15th APRSAF Water Rocket Event (WRE)

November 22-24, 2019
Sagamihara, Japan

Organized by APRSAF SEWG and JAXA
Sponsored by Northrop Grumman and Young Astronaut Club - Japan
15th APRSAF WRE Participants

65 students, 24 educators, and 32 observers from 13 countries

Bangladesh, Cambodia, China, Colombia, Korea, India, Indonesia, Japan, Malaysia, Nepal, Sri Lanka, Thailand and Vietnam
15th APRSAF WRE Program

- Country Presentation by students
- Educator Session
- Facility tour of JAXA Sagamihara Campus
- Water Rocket Making and Launch Competition
Country Presentation by Students

Sri Lanka

Thailand

Japan

India

Cambodia

Colombia
Country Presentation by Students
Students from across Asia Pacific Region
Water Rocket Making
APRSAF-26 Water Rocket Competition

- Participants: Students between the ages of 12 and 16 years
- 1st, 2nd, and 3rd place winners were decided based on the shortest distance from the target located 80m away in two trials.
- The special award was to be selected based on the combined total distance of two trials from the target.
Launch Competition
Best Combined Award

U.G. Didula Adithya
(Sri Lanka)
4.64m (3.30m + 1.34m)
1st Place

U.G. Didula Adithya
(Sri Lanka)
1.34m
2nd Place

Mohamad Ashraf Mohd Salim (Malaysia)
1.47m
3rd Place
Maria Jose Mercado
(Colombia)
1.73m
APRSAF-26 WATER ROCKET EVENT: OUTLINE

1. Date: November 22nd – 25th, 2019 (Friday -Monday)  
   (Notice: Including arrival and departure dates)

2. Venue: Camp Fuchinobe reserved land  
   adjacent to National Consumer Affairs Center of JAPAN (NCAC)

3. Lodging: National Consumer Affairs Center of JAPAN(NCAC)  
   3-1-1 Yaei, Chuo-Ku, Sagamihara, Kanagawa, 252-0229

4. Official Language: English

5. Tentative Schedule

<table>
<thead>
<tr>
<th>Date/Day</th>
<th>Time</th>
<th>Activity</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday, Nov. 22 Day 1</td>
<td></td>
<td>Arrival in Japan. Participants will be transported to the accommodation place.</td>
<td>NCAC</td>
</tr>
<tr>
<td></td>
<td>18:00 – 19:00</td>
<td>Dinner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19:00 – 20:00</td>
<td>Ice Breaking</td>
<td></td>
</tr>
<tr>
<td>Saturday, Nov. 23 Day 2</td>
<td>07:30 – 08:15</td>
<td>Breakfast</td>
<td>NCAC</td>
</tr>
<tr>
<td></td>
<td>08:30 – 09:00</td>
<td>Registration and Rocket Launch Order by Lots</td>
<td></td>
</tr>
<tr>
<td></td>
<td>09:00 – 09:15</td>
<td>Opening Ceremony</td>
<td></td>
</tr>
</tbody>
</table>
|                | 09:15 – 11:00 | Country Presentation  
   *5 minutes for each country. Please submit your presentation data to  
   ap26_wre@tobutoptours.co.jp in advance. |             |
<p>|                | 11:00 – 11:15 | Tea Break                                                               |             |
|                | 11:30 – 12:15 | Briefing on Water Rocket Competition Launcher Display                   |             |
|                | 12:15 – 13:15 | Lunch Break                                                            |             |
|                | 13:15 – 16:15 | Water Rocket Making and Educators’ Session                             | Ario Hashimoto |
|                | 16:30 – 17:00 | Move to a Shopping mall                                               |             |
|                | 17:00 – 19:00 | Shopping                                                                |             |</p>
<table>
<thead>
<tr>
<th>Date/Day</th>
<th>Time</th>
<th>Activity</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19:00 – 19:30</td>
<td>Back to Accommodation</td>
<td>NCAC</td>
</tr>
<tr>
<td></td>
<td>19:30 – 20:30</td>
<td>Dinner</td>
<td></td>
</tr>
<tr>
<td><strong>Sunday, Nov.24</strong></td>
<td><strong>Day 3</strong></td>
<td><strong>Time</strong></td>
<td><strong>Activity</strong></td>
</tr>
<tr>
<td></td>
<td>07:30 – 08:15</td>
<td>Breakfast</td>
<td>NCAC</td>
</tr>
<tr>
<td></td>
<td>08:30 – 09:30</td>
<td>Water Rocket Presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>09:30 – 10:00</td>
<td>Move to Launch Site and Photo Session</td>
<td>Camp Fuchinobe reserved land</td>
</tr>
<tr>
<td></td>
<td>10:00 – 10:15</td>
<td>Opening Ceremony</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10:15 – 11:15</td>
<td>Water Rocket Test Shot (Student)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11:15 – 14:00</td>
<td>Water Rocket Competition</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Move to JAXA</td>
<td>JAXA</td>
</tr>
<tr>
<td></td>
<td>15:00 – 17:00</td>
<td>JAXA Facility Tour and Space Education Activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17:30 – 19:30</td>
<td>Farewell Party</td>
<td></td>
</tr>
<tr>
<td><strong>Monday, Nov.25</strong></td>
<td><strong>Day 4</strong></td>
<td><strong>Time</strong></td>
<td><strong>Activity</strong></td>
</tr>
<tr>
<td></td>
<td>07:30 – 08:15</td>
<td>Breakfast</td>
<td>NCAC</td>
</tr>
<tr>
<td></td>
<td>09:00</td>
<td>Check Out</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participants will be transported to the airport.</td>
<td></td>
</tr>
</tbody>
</table>

6. **Application**

Water Rocket Competitors are school students at age between 12 and 16 years old from countries in Asia Pacific region.
(Date of Birth between 25 November 2002 and 24 November 2007). The students shall be accompanied by teachers or leaders of youth activities to travel to Japan.

Due to limited capacity of the venue and accommodation, each participating country should limit the number of students to 6 and accompanying teachers/leaders to 2 to participate.

See AP-26 WRE APPLICATION PROCESS for detailed information.

7. **Organizers**

APRSAF-26 WRE Local Organizer: Tobu Top Tours co Ltd
Contact point: Ms. Kanako Fukuyama / Mr. Kenichiro Saito
E-mail: ap26_wre@tobutoptours.co.jp
Tel: +81 3 5348 3500 (Weekdays 9: 30-18: 30 in JP time)

JAXA Contact point: Ms. Ayako Uchida
E-mail: ap_wre_edu@ml.jaxa.jp
Tel: +81 50 3362 6438
Fax: +81 42 759 8612
## Flight Information

### Participating countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Airline</th>
<th>Flight Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>Thai Airways</td>
<td>TG322 21NOV DAC13:40-BKK17:10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG640 21NOV BKK22:30-NRT06:20 22NOV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG661 25NOV HND00:20-BKK05:25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG321 25NOV BKK10:55-DAC12:30</td>
</tr>
<tr>
<td>Cambodia</td>
<td>All Nippon Airways</td>
<td>NH818 21NOV PNH22:50-NRT06:30 22NOV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NH817 25NOV NRT10:50-PHN15:40</td>
</tr>
<tr>
<td>China</td>
<td>Air China</td>
<td>CA929 22NOV PVG09:55-NRT13:50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA930 25NOV NRT14:55-PVG17:20</td>
</tr>
<tr>
<td>India</td>
<td>All Nippon Airways</td>
<td>NH828 22NOV DEL01:25-NRT12:45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NH827 25NOV NRT17:55-DEL00:05 26NOV</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Garuda Indonesia</td>
<td>GA874 21NOV CGK23:50-HND08:50 22NOV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GA875 25NOV HND11:45-CGK17:30</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Malaysia Airlines</td>
<td>MH070 21NOV KUL09:40-NRT17:30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MH089 25NOV NRT10:10-KUL17:05</td>
</tr>
<tr>
<td>Nepal</td>
<td>Thai Airways</td>
<td>TG320 20NOV KTM13:55-BKK18:30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG640 BKK22:30-NRT06:20 21NOV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG661 25NOV HND00:20-BKK05:25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG319 25NOV BKK10:30-KTM12:45</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippines Airlines</td>
<td>PR428 22NOV MNL06:40-NRT12:10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PR427 25NOV NRT13:40-MNL17:30</td>
</tr>
<tr>
<td>Singapore</td>
<td>Singapore Airlines</td>
<td>SQ632 21NOV SIN08:05-HND15:35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SQ631 25NOV HND08:50-SIN15:25</td>
</tr>
<tr>
<td>South Korea</td>
<td>Korean Air</td>
<td>KE707 22NOV GMP09:00-HND11:05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KE708 25NOV HND12:25-GMP15:00</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>Sri Lanka Airlines</td>
<td>UN454 21NOV CMB19:50-NRT07:30 22NOV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UN455 25NOV NRT11:20-CMB17:50</td>
</tr>
<tr>
<td>Thailand</td>
<td>Thai Airways</td>
<td>TG640 21NOV BKK22:30-NRT06:20 22NOV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG661 25NOV HND00:20-BKK05:25</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Japan Airlines</td>
<td>JL752 22NOV HAN00:25-NRT07:10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JL751 25NOV NRT18:30-HAN22:55</td>
</tr>
</tbody>
</table>
APRSAF-26 WATER ROCKET EVENT
GUIDELINE FOR LAUNCH COMPETITION

GUIDELINE FOR LAUNCH COMPETITION
1. Venue ................................................................................................................................................... 1
2. Making Water Rockets .................................................................................................................. 1
3. Materials for making Water Rockets ...................................................................................... 2
4. Launching Water Rockets ............................................................................................................ 3
5. Rules for Launching ....................................................................................................................... 4
6. Results ................................................................................................................................................. 4

1. Venue
The APRSAF-26 Water Rocket Launch Competition will be held at Camp Fuchinobe reserved land, Sagamihara-City, Kanagawa, Japan on Sunday, November 24, 2019.

2. Making Water Rockets
The organizer will provide all materials and equipment for Water Rocket Launch Competition, including the launcher and air pump. Pre-made materials or launchers brought in by participants will not be allowed for the competition.

3 hours will be given for making Water Rockets. Each student should make one (1) or two (2) rockets. Each student will receive the materials on next page.

Students may bring left-handed scissors and their data book if necessary. Measuring cups and weight scales are available on site.

The students are encouraged to be creative in the design of their water rockets.
3. Materials for making Water Rockets

<table>
<thead>
<tr>
<th>Six (6) 1.5L PET Bottles</th>
<th>PVC sheet (30cm square sheet, 0.5mm thick)</th>
<th>Clear folder (0.2mm thick)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinyl Tape</td>
<td>Ruler</td>
<td>Scissors (right-handed)</td>
</tr>
<tr>
<td>Plasticine (modeling clay)</td>
<td>Cutter</td>
<td>Cutting Mat (A3 size)</td>
</tr>
<tr>
<td>Cushioning paper (to fill space in the nose cone)</td>
<td>Nozzle 0.8cm 4cm</td>
<td>Guide tube 4cm</td>
</tr>
</tbody>
</table>

4. Water Rocket Launcher

Guide stick: dia. 1cm, length 90cm

Guide tube: dia. 1.5cm, length 4cm
5. Launching Water Rockets

This Competition aims at precision flight of the rocket, i.e. to launch the rocket as close as possible to the target. The target will be placed **80m** from the launcher. (see figure below)

There will be two (2) targets and eight (8) launchers available for the launch competition: i.e. 4 launchers for one target. In this competition, Japanese Steel Launchers are set up for launching.

80m from target

Bull's eye

5m radius (GOLD Band)

7m radius (SILVER Band)

10m radius (BRONZE Band)

OUT of range

Blow up view of target
6. Rules for Launching

Each student will launch one (1) rocket at a time.

Prior to competition launch, each student can try to conduct one (1) test launch. The student may skip this test launch.

Each student will conduct two (2) launches for the competition.

Order of Launch will be decided by drawing lots on Day2 by the students themselves.

Students must use the launcher assigned by the lot or the staff. It is NOT allowed to choose the launcher.

Each student will have 5 minutes for launch preparation: setting the rocket onto assigned launcher, pumping the air in the rocket (Air pressure must not exceed 5 bars.), adjusting the launcher’s angle / orientation.

Exact distance from the point of impact to bull’s eye will be measured when the rocket lands inside the GOLD band. The result of both launches will be recorded. The launch that lands out of the circle will not be measured and recorded as SILVER, BRONZE or OUT.

If launch preparation is undone within 5 minutes, it will be recorded as TIME exceeded.

7. Results

The results and ranking of Launch Competition will be prepared for each country and informed to each POC after the event.

**Best score ranking**

The better result between 2 launches is considered for deciding Best Score Ranking. The students ranked in the 1st place, 2nd place, and 3rd place will be awarded.

In case of a draw, the two launches will be taken into consideration to determine the better place.

**Best combined score**

Students who succeeded both 2 launches have got “combined score”: the sum of 1st and 2nd launch results.
APRSAF-26 WATER ROCKET EVENT

APPLICATION PROCESS

Please read carefully this document to proceed your application for APRSAF-26 Water Rocket Event.

1. ENTRY CONDITION
   i. Student participants
      School students at age between 12 and 16 years old from countries in Asia Pacific region.
      (Date of Birth between 25 November 2002 and 24 November 2007)

   ii. Selection
      A participating country should hold its national water rocket competition to select student participants.
      (Notice: It is suggested that the student participants be selected based on not only their performance in making and launching water rockets but also their interest in space activities and in friendship and cultural exchange. The selected students should preferably have adequate English language proficiency.)

   iii. Teachers/Leaders
      The students shall be accompanied by teachers or leaders of youth activities to travel to Japan. The accompanying teachers or leaders must be interested in space and science education, willing to engage in the exchange of knowledge, experience and skills with water rocket and other educational activities with those from other countries and committed to promoting space and science education activities among young people in their home countries.

   iv. Number of participants
      Due to limited capacity of the venue and accommodation, each participating country should limit the number of students to 6 and accompanying teachers/leaders to 2 to participate.
v. Participation fee
The organizer will collect a participation fee (15,000 JPY per person) from each of student participants and their teachers/leaders. The organizer will issue an invoice based on the information from POCs of participating countries. The participation fee will be collected by online payment via credit card or bank transfer prior to the event. The deadline of participation fee payment is November 10, 2019. If you need further arrangement and assistance for the payment, please contact Ms. Kanako Fukuyama (ap26_wre@tobutoptours.co.jp).

vi. Observers
POC can make application for people other than participants as observers. Observers should pay observer fee to join the Water Rocket Event. The Observer fee is 40,000 JPY for advanced payment and 45,000 JPY for on-site payment. Advanced payment can be placed by online with credit card or by bank transfer. The deadline of advanced payment is November 10, 2019. Later than this date the observer fee should be collected with credit card or by cash on site. If you need further arrangement and assistance for the payment, please contact Ms. Kanako Fukuyama (ap26_wre@tobutoptours.co.jp).

2. APPLICATION TIMELINE AND PROCESS

[Timeline]
June 1 ----------- POCs start to submit the expected number of participants/observers
June 30 ----------- Deadline for submitting the number of participants/observers
August 1 ---------- Start accepting application
September 30 --- Deadline for submitting final member list
November 10 ---- Deadline for advance payment participants/observers

[Process]
i. Submitting the number of Participants/Observers
POC should submit the number of teachers, students, and observers to attend AP-26 WRE from your country by sending an email to Tobu Top Tours, the local organizer of this event ap26_wre@tobutoptours.co.jp as well as ap_wre_edu@ml.jaxa.jp. POC will receive a reminder of this report from Tobu Top Tours in June. The deadline is June 30, 2019. The organizer uses this information to arrange accommodation, meals, and transportation and to determine whether participation fee should be collected.

ii. Making Application to AP-26 WRE
POC should fill the Application form provided by Tobu Top Tours and send it to ap_wre_edu@ml.jaxa.jp and ap26_wre@tobutoptours.co.jp. The deadline is September
30, 2019.

iii. Invoice

Tobu Top Tours will issue invoice of observer fee towards the organization or individual observer according to request.

iv. Payment

We encourage observers to pay the fee in advance. Observers can place advanced payment online with their cash card as well as by bank transmission. The deadline of observer fee payment is November 10, 2019. Observer fee will be 45,000 JPY for payment on site with credit card or cash (*only accept Japanese Yen). If you need further arrangement and assistance for the payment, please contact Ms. Kanako Fukuyama (ap26_wre@tobutoptours.co.jp)

v. Cancellation Policy

POC should immediately inform Tobu Top Tours and JAXA by email if any of participants and/or observers have to cancel their application. Full refund will be made for a cancellation until October 31st, 2019. If you cancel in November 2019, we refund excluding cancellation charges. Our cancellation charges are as follows:

From November 1st to November 14th, 2019 ---- 20%
From November 15th to November 20th, 2019 --- 30%
On November 21st ---- 50%
On November 22nd and after ---100%

The deadline is set based on JP time zone and the cancellation date is judged when TOBU Top Tours receives your email notice.

APRSAF-26 WRE Local Organizer: Tobu Top Tours co Ltd
Contact point: Ms. Kanako Fukuyama / Mr. Kenichiro Saito
E-mail: ap26_wre@tobutoptours.co.jp
Tel: + 81 3 5348 3500 (Weekdays 9:30-18:30 in JP time)

JAXA Contact point: Ms. Ayako Uchida
E-mail: ap_wre_edu@ml.jaxa.jp
Tel: +81 50 3362 6438
Fax: +81 42 759 8612