A-P-T RESEARCH, INC.
AN EMPLOYEE-OWNED COMPANY

IMESAFR FUNDING AND SUPPORT PICTURE UPDATE FOR CEAEC AUG 2021

IMESAFR PATH FORWARD - UPDATE

- IMESAFR is currently at ver 2.1(xxx)
  - APT considers this version to be fully supported 'in perpetuity' from the original training/license fees paid
    - Perpetuity ends the moment a software upgrade is needed due to changes in, e.g., Windows or Java rendering 2.1 incompatible
- To move to the next funding model, APT will issue ver 2.2 which will contain significant upgrades/new features
  - Note that 2.1 will still be supported but APT does not guarantee backwards compatibility (for versions post the 2.2 release)
  - The new funding model will be a combination of Sponsorships (certainly most/all from explosives companies) and license fees
  - To get to 2.2 requires minimum funding over the next 12-14 months of USD 180K
    - This level of funding is not yet guaranteed
- The next slide shows the proposed sponsorship levels and benefits

Sponsor Tiers	Cost	Number of Licenses	Sponsorship Benefits for all Tiers	50% Off Training For Sponsorship Licenses	Advanced Tech Support[+]	Free Web-Based Upgrade Training	50% Off Licenses Above Sponsor Licenses	Votes on Priorities in IMESAFR Development Team
Platinum	US$75K/year	20	Entitles the sponsor to a number of licenses for trained users based on the chosen tier. Standard tech support. Free corporate access to "awareness sessions" and free incremental software updates. Advanced support to regulators (including assisting regulators on variance/derogation submissions from partner companies). Sponsor fees also support regulators who are unable to pay for training. Sponsors will be identified by sponsorship tier in all software material, training material, IMESAFR website, etc.	✔ Plus 50% off for any other employees	✔ (40 hrs)	✔	✔	3
Gold	US$50K/year	12		✔ Plus 50% off for any other employees	✔ (20 hrs)	✔		2
Silver	US$30K/year	5		✔				1
Bronze	US$10K/year	1		✔				0

[+] Advanced tech support includes answering questions and providing support not generally covered under standard software tech support. It does not include APT conducting analyses for sponsors, though APT offers these services through independent IMESAFR consulting contracts/agreements.

CURRENT FUNDING VS PLANNED

- APT believed that an annual funding of roughly USD 200K could be achieved and this would allow IMESAFR to continue indefinitely, with modest improvements annually
  - The new funding model assumed 4-5 corporate sponsors totalling USD 150K and 30 additional licensees totalling another USD 60K
    - 4 sponsors at 120K and 60K from licenses is deemed the minimum viable funding level to get to 2.2
  - Currently there are three companies committed to sponsorships totalling USD 90K
  - All regulators that APT has contacted are willing to pay the license fees
    - With the expected grumbling that they are doing this for industry so why should they pay? Note that historically, the IME covered all their training/software/tech support costs
  - APT has no feel as to how the individual/consultant license holders will react to the new fee but expects at least some to choose to stay with 2.1 for as long as it is viable

FUTURE OF IMESAFR

- APT has prepared a series of draft budgets/spending vs funding level
  - To go forward, a minimum of USD 180K is required for the 2021/2022 year
    - This has not yet been achieved but discussions continue with companies who have not yet committed to a sponsorship
    - This provides no development beyond getting ver 2.2 running
  - The minimum on-going annual budget is deemed to be USD140K which will provide minimal development/software improvements
  - USD 240K would be the goal of APT and would allow for a significant annual development program
    - Significant development but likely not the development of 3.0 (see potential features) except possibly through a multi-year (likely 5+ years) development program
  - USD 300K would allow full development cycles over a reasonable timeframe
  - APT is in discussion with other parties on how to fund, e.g., an ANE engine outside of the annual budget (as the ATF has funded the propagation model)
- At this point APT is really only concerned about reaching the minimum viable levels

IMESAFR 3.X HIGH LEVEL IDEAS

- Ammonium nitrate emulsion engine – similar to the AN engine, but for ANEs. Current ways to handle ANEs in IMESAFR are either overly conservative or non-conservative on the consequence determination.
- 3D – True incorporation of terrain/topographic/height considerations (in the algorithms, not just the GUI)
  - This would allow straight forward implementation of improved barricade modeling, including “natural barricades
  - Improves capability for multistory ES modeling
- Uncertainty – using better input from the user in a different way, to avoid the issues we see with the expected risk answers
- Exposure – more control over the real schedule for people doing true risk management inside the fence; possibly control over distribution (within the ES) details
- PES scaling – mostly debris concerns
- Additional PES types (e.g., “tanktainers”)
- Frangible Walls/Roof – Frangible walls allow a reduction in debris in other directions
  - IMESAFR does not fully give credit to the benefits of frangible walls/roof to the non-frangible walls regarding debris generation and underestimates the air overpressures in the direction of the frangible surface.
  - Frangible walls/roofs can be a powerful mitigation tool that would be very useful to be able to model in IMESAFR.
- Barricade Improvements – User-defined side impact blocking and vertical energy protections were only meant to be a temporary solution. IMESAFR logic can be created to handle these without relying on user-defined values.