738 C
Throwing Zone 2 (TZ2)	Plywood; water paint	Dark Green	PANTONE 7738 C
Throwing Zone 3 (TZ3)	Plywood; water paint	Dark Green	PANTONE 7738 C
Fence	Steel; oil paint	Light Blue	PANTONE 2727 C
Border Line between MRA and TZ1	Water paint	Light Blue	PANTONE 2727 C
Border Line between MRA and TZ2	Water paint	Light Blue	PANTONE 2727 C
Border Line between MRA and TZ3	Water paint	Light Blue	PANTONE 2727 C
No Contact Area (NC)	Water paint	Cyan	PANTONE 3315 C
Guide line	Non-shiny vinyl tape	White	PANTONE 663 C
Ring	Steel; oil paint	Light Red/ Light Blue/ Yellow	PANTONE 1785 C PANTONE 2727 C PANTONE 3935 C
Ring Tree	Steel; oil paint	Light Red/ Light Blue/ Yellow	PANTONE 1785 C PANTONE 2727 C PANTONE 3935 C
Golden Cup	See Figure 1.5	Light Red/ Light Blue/ Yellow	PANTONE 1785 C PANTONE 2727 C PANTONE 3935 C

3. Shuttlecock

3.1. Requirement:

- + Material: soft material (natural fibre, or synthetic fibre);
- + Weight: from 60 to 100 gram including shuttlecock, tail and fringe;
- + Shape: sphere, minimum 120 mm diameter; or other shapes nearly sphere with minimum 120 mm dimension when measured from any angles and through the center of shuttlecock. (Figure 3.1.a).
- + Tail: Different colours. Maximum thickness 10 mm. Automatic Robot holds the tail from Keeping Point (with distance to Shuttlecock 250mm) or further (Figure 3.1.a).
- + Fringes: Different colours with minimum 3 colours. Minimum 5 Fringes. Fringes are freely attached to different positions on Shuttlecock. The length of Fringes is minimum 200 mm starting from the bottom of Shuttlecock (Figure 3.1.b).



a) Measurement and Weight of Shuttlecock

b) Fringe length

Figure 3.1. Shuttlecock Requirements

3.2. Ways to define Shuttlecock measurement

- Length of Fringes:

When keeping the tail to hang the shuttlecock, the length of fringes is 200 mm minimum, starting from the bottom of shuttlecock. (Figure 3.1.b).

- *Measurement of Shuttlecock dimension:*

Using 120 mm wide U ruler to quickly define the dimension of Shuttlecock. (Figure 3.2).

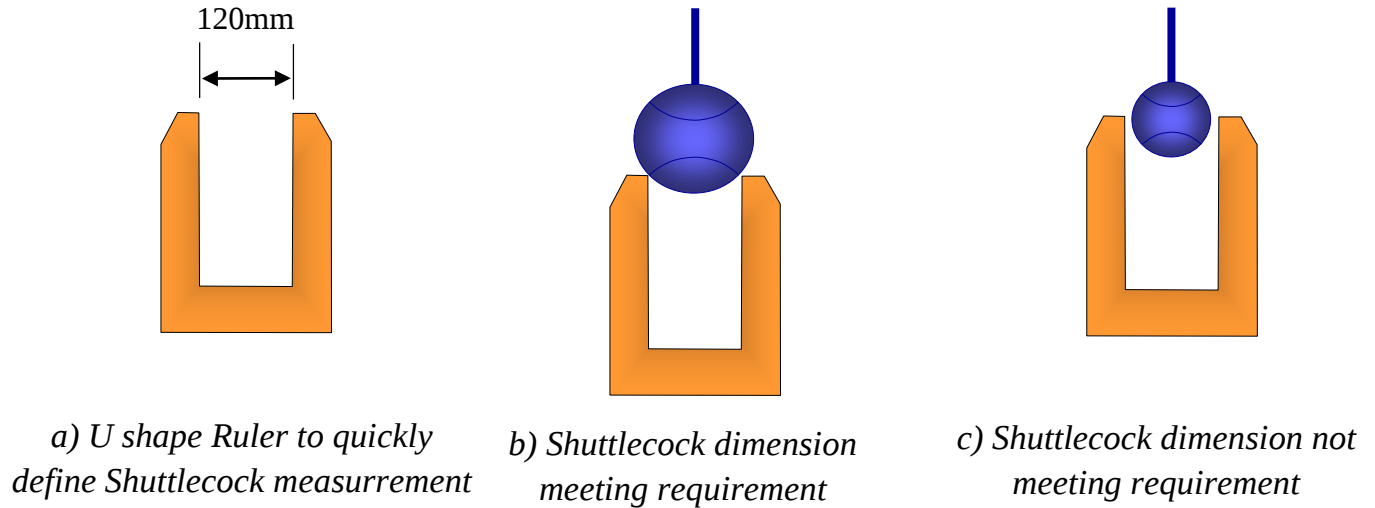


Figure 3.2. Checking Shuttlecock dimension

3.3. Shuttlecock Rack (for reference)

Besides putting Shuttlecock directly in Loading Area, teams can use Rack to arrange or hang Shuttlecocks. (Figure 3.3).

Maximum measurement of Rack is 2000 mm long x 1000 mm wide x 1000 mm high. When in use, the total dimension of the Shuttlecock racks has to be fit inside the Loading Zone.

Total weight of each robot and rack is not over 25 kg.

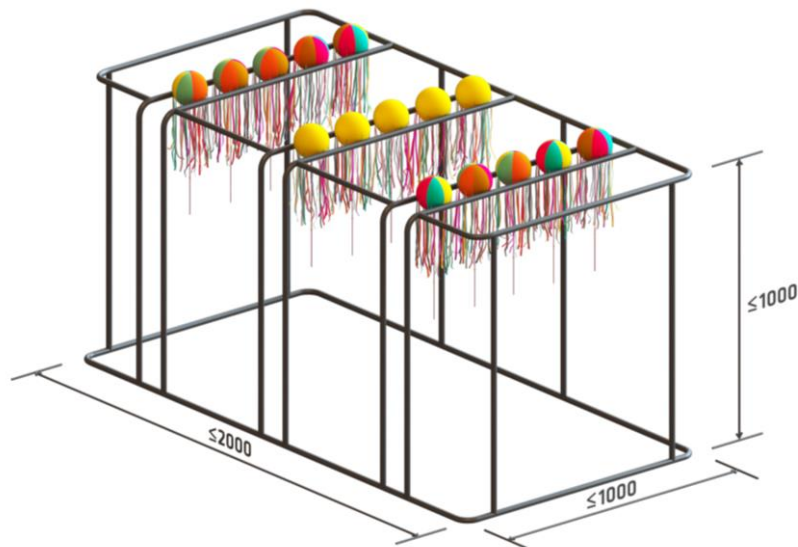


Figure 3.3. Shuttlecock Rack (for reference)